



# INNOVATIVE APITHERAPY METHOD: "BEE HEALING BED IN A PYRAMID"

– A Unique Wellness Approach for America

- 
- ✓ Strengthens immunity
  - ✓ Normalizes the nervous system
  - ✓ Helps overcome depression
  - ✓ Restores strength in case of burnout
  - ✓ Based on organic care

Anatolii Olshanskyi



Anatolii Olshanskyi

## Innovative Apitherapy Method: “Bee Healing Bed in a Pyramid” – A Unique Wellness Approach for America

This comprehensive monograph is dedicated to apitherapy – an ancient therapeutic practice using beekeeping products, adapted to meet the requirements of modern evidence-based medicine. The publication examines both traditional treatment methods with honey, propolis, and bee venom, as well as an innovative development by Ukrainian inventor Anatolii Olshanskyi – a healing methodology implemented in a specially designed pyramid containing active beehives. The relevance of the work lies in the growing demand for natural, non-invasive wellness methods in the context of the global health crisis and mental disorders. Apitherapy offers an alternative to pharmacotherapy for patients suffering from chronic stress, neurotic disorders, and psychosomatic diseases. Purpose – to substantiate the scientific basis and clinical effectiveness of apitherapy, particularly to present the latest method that combines the bioactive environment of beekeeping with the energetic properties of pyramidal architecture. Readers will learn about the historical origins of apitherapy in ancient civilizations, the mechanisms of action of beekeeping products on brain activity (confirmed by EEG studies), patents in Ukraine and Germany, as well as the commercial and therapeutic potential of the method within the American healthcare system. Novel discoveries include evidence of the positive impact of a structured apitherapeutic environment on the normalization of brain rhythms, reduction of anxiety, and activation of the parasympathetic nervous system, all without the need for pharmacological intervention. The book will be of interest to medical professionals, researchers, practicing apitherapists, investors in the wellness tourism sector, as well as the general public interested in natural healing methods and integrative medicine.

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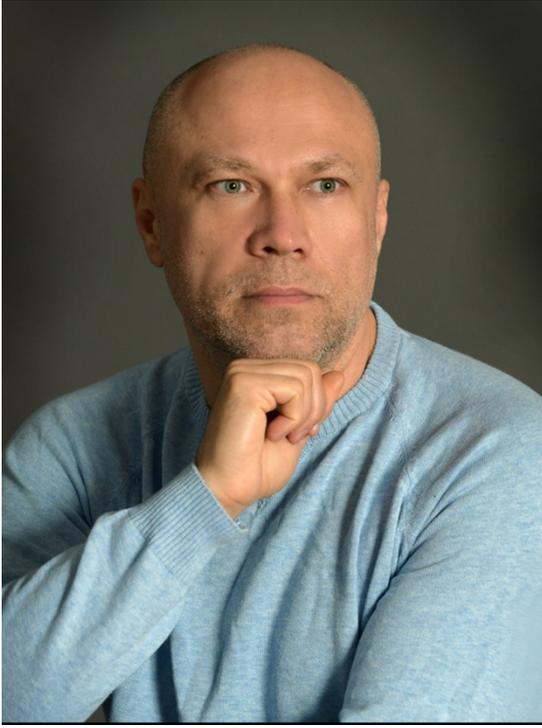


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# Autobiography

## Anatolii Olshanskyi

Inventor | Researcher | Lawyer | Innovator in Apitherapy



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### Personal Information

- Date of birth: August 8, 1973
  - Place of birth: Lokhvytsia, Poltava region, Ukraine
  - Citizenship: Ukraine
- 

### Education and Professional Training

- 1989 — Graduated from the Hadyach Beekeeping College and received a diploma as a beekeeper.
  - 1994 — Graduated from the Donetsk Institute with a degree in Law Enforcement.
  - 2023 — Completed additional studies at the Hadyach Beekeeping College and earned a second beekeeper diploma.
  - Completed specialized courses in apitherapy and apitechnology, obtaining relevant certificates.
- 

### Professional Activity

- Since 2003, he has worked in the field of law, combining legal practice with scientific research in apitherapy and beekeeping.
  - Dedicated his life to studying the healing properties of bees and creating unique innovative systems aimed at promoting human health and well-being.
- 

### Scientific Work and Inventions

- Inventor of the “Bee Healing Bed in a Pyramid” — a therapeutic system that allows a person to experience the microvibrations, buzzing, warmth, and aromas of a beehive without the risk of bee stings.
  - Author of more than ten scientific publications on apitherapy, bioenergetics, and innovative wellness technologies.
  - Speaker at international conferences in Kyiv and Bucharest.
- 

### Awards and Patents

- Holder of patents for the “Bee Bed” in Ukraine and Germany, with patent applications submitted in the United States.
  - Recipient of certificates and awards from the P. I. Prokopovych Ukrainian Research Institute of Beekeeping.
- 

### Mission and Purpose

Anatolii Olshanskyi seeks to integrate ancient knowledge about the healing power of bees into modern science to advance natural methods of human recovery and health improvement. His inventions combine the traditions of beekeeping, innovative technologies, and the future of apitherapy.

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**INTRODUCTION** ..... 6

**CHAPTER 1** ..... 11

HISTORY AND SCIENTIFIC FOUNDATIONS OF APITHERAPY ..... 11

1.1. Origins of Apitherapy: A Historical Overview ..... 11

1.2. American experience of apitherapy in personalities and events ..... 20

..... 25

1.3 Evolution of apitherapy methods in European countries ..... 25

1.4. Apitherapy as a component of traditional and alternative medicine ..... 30

Conclusions to Section 1 ..... 34

References for Section 1 ..... 35

**CHAPTER 2** ..... 39

THEORETICAL BASIS AND BIOLOGICAL MECHANISMS OF APITHERAPY ..... 39

..... 39

2.1. Basic principles of apitherapy ..... 39

2.2. The effect of bee products on the human body ..... 41

2.3. Biophysical properties of bee energy and their medical significance ..... 44

2.4. Scientific evidence of the effectiveness of apitherapy methods ..... 45

Conclusions to Section 2 ..... 49

References for Chapter 2 ..... 50

**CHAPTER 3** ..... 53

INNOVATIVE METHOD OF APITHERAPY: “BEE MEDICAL BED IN A PYRAMID” ..... 53

..... 53

3.1. Concept of the method and its scientific basis ..... 53

3.2. Bioenergetic features of a wooden pyramid with a thatched roof ..... 55

3.3. Human interaction with the biofield of bees in the enclosed space of a pyramid ..... 56

3.4. Comparison of traditional and innovative methods of apitherapy ..... 58

..... 60

Conclusions to Section 3 ..... 60

**SECTION 4** ..... 62

PATENT RESEARCH AND SCIENTIFIC DEVELOPMENTS ..... 62

4.1. Ukrainian patent for the utility model “Therapeutic bed in a pyramid” by Anatolii Olshanskyi ..... 62

..... 62

4.2. German patent “Therapeutic bees in a pyramid” by Anatolii Olshanskyi ..... 71

4.3. Scientific work “Health promotion and disease prevention in humans” using a wooden pyramid ..... 74

..... 74

Conclusions to section 4 ..... 78

**CHAPTER 5** ..... 79

RESEARCH ON THE EFFECTIVENESS OF THE “BEE MEDICAL BED IN THE PYRAMID” ..... 79

5.1. Effect on the cardiovascular system and blood circulation .....	79
5.2. Influence on the normalization of cerebral cortex signals .....	82
5.3. The anti-stress effect of apitherapy in an urban environment.....	87
5.4. Clinical studies of the method's effectiveness.....	90
Conclusions to Chapter 5.....	94
References for Chapter 5.....	96
<b>CHAPTER 6</b> .....	99
INTEGRATION OF THE APITHERAPY METHOD INTO THE US HEALTHCARE SYSTEM .....	99
.....	99
6.1. Demand for innovative health improvement methods in America.....	99
6.2. Legislative and regulatory aspects of the introduction of apitherapy in the United States.....	102
6.3. Comparison of the development of the apitherapy market in Ukraine and the United States .....	105
.....	105
6.4. The potential of international partnership in the field of apitherapy .....	106
Conclusions to Chapter 6.....	110
References for Chapter 6.....	111
<b>CHAPTER 7</b>	
COMMERCIAL POTENTIAL OF THE "BEE MEDICAL BED IN A PYRAMID" .....	113
.....	113
7.1. Development of a business model for implementation in the United States .....	113
7.2. Advantages of Olshansky's innovative method in the field of medical tourism .....	118
7.3 Profitability and economic efficiency of the "Bee healing bed in a pyramid" project .....	120
.....	123
Conclusions to Chapter 7.....	123
References for Chapter 7.....	124
<b>CHAPTER 8</b> .....	125
PRACTICAL RECOMMENDATIONS FOR IMPLEMENTING THE METHOD.....	125
.....	125
8.1. Creation of apitherapy complexes: construction and organization .....	125
8.2. Methodology for using the "Bee Healing Bed in a Pyramid" .....	129
8.3. Recommendations for medical support of patients.....	133
8.4. Ethical and safety aspects of bee treatment .....	136
Conclusions to Chapter 8.....	137
References for Chapter 8.....	138
<b>CONCLUSIONS</b> .....	139
<b>APPENDICES</b> .....	143

# INTRODUCTION



In contemporary preclinical and clinical practice, there is a growing interest in integrative models of therapy that combine biological, psycho-emotional, and sensory factors. This textbook is designed to address existing gaps in the scientific substantiation of apitherapy within pyramidal structures, a concept defined as apistructurotherapy, a comprehensive non-pharmacological method that integrates the principles of traditional apitherapy with the spatially organized influence of architectural forms and sensory environments.

Apitherapy (from the Latin *apis*, meaning bee, and the Greek *therapeia*, meaning treatment) is a system of therapeutic and preventive effects on the human body achieved through the use of biologically active substances and factors produced by honeybees: honey, propolis, wax, royal jelly, bee bread, bee venom, as well as apibioaerosols, heat, and vibrations generated by the bee colony. Apitherapy is based on the long-standing traditions of beekeepers and healers who observed the calming and restorative effects of everything related to beekeeping and its products. At the same time, it represents new formats of wellness environments that meet the needs of twenty-first-century individuals. This field has been officially recognized in several countries as an element of naturopathic medicine and is actively studied within the frameworks of functional and preventive medicine.

Apistructurotherapy is a specific modification of apitherapy, and the healing method involves placing the patient inside a sealed structure called an apistructure (a wooden pyramid, apicapsule, or bioenergetic pavilion), at the base of which lies an active bee colony. Api-houses are often built in the shape of a pyramid, as this form is believed to enhance the therapeutic effect.

The method of apistructurotherapy provides for the patient's rest or sleep on a special couch inside a wooden structure that functions as a natural micropharmacopoeia, concentrating the healing properties of both the environment and the physicochemical characteristics of bee activity. In the therapeutic process, there is no direct contact with the bees; however, the patient is exposed to a combination of natural physical and chemical factors, including sound vibrations, hive oscillations, warmth, humidity, air enriched with ions, and apibioaerosols formed as a result of the bees' vital activity.

The temperature and humidity inside the apistructure are regulated by the natural biological processes of the bee colony, maintaining approximately 35°C and 50% relative humidity, which creates conditions similar to gentle steam inhalation. The air inside the apistructure is free from pollen, chemical irritants, and toxins, making it suitable even for individuals with bronchial hyperreactivity or allergies. Thus, the apistructure functions as a controlled environment comparable to the clean mountain or coniferous air found in health resorts but localized in a convenient setting.

Apitherapy in pyramid-shaped hives is indirectly related to apitherapy as a branch of integrative medicine that utilizes beekeeping products such as honey, propolis, and bee venom. However, unlike classical apitherapy (for example, bee sting therapy), this method does not involve direct stinging or ingestion of bee products. Instead, it is based on the sensory influence of the bee colony's natural activity.

The phenomenon of apistructurotherapy aligns with other branches of nontraditional medicine, including microclimatotherapy, zootherapeutic relaxation, sensory stimulation, aromatherapy, and body–mind therapy.

According to initial observations, the multidirectional influence of apistructurotherapy can modulate neurovegetative regulation, enhance stress resilience, normalize sleep parameters, improve breathing quality, and reduce anxiety levels. One of the practitioners of apistructurotherapy noted: “Stress disappears when you listen to the bees doing their work, surrounded by the aromas of honey and propolis.”<sup>1</sup>

The experience of being inside pyramidal structures appeals to the innate human need for a biocentric connection, while the influence of a living ecosystem contributes to the stabilization of the psycho-emotional state. This occurs because the therapeutic model provides a systemic effect through several channels simultaneously, influencing the respiratory system, skin receptors, auditory and olfactory analyzers, and the affective–cognitive centers of the central nervous system.

The sensory stimuli interact in a complex and synergistic manner, neutralizing the effects of chronic stress-related signals and promoting immersion in a trance-like, semi-meditative state. Such sensory integration corresponds to modern methods of neurosensory therapy that are used to reduce anxiety and to treat autism, post-traumatic stress disorder (PTSD), and sensory processing disorders in both children and adults.<sup>2</sup>

Advocates of integrative medicine in the United States regard apistructurotherapy as a complementary or preventive, noninvasive, and physiologically safe method that can be applied in pulmonology, psychotherapy, gerontology, rehabilitation, and psychosomatic programs. Beehive therapy conducted in specially designed houses ensures complete safety: the patient benefits from the bees' natural “biofield” without any risk of stings or allergic reactions to venom, which may occur during direct apitherapy involving bee stings. This noninvasive and natural approach makes the method acceptable for most individuals, including those who fear bee stings or have contraindications to more aggressive interventions. The method of apistructurotherapy represents a

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<sup>1</sup> Bee Hive Pyramid Therapy is an Unusual European Wellness Practice Now Intriguing Americans. *Good News Network*. 2023. URL: <https://www.goodnewsnetwork.org/bee-hive-pyramid-therapy-is-an-unusual-european-wellness-practice-now-intriguing-americans/> (date of access: 03.08.2025).

<sup>2</sup> Pfeiffer B., Koenig K.P., Kinnealey M., Sheppard M., Henderson L. Effectiveness of Sensory Integration Interventions in Children With Autism Spectrum Disorders: A Pilot Study. *The American Journal of Occupational Therapy*. 2011. Vol. 65, No. 1. P. 76–85. URL: <https://pubmed.ncbi.nlm.nih.gov/> (date of access: 03.08.2025).

hybrid therapeutic approach that requires interdisciplinary justification. From a medical perspective, it can serve as an adjunctive therapy, while from a cultural standpoint, the method embodies the incorporation of sacralized natural practices into the medical space. From a physiological point of view, it enables the simultaneous activation of several parallel neurosensory processes that are not realized in any other conventional form of therapy. Therefore, apitherapy conducted within pyramidal structures represents an integrated approach that combines culturally rooted practices of traditional medicine with modern wellness trends.

Considering the cultural and ethical characteristics of healthcare in the United States, the method of apitherapy in pyramidal structures may initially be met with skepticism due to its unconventional nature. However, within the expanding paradigm of integrative medicine, apistructurotherapy has the potential to establish its own niche as a form of holistic therapy that simultaneously influences sensory perception and the central nervous system.

Despite the lack of large-scale clinical studies, the available empirical data indicate a positive dynamic in the physiological parameters of patients who have undergone courses of apistructurotherapy. Foundational research on the chemical composition of the air inside bee pavilions and the effects of these environments on respiratory and autonomic functions is already beginning to appear in reputable scientific sources.<sup>3</sup>

From the standpoint of evidence-based medicine, it must be acknowledged that the method requires controlled clinical trials with clearly defined selection criteria and comparative groups. Conducting apitherapy within pyramid-shaped structures necessitates clinical studies with a controlled design to validate its effectiveness and determine its therapeutic parameters. However, the individual components of the therapeutic model already have empirical support: the beneficial effects of beekeeping products have been demonstrated in pharmacology, the influence of microclimatic conditions on human respiratory organs has been confirmed in pulmonology, and the advantages of body-oriented techniques have been established in psychosomatic medicine. Empirical research and analytical development of the apistructurotherapy model represent an important task for both the medical community and institutions implementing integrative medicine programs. In practical application, apitherapy conducted within pyramidal structures can be regarded as a complementary therapy that supports primary treatment. It may be integrated into rehabilitation modules for patients with chronic pain, psychotherapeutic programs aimed at reducing anxiety, or as a means of sensory preparation before acupuncture sessions.

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<sup>3</sup> ResearchGate. Bee therapy huts: studies on microclimate and respiratory effects. URL: <https://www.researchgate.net/> (date of access: 03.08.2025).

Its noninvasive nature, absence of pharmacological load, and minimal risks (except for possible allergic reactions to bee products) underscore the therapeutic appeal of apistructurotherapy for patients seeking natural methods of healing.

Thus, apitherapy in pyramidal structures forms a unique synergistic therapeutic platform that combines the biological properties of bee products, the spatial and architectural characteristics of the environment, the psycho-emotional components of sensory experience, and the scientifically validated effects of natural modulation of autonomic functions.

The purpose of this textbook is to systematize scientific concepts related to apistructurotherapy, establish its methodological foundations, describe its clinical applications, and outline prospects for further interdisciplinary research.

The scientific interpretation of apistructurotherapy as an innovative form of therapeutic interaction presented in this work is complemented by the author's experience, whose academic and practical contributions represent the achievements of modern apitherapy. Notably, the author's published results in the professional journal *Investments: Practice and Experience* demonstrate the development of an original concept of apitherapy as a multifunctional biocultural resource. In this research, apitherapy is positioned not only as a physiologically active procedure but also as a factor in the development of medical tourism, a tool of sensory ecology, and a platform for a new type of wellness environment.<sup>4</sup>

In the context of international scientific and applied collaboration, the author has carried out a series of research and methodological developments within the framework of the European project *Bienenpyr* (Germany). This initiative sought to integrate architectural, bioenergetic, and therapeutic aspects into a unified structural model, in which apistructures functioned not only as infrastructural elements but also as spatial mediators of healing influence. The author participated in designing the therapeutic space with careful consideration of vibrational, microclimatic, and aromatic components that contribute to the overall therapeutic effect.<sup>5</sup>

Particular attention should be given to the applied initiative *HIVES* (Honeybee for Integrated Veteran Empowerment and Support), implemented with the participation of the U.S. Department of Veterans Affairs. The program involved the use of an apitherapeutic environment as part of the psychosocial rehabilitation of veterans exhibiting symptoms of post-traumatic stress disorder, anxiety, and depressive disorders. By integrating apistructures into modules of controlled sensory stimulation, relaxation, and mindfulness practices, the author successfully developed a

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<sup>4</sup> Pylypchuk I. I. Apiterapiia yak skladova ozdorovchoho turyzmu v umovakh kreatyvnoi ekonomiky [Apitherapy as a component of health tourism in the conditions of creative economy]. *Investytsii: praktyka ta dosvid – Investments: Practice and Experience*. 2019. No. 24. P. 87–91. URL: <https://doi.org/10.32702/2306-6814.2019.24.87> (date of access: 03.08.2025). [in Ukrainian].

<sup>5</sup> Bienenpyr. Bienenpyr: Heilen im Einklang mit der Natur. URL: <https://www.bienenpyr.com/de/> (date of access: 03.08.2025).

comprehensive therapeutic protocol that meets the standards of evidence-based medicine, social adaptation, and ecotherapeutic integration.<sup>6</sup>

These and other studies conducted by the author demonstrate a consistent progression from empirical observations to formalized interdisciplinary models that can be adapted in accordance with modern medical protocols. The proposed publication not only consolidates current scientific knowledge on apistrurotherapy but also initiates a new theoretical and practical framework for its systematic implementation within the healthcare sector.

The author expresses hope that, over time, integrative medicine will gain broader recognition and that medical education programs will include more comprehensive information on integrative approaches to health and well-being.



### Participation of Anatolii Olshanskyi in the 5th Congress of the International Federation of Apitherapy, Bucharest, 2025<sup>7</sup>

<sup>6</sup> U.S. Department of Veterans Affairs. HIVES: Honeybee for Integrated Veteran Empowerment and Support. *VA Innovation Marketplace*. 2024. November 15. URL: <https://marketplace.va.gov/innovations/hives> (date of access: 03.08.2025).

<sup>7</sup> Anatolii Olshanskyi at the 3rd Congress of the Romanian Society of Apitherapy, Phytotherapy and Aromatherapy and the 5th Congress of the International Federation of Apitherapy (May 16–19, 2025, Bucharest, Romania), the scientific work “*Therapeutic Bee Bed in the Pyramid*” was awarded the First Prize



# HISTORY AND SCIENTIFIC FOUNDATIONS OF APITHERAPY

## 1.1. Origins of Apitherapy: A Historical Overview

The formation of apitherapy as a scientifically grounded method for using beekeeping products for therapeutic purposes dates back to ancient times and is associated with the emergence of the first highly developed civilizations. Within archaic sociocultural systems, honey, propolis, wax, and, in some cases, the bee itself acquired not only practical value but also sacred status. They served as carriers of divine knowledge, metaphors of vital energy, components of ritual practices, and key ingredients in the traditional medicine of the ancient world.

In ancient civilizations that arose during the transition from primitive lifestyles to agrarian and urban forms of coexistence, particularly in Mesopotamia, Egypt, India, China, the Mediterranean region, and Central America, medical knowledge was accumulated through a synthesis of empirical observations, religious beliefs, and natural-philosophical ideas. During this period, the city became a center not only of economic activity but also of sacred knowledge, including medicine, which was an integral part of a broader cosmogonic worldview. Physical healing was considered inseparable from spiritual restoration, and therapeutic practices integrated the power of words, rituals, actions, and substances.

In those times, beekeeping products were regarded as universal means of influencing both body and spirit. Hilda M. Ransome, in her work *The Sacred Bee in Ancient Times and Folklore* (Ransome, 1937) [44], conducted a comprehensive analysis of the role of the bee in mythology, religious practices, and daily life across many cultures, from the civilizations of the Ancient East to those of Central Europe. The evidence presented in this monograph, which is of particular importance to our study, clearly demonstrates the sacralization of bees in ancient societies.

According to Ransome, the sanctification of the bee represented a universal archetype embedded in collective perceptions of life, death, harmony, and transcendence. A similar conclusion was reached by modern researcher Gene Kritsky in his book *The Tears of Re: Beekeeping in Ancient Egypt* [37], who, incidentally, refers to Hilda M. Ransome's work as "a classic in the history of beekeeping."

In this section, we will look at how bee products were used in medical, sacred, and bioenergetic practices in different civilizations.

In particular, in Ancient Egypt, honey was used in prescription pharmacology, mummification rituals, and temple medicine; in Sumerian-Akkadian culture, the first recorded evidence of the medicinal use of bee products appeared; in an Indian treatise on Ayurveda, honey was interpreted as a sacred substance with balanced properties; in traditional Chinese culture, bee products were integrated into the system of harmonizing bodily energies (qi). Noteworthy is the Greek medical tradition, in which Asclepius, Hippocrates, and other theorists of humoral medicine included honey in practices for balancing the main bodily fluids—humors. In Mayan and Aztec civilizations, bees represented cosmic power, and honey was used for ritual and medicinal purposes. Ancient civilizations were the cradle of apitherapy as a holistic practice that combined medicinal, religious, and philosophical ideas about humans, nature, and the cosmos.

Thus, at an early stage of human historical development, apitherapy was already part of universal knowledge about nature, the body, the soul, and the cosmos, functioning not only as a system of empirical procedures but also as a holistic cultural phenomenon that embodied the desire for harmony, healing, and the integration of humans into the environment. The actualization of this experience in modern conditions opens up prospects for rethinking apitherapy as a practice that can combine traditional knowledge, scientific research, and environmental awareness.

Sources have been preserved that testify to the exceptional importance of bee products in the socio-cultural life of ancient civilizations. Texts on clay tablets, papyrus, stone steles, and in medical treatises contain numerous references to the use of honey, wax, and propolis in medical, religious, and everyday practices. Bee products were considered not only a means of physical healing, but also universal substances associated with ideas of purity, immortality, divine gift, and natural harmony; that is why they had a wide range of applications in sacred and social interactions.

The perception of bees in the ancient world was multidimensional, deeply symbolic, and embedded within the framework of natural, social, and cosmic order. For individuals living in close connection with nature, the bee was not merely an object of observation but also a source of intuitive understanding of universal harmony. Its behavior, rhythmic, orderly, and coordinated, evoked admiration and served as a model for ideal coexistence. People observed how bees worked tirelessly, fulfilled their role within the community without conflict, and created something new and perfect from plants, particularly honey, which carried the taste of light, the fragrance of flowers, and the energy of the sun. This inspired human imagination and fostered deep reverence for the bee as a creature believed to possess sacred knowledge of the world that remained beyond human reach. In human experience, the bee was perceived as a bearer of divine will, a messenger of truth, and a mediator between worlds. Its sting, capable of both harming and healing, was not regarded as an

act of aggression but rather as an instrument for restoring justice and energetic balance. In ritual contexts, it symbolized the soul departing the body or a sacred spirit descending from the celestial sphere to the earth.

Within social institutions such as governance, religion, temple complexes, and cult centers, the image of the bee and the products of its activity acquired codified symbolism. The bee came to represent order, hierarchy, discipline, selflessness, and service to the common good. A bee colony was often likened to a well-organized state or a temple community, where each member performed their function in obedience to a higher purpose. These ideas influenced sacred rituals, state ideology, and even political philosophy.

Honey, as the product of the transformation of natural matter, also held profound symbolic significance. It was regarded as a sign of purification, wisdom, and divine grace, and its use was carefully regulated. Honey was offered to deities, incorporated into religious and civic ceremonies, used as a form of payment for ritual services, and symbolized blessings for new beginnings, including marriage, birth, and initiation.

Wax was also used in the creation of cult images, lamps, and seals, and was perceived as a material capable of fixing form while remaining plastic, absorbing the spiritual power of the ritual. The social elites could control access to bee products and used them as elements of symbolic capital that embodied God-sanctioned power.

At the everyday level in ancient societies, bee products were part of the collective culture of health, survival, and sacred interaction with nature. Their use covered a wide range of practices, from nutrition and body care to healing and participation in rituals of transition, purification, and protection from evil forces. Honey was used as a medicine and as a sacred substance that "absorbed" the power of herbs and prayers. Wax and propolis were considered not only as household or medicinal products, but as conductors of energy that strengthened the connection between body and spirit, between man and the cosmos. In folk beliefs, bees had the ability to hear prayers, understand human speech, keep secrets, and bring good news as messengers of harmony to a world where evil and disease were considered signs of a violation of the natural order. That is why even touching a beehive or consuming honey was considered an act of communion with the extraordinary, higher than ordinary biological existence.

These ideas collectively embodied the deep and multi-level integration of bees and their products into the worldview of ancient man. Thus, it was not just human interaction with a natural resource, but a complex system of relationships in which the bee personified natural ethics, religious ontology, and social philosophy, in which humanity sought answers to key questions of existence: how to live in harmony, heal, and remain part of a world that breathes and pulsates in tune with a higher order.

Next, we will consider the use of bee products in the healing practices of ancient civilizations, a representative example of which is the use of honey in ancient Egypt, as confirmed by scientific works (Gene Kritsky [37], Ian Shaw [56], Sally Fallon [26]).

Archaeological research shows that honey in Ancient Egypt was an important and extraordinary substance and was used for utilitarian, social, and sacred purposes. The discovery of sealed clay jars of honey in tombs, including Tutankhamun's tomb, confirms its use as a food product and as a means of treating wounds due to its natural antibacterial properties. Images on the walls of the temple of Pharaoh Neusera of the Fifth Dynasty (around 2450 BC) depict scenes of beekeeping, indicating the existence of organized honey production and its integration into the economic structure of the state.

In ancient Egyptian civilization, bee products, especially honey, acquired life-sustaining and sacred significance, and therefore it is appropriate to consider it in three interrelated aspects: at the level of human empirical experience, within the framework of socio-institutional mechanisms, and in the symbolic field of ritual-mythological communication.

From the point of view of practical application in everyday life, honey was used as a therapeutic, cosmetic, and hygienic agent. As a therapeutic agent, it is mentioned in the Ebers Papyrus, one of the most important medical documents of the New Kingdom, as an active ingredient for treating wounds, ulcers, and other skin lesions [56]. Amandine Marshall emphasizes its wide range of applications in gynecological prescriptions, in particular as a contraceptive in the Kahun Papyrus (circa 1850–1750 BC), which indicates early empirical knowledge of the spermicidal properties of this substance [40].

In socio-institutional terms, beekeeping was highly organized as part of the state economy. Ian Shaw analyzes beekeeping as a component of the agricultural industry of Ancient Egypt, within which the production, storage, and distribution of bee products were centralized. According to the researcher's observations, honey could be equivalent to the price in the system of natural rent, or part of tax collections or offerings in temples [56]. Manal B. Hammad, relying on iconographic sources, in particular reliefs from the temple of Pharaoh Neusera (5th dynasty), reconstructs specific beekeeping technologies — from the use of woven baskets and clay hives to methods of honey collection, which indicates the development of a specialized infrastructure [30].

In terms of sacred symbolism, honey was obviously a bearer of transcendental meaning and was therefore associated with cosmogonic narratives and ritual practices. In his monograph *The Tears of Re*, G. Kritsky draws attention to the mythological explanation of the origin of bees as the tears of the sun god Ra, which fell to the ground, transformed into bees, and created honey. This interpretation of the nature of bees gives their product, honey, the function of a mediator between the divine and the human, the sacred and the profane [37]. A. Bovi expresses a similar opinion and

compares the Egyptian tradition of ritual use of honey with the cultures of the Hittite Empire and ancient Greece, emphasizing the uniqueness of the Egyptian cultural context, where honey was an indispensable part of royal and cult practices. The author argues that honey was left in tombs as a gift for the dead, and the image of the bee was identified with Lower Egypt and symbolized the sacred sovereignty of the pharaoh [19;44].

Thus, honey in Ancient Egypt was used not only as a natural product: its value was shaped by the interaction of practical knowledge, social regulation, and religious-mythological symbolism, which gave honey the status of a universal mediator between the physical and spiritual, the human and the divine.

Although the worship of bees in Egypt lasted for over 2,000 years, there is evidence that pre-dynastic Egypt was influenced by more developed Eastern civilizations, in particular the Sumerians, for whom the worship of bees was part of an ancient Mesopotamian tradition even before it came to pre-dynastic Egypt.

Historical sources suggest that in the developed Sumerian-Akkadian culture, honey was used in gastronomic and sacred-medicinal spheres, particularly in the mythological, religious, and royal practices of Mesopotamia. Within the religious culture of Mesopotamia, the symbolism of honey was realized through semiotic compositions in which it was a sacred transformant. The rituals of symbolic pollination depicted on Assyrian reliefs with figures of Apcallu, where an image of a palm branch is dipped into a bag, probably filled with pollen or honey, visualize the act of ritual purification, blessing, and transfer of life force. Such a ritual conveys the idea of honey as a biocosmic substance that accumulates the energy of fertility, security, and divine order. Akkadian language artifacts confirm the hygienic and cultic function of honey: the terms *banddudû* (bucket) and *mullilu* (cleanser) record the use of ritual containers for cleansing substances, probably honey, in ceremonial medicine.

Medical texts on therapy recorded on cuneiform tablets from Ashur, Nippur, and Uruk contain recipes that included honey combined with milk, beer, barley water, and both mineral and plant ingredients. Such formulations demonstrate an understanding of the synergistic effect in pharmacology, specifically the use of honey as a transport matrix to enhance the therapeutic action of other components. A text known as the "Sumerian Medical Compendium" provides detailed descriptions of infection treatments in which honey functions as an antiseptic agent [50].

In Mesopotamian medicine, disease was defined as a consequence of imbalance between the physical and spiritual, as well as between the social and biological aspects of life. The cuneiform pharmacopoeia from Ashur and Nippur enables the reconstruction of the early pharmacological use of bee products as an element of social medicine, intended to restore bodily equilibrium, promote

purification, and facilitate the patient's resocialization within the framework of ritual interaction with the sacred.

The use of bee products for medical and ritual purposes is also confirmed by socio-economic documents. Although few beehives have been found during archaeological excavations at the site of ancient Mesopotamia, written sources mention containers for storing honey and places for keeping bees. Old Babylonian texts on farming mention honey as an object of taxation or gifts, which indicates its systematic use. There is reason to believe that bees were kept in clay pipes or woven baskets, as in early Egyptian practices. Archaeological excavations in the city of Mari (19th–18th centuries BC) confirm the existence of personnel involved in honey collection, indicating the social institutionalization of beekeeping as a professional practice.

In addition to its pharmacological use, honey appears in cultural artifacts as a metaphor for physical pleasure, fertility, and the ontological union of humans with the divine. For example, in Sumerian poetry, particularly in the hymn "The Marriage of Inanna and Dumuzi," honey serves as a linguistic and semantic tool for expressing divine eroticism: "His hand is honey, his foot is honey." These images illustrate the idea of honey as a substance of physical deification, integrated into the structure of sacred corporeality.

Thus, in the Sumerian-Akkadian civilization, honey fulfilled a universal function and was used in medicine, religion, and ritualized political life. Its application in both therapeutic and sacred practices reveals the complex nature of the ancient medical model, in which the restoration of physiological homeostasis was inseparable from the restoration of the patient's social and symbolic status.

Next, we turn to the history of apitherapy in other regions of the ancient world. In Indian civilization, honey had a long-standing role in Ayurvedic medicine, where it was regarded as a polyvalent pharmacological agent. In classical Ayurvedic texts, particularly the Charaka Samhita and Sushruta Samhita, honey (*madhu*) was described as one of the fundamental substances with healing properties encompassing a wide range of therapeutic applications, from immunomodulation to wound healing and enhancement of metabolic functions. It was used both as a monotherapy and as a component of multicomponent formulations in which honey functioned as *anupana*, a carrier that increases the bioavailability of active substances.

Recent studies by D. Ramanathan, director of the pharmaceutical company Sitaram Ayurveda and a specialized Ayurvedic clinic in Thrissur, India, confirm that honey remains a key element in therapeutic strategy. The study states: "Honey, known as *madhu* in Ayurvedic writings, is one of the most important medicines. It is used both internally and externally to treat a wide range of conditions, including eye diseases, cough, phlegm, hiccups, diabetes, leprosy, asthma, obesity, helminthic infestations, wounds, and other disorders. In addition, honey acts as a natural

preservative and sweetener in Ayurvedic preparations and is also used to reduce the side effects of other medicines” [17–18].

Ayurveda classifies honey into eight types, each of which has a specific therapeutic focus:

- Makshikam – for the treatment of eye diseases, tuberculosis, asthma, hepatitis;
- Bhraamaram – effective for vomiting and bleeding;
- Kshoudram – prescribed for patients with diabetes;
- Pauthikam – for the treatment of diabetes and infections of the genitourinary system;
- Chatram – used for worm infestations and bleeding;
- Ardhyaam – useful for anemia, eye diseases, and coughs;
- Ouddalakam – used for poisoning and leprosy, improves taste;
- Daalam – improves digestion, relieves coughing and vomiting.

In Ayurveda, it is particularly important to differentiate between fresh and aged honey. Fresh honey stimulates anabolic processes and promotes weight gain, while aged honey acts as a catabolic agent and contributes to weight reduction. Furthermore, honey should not be heated, as heat treatment decreases its biological activity and may lead to the formation of toxic compounds. This principle is recognized not only in traditional Ayurvedic practice but also in modern biochemical research on bee products [17].

Ayurveda also emphasizes the significance of honey’s origin. Wild honey produced by Indian bees (*Apis cerana indica*) is considered more “energetically pure” and bioactive compared to honey collected from the hives of European bees (*Apis mellifera*) that are raised under industrial conditions. In ancient Indian medicine, honey is not only a pharmacological ingredient but also an integrated component of a holistic treatment system that combines biochemical, energetic, and dietary aspects of therapy. Its systematic use in Ayurvedic practice confirms the functional versatility of honey as an adaptogen, antiseptic, immunostimulant, and metabolic regulator.

In traditional Chinese medicine (TCM), bee products, particularly honey (feng mi), play an important role in harmonizing the body’s vital energy (qi). Honey was first mentioned as a remedy by Shen Nong around 2000 BC. The Book of Recipes from the 3rd century BC also contains a medicinal formula that includes honey. According to TCM, honey possesses a balanced nature, being neither Yin nor Yang, and corresponds to the principles of the Earth element, influencing the meridians of the lungs, spleen, and large intestine.

A compendium of medical knowledge by the Ming Dynasty pharmacist Li Shizhen (1368–1644), a classical source of Chinese medicine, offers the following explanation: “Honey can help expel pathogenic heat, cleanse the body of toxins, relieve pain, and combat dehydration” [29].

The Fundamentals of Chinese Medicine describes honey’s therapeutic properties in detail: “Balanced, sweet, and non-toxic. Affects the meridians of the lungs, spleen, and large intestine. It harmonizes the center and moisturizes the lungs. It relieves pain and eliminates toxins. It treats coughs caused by dryness of the lungs, constipation resulting from dryness of the intestines, stomach pain, deep nasal inflammation, mouth ulcers, burns, and skin irritation” [18].

Sui Wang concludes: “Honey has been used in traditional Chinese medicine to treat a wide range of diseases for more than two thousand years” [18].

Thus, the use of honey in traditional Chinese medicine is deeply rooted and supported by modern scientific research, which confirms its historical continuity and significance within the system of apitherapy.

The importance of honey and other bee products in the civilizations of the ancient world is also evident in ancient Greek culture, where honey (méli) was used for religious, medical, and gastronomic purposes. Ancient medical theory advocated the use of honey, which was believed to play a key role in maintaining the balance of the four primary bodily humors: blood, phlegm, yellow bile, and black bile. An imbalance among these fluids was thought to cause disease, and treatment aimed to restore harmony between them. This concept, known as the humoral theory, was central to the works of Asclepius, Hippocrates, and other representatives of classical medicine.

The article “The Ritual Role of Honey in Ancient Egypt, Hatti, and Greece” (2020) presents a comparative analysis of the ritual use of honey in three ancient cultures: Egypt, Hatti, and Greece. Particular attention is devoted to Greek culture, where notable differences in the ritual application of honey are identified in comparison to the Mycenaean pre-classical period [19].

In the Mycenaean period of prehistoric Greece, the use of honey was not limited to healing or religious needs, and in the archaic and classical periods, it was used mainly in rituals related to burial and the dead, emphasizing its role in chthonic rites and invoking the gods. A. Bovi notes that honey was used in rituals related to the underworld and the dead, which indicates a transformation in the ritual significance of honey in ancient Greek culture, where it began to be associated with special rituals and connections with the afterlife.

Ukrainian historian O. Nemirovsky studied the use of honey in ancient medical practices, particularly in Ancient Greece. His analysis of the works of Hippocrates and other ancient Greek doctors established the importance of honey as a remedy: it was used to treat various diseases, including baldness, cough, and sore throat. It has been recorded that honey was used in combination

with vinegar to create oxymel, a remedy for pain relief. Similar studies detail the medical aspects of honey use and prove that its use was part of a broader treatment strategy that included diet, exercise, and other methods aimed at restoring natural harmony in the body. Thus, in the Greek medical tradition, honey was not only a food product but also an important remedy integrated into the system of humoral medicine to maintain and restore health. In the Mayan and Aztec civilizations, bees held sacred status and occupied a special place in the religious and cosmogonic worldview of indigenous peoples, representing a cosmic force that maintained harmony between natural cycles and spiritual practices. Stingless bees, particularly *Melipona beecheii*, were especially revered, as the Maya considered them to be “divine” guides between worlds. In traditional medicine, honey from these bees was used to treat eye, skin, and respiratory diseases, as well as for bodily purification before participation in rituals [48].

Within the framework of cult practices, honey was incorporated into a system of religious symbolism in which it was regarded as the embodiment of the “vital essence” of the sun. During ritual ceremonies, its use was considered not only an offering to the gods but also a means of psychophysiological activation of participants’ consciousness, serving as a transition to altered states of awareness. This interpretation aligns with modern concepts of the psychotherapeutic application of sensory stimulation [55].

From a psychosomatic perspective, honey functioned as a regulator of psycho-emotional homeostasis, particularly during periods of transformation such as initiation, healing, and sacrifice. Honey-based mixtures frequently included plant ingredients with psychotropic properties that, according to modern classifications, can be associated with adaptogens or entheogens [49].

In other words, within the medical and sacred practices of the Maya and Aztecs, honey served both practical and spiritual purposes, forming an essential component of a holistic psychophysiological, cosmological, and therapeutic system characterized by multi-level interaction among the physical, spiritual, and social dimensions of human experience [41].

The historical overview of the origins of apitherapy presented in this section, including archaeological evidence and religious and medical texts, demonstrates a high degree of human integration into the natural and cosmic order. In ancient cultures, the bee was not regarded solely as a biological organism but was seen as a bearer of ethical, cosmological, and medical knowledge that contributed to the healing of both body and soul. This understanding reflected the biophilic connection between humans and the environment, which was formed through deep integration into the ecosystem at the levels of sensory experience, mythological thought, and practical activity.

In modern urbanized societies, this connection with nature has been significantly weakened. According to experts in ecological psychology, such detachment diminishes biophilic resonance and disrupts psychophysiological regulation. The lack of direct interaction with the biological

elements of the environment negatively affects cognitive and somatic health and underscores the need for integrative, ecologically oriented therapeutic practices.

Within this context, apistrustructure therapy, particularly through the use of specialized apihouse (bee houses), represents a modern methodological platform that merges traditional knowledge with the technologies of ecological medicine. Its architectural and physiological design enables the restoration of human sensory interaction with the bee microenvironment without disturbing the natural rhythm of the hive. The bioacoustic, aromatic, and vibrational influences of the bees act as multimodal stimuli that activate the parasympathetic nervous system, stabilize cardiovascular activity, regulate stress levels, and promote the restoration of homeostasis.

Thus, the historical understanding of apitherapy not only reveals the anthropomedical and cultural significance of bees in traditional societies, but also outlines the prospects for its ecologically adapted application in modern realities. A return to ancient models of interaction with nature within the framework of scientifically based therapeutic practice creates the basis for the formation of a new biocentric paradigm of medical care.

## **1.2. American experience of apitherapy in personalities and events**

Unlike Europe, where apitherapy has a thousand-year tradition, in the United States this field emerged only in the 20th century, largely due to the work of Dr. B. Beck (1868–1942). A native of Hungary, Beck emigrated to the United States and obtained American citizenship in 1919 [8].

While practicing medicine in New York, Beck focused on treating arthritis and rheumatism with bee venom and introduced the term “bee venom therapy” into scientific circulation [60]. His monograph *Bee Venom Therapy: Bee Venom, Its Nature, and Its Effect on Arthritic and Rheumatoid Conditions* (1935) was the first comprehensive work on bee venom therapy [17–18]. It detailed the biochemical composition of bee venom and its effects on inflammatory processes in the body. Beck devoted particular attention to the so-called “reactive stage,” a short-term local inflammatory response to a sting (manifested as redness, itching, or swelling), which he regarded as a necessary condition for achieving the therapeutic effect. He claimed that this reaction precedes improvement in the patient’s condition, including reduced pain and greater mobility [27].

The success of Beck’s research was supported by his extensive medical practice. He studied the effects of bee venom in patients with rheumatic diseases, systematically documenting its anti-inflammatory and analgesic properties. These empirical observations became the foundation for subsequent research in the field of apitherapy in the United States [20].

In 1938, Beck published another work, *Honey and Health: A Nutritional, Medicinal and Historical Commentary*, in which he explored the medicinal properties of honey and emphasized

its role not only as a food product but also as a potential therapeutic agent [11]. It is evident that B. Beck was the founder of the scientific school of apitherapy in the United States and initiated both clinical trials and systematic scientific research in this field.

Research into the therapeutic potential of bee venom in the United States in the mid-20th century gradually transformed from the applied experience of individual doctors into a field with signs of institutionalization. At this stage, D. Brodman (1883–1966) played an important role, continuing the clinical observations initiated by B. Beck. Apitoxin therapist D. Brodman, practicing in New York, began using bee stings to treat arthritis in the early 1950s, and summarized the results of his many years of clinical experience in the monograph *Bee Venom: The Natural Curative for Arthritis and Rheumatism* (1962), published by the influential publishing house G.P. Putnam's Sons [17]. The work contains a detailed analysis of clinical cases of rheumatoid arthritis and osteoarthritis in which bee stings helped to reduce pain and joint stiffness. The researcher paid considerable attention to the issues of dosage and frequency of procedures, based on the individual response of patients [27].

The next stage in the development of apitherapy in the United States is associated with the work of C. Mraz (1905–1999), who transformed individual treatment practices into a collective and methodologically sound movement. Although C. Mraz was a beekeeper by training, his contribution to the legitimization of apitherapy in American medical discourse was undeniable [11]. From the 1930s, C. Mraz supported B. Beck's practice of bee stings, and later, based on his own experience of treating arthritis, developed a dosed application of venom, which was based on a gradual increase in the intensity of exposure. His therapeutic model involved applying stings three times a week, taking into account the location of the inflammatory processes [60].

Many years of clinical observations and documented cases of improvement in patients with autoimmune diseases contributed to the growth of C. Mraz's authority among apitherapists. His activities went beyond remission practice and were aimed at legitimizing apitherapy through collaboration with research institutions, including the Sloan-Kettering Institute and the Walter Reed Army Institute, where research on the effects of melittin on the immune response and tumor cells was conducted in the 1970s [61].

Ch. Mraz's contribution to the standardization of bee venom deserves special attention: it was he who developed the technical specifications for purified dry venom that met USDA requirements and supplied it to pharmaceutical companies for the production of injectable forms of drugs [31]. Mastering the pharmaceutical market made it possible to prove the safety of the procedures and conduct clinical trials with precise dosages.

The institutional direction of Ch. Mraz's institutional activities were realized through the initiation of the American Apitherapy Society (AAS), a professional platform that brought together

doctors, scientists, and practitioners. Since the 1990s, the AAS has organized the annual Charles Mraz Apitherapy Course and Conference (CMACC), dedicated to modern apitherapy methodology [42].

Charles Mraz's work is published in *Health and the Honey Bee* (1994), which summarizes many years of practice in the use of bee venom in the treatment of various degenerative and inflammatory diseases. Publications in the journals *Gleanings in Bee Culture* and *American Bee Journal* became part of the strategy to popularize apitherapy in medical and beekeeping circles [31].

Thus, the stages of development of apitherapy in the United States, represented by the activities of D. Brodman and C. Mraz, demonstrate a gradual transition from empirical clinical practices to a methodologically sound and institutionally established system of treatment that is integrated into modern complementary medicine.

We recognize that the creation of the American Apitherapy Society was of exceptional importance for the establishment of apitherapy in the United States: by the end of the 1980s, a group of doctors and scientists had formed in the United States who sought to integrate apitherapy into evidence-based medicine and spread knowledge about it. These efforts culminated in the founding of the American Apitherapy Society (AAS) in 1989, a non-profit organization that brought together specialists from various fields (medicine, biology, beekeeping) to research and implement methods of treatment with bee products [24].

The first president of the AAS was Christopher M. Kim (Christopher M. Kim, M.D.), the vice president was Dr. James Bellivo (Ph.D.), the treasurer was Harold Lenz (D.Sc.), and the board of directors included Charles Mraz and Dr. Bradford S. Weeks (M.D.) [24]. These scientists formulated the Society's mission: "to promote knowledge about the traditional and scientifically based use of apitherapy to support health and alleviate pain and suffering" [1].

An important figure in modern apitherapy in the United States is Christopher M. H. Kim, who conducted a series of clinical studies, including the effectiveness of apitoxin in the treatment of rheumatic diseases [34].

In the 1990s, the scientist conducted a randomized clinical study involving 180 patients, published its results in specialized sources [16], and later summarized them in a chapter of the book *Biotherapy – History, Principles and Practice* [35].

Another key figure in American apitherapy is B. Vicks, the initiator of the Multi-Center Apitherapy Study (MCAS), which included thousands of treatment cases [13] and the subsequent systematization of patient questionnaire data to create an evidence base for the method's effectiveness [14]. The scientist's article "What Diseases Can Be Treated with Bee Venom?" became

a cornerstone work [63] in apitherapy, as did his published results on the clinical use of bee venom components [43], [64].

Among modern representatives of apitherapy, T. Cherbuliez deserves special mention. He organized numerous CMACC conferences [53], combined apitherapy with psychiatry through the technique of apipuncture, and actively participated in international apitherapy forums [51–54]. In addition, T. Cherbuliez co-authored the academic publication on apitherapy *Biotherapy – History, Principles and Practice* [35], and his clinical experience includes the treatment of chronic pain, multiple sclerosis, and autoimmune disorders [51–54].

A contemporary practical direction in apitherapy is represented by the work of E. Kochan, a physician specializing in physical medicine and rehabilitation from Los Angeles, who began using bee products, primarily bee venom, as early as 1989 [36]. After achieving positive outcomes in patients with chronic pain syndromes, E. Kochan became an active advocate for apitherapy among orthopedic and rehabilitation professionals. He currently heads the Institute for Healing Arts Research, where he integrates apitherapy with regenerative medicine approaches, including prolotherapy and PRP therapy [32].

E. Kochan served as president of the American Apitherapy Society after 2010 and is currently a member of the AAS Board of Directors [21] and an elected member of the Board of Directors of the American Association of Orthopedic Medicine (AAOM), which attests to his high level of professional recognition [21]. E. Kochan's public activities are impressive: he works at Northridge Hospital Medical Center, where he integrates apitherapy into standard clinical practice [21], teaches students and residents the principles of safe use of apitherapy, including allergy testing and emergency use of epinephrine for anaphylaxis [51-54]. In 2016, Kochan and Theodore Cherbulie appeared on The People's Pharmacy radio show and promoted the therapeutic properties of honey, propolis, and bee venom [21].

In clinical practice, E. Kochan has successfully used apitherapy to treat diseases of the musculoskeletal system and reported positive results in patients with knee osteoarthritis, shoulder-scapular peri-arthritis, and post-traumatic pain. The doctor sees considerable promise in combining apitherapy with injection methods based on autologous biomaterials (e.g., plasma, platelet-enriched ) [22]. Documented cases of successful joint function restoration without surgery, presented at scientific conferences, allowed him to recognize bee venom as a natural analogue of steroids that does not cause side effects [23]. Twenty-five years of medical experience (1989–2014) of this renowned doctor confirms the effectiveness of apitherapy as a method of treating chronic pain in patients who have not found relief from standard pharmacotherapy. Thus, Andrew Kochan represents a new generation of doctors who take into account the experience of their predecessors and introduce apitherapy into modern medicine from an evidence-based perspective.

The dynamics of the institutional and clinical development of apitherapy in the American medical community are illustrated in Table 1.1.

**Table 1.1**

**Chronology of the development of apitherapy in the United States**

<b>Year</b>	<b>Event/Achievement in apitherapy in the US</b>
1935	Bodog F. Beck (New York) published the book <i>Bee Venom Therapy</i> , introduced the term "apitherapy" for the first time, and described a method of treating arthritis with bee stings (researchgate.net). This work laid the foundation for professional apitherapy in the United States.
1978	The North American Apitherapy Society (NAAS) was founded—the first organization of apitherapists in the United States dedicated to research and education in bee therapy (secure.directoryofassociations.com).
1989	The American Apitherapy Society (AAS) was formed on the basis of the NAAS, which later became the main center of the apitherapy movement in the United States (secure.directoryofassociations.com). The leadership included doctors and beekeepers, including Charles Mraz, the honorary director.
2002	The American Apitherapy Society held the first Charles Mraz Conference and Course (CMACC), a regular event for training in apitherapy. Since then, the annual AAS conferences have brought together doctors and researchers to share their experiences of treatment with bees (beekeep.info).
2003	Christopher Kim patented a standardized injectable bee venom preparation called Apitoxin, which was approved for use (in collaboration with South Korean specialists) (researchgate.net). This expanded the possibilities for the safe use of apitoxin in clinics.
2005	The first placebo-controlled study of apitherapy for multiple sclerosis was conducted (USA). Despite the lack of a clear therapeutic effect, researchers recorded immunological changes in patients under the influence of bee venom (japitherapy.com). This year marked a turning point in the recognition of the need for scientific evidence of the effectiveness of apitherapy.
2020s	Apitherapy continues to be integrated into clinical medicine in the US: honey has been approved by the FDA as a component of some medical products for wound treatment (e.g., Manuka honey in bandages); clinics offering bee venom therapy for the treatment of arthritis and Lyme disease are operating in several states. The AAS continues to hold annual educational events (in 2024, a conference in Chicago), and apitherapy is attracting attention in the context of research into new anti-inflammatory and immunomodulatory agents from bee products.

Thus, the development of apitherapy in the United States is closely connected to the work of medical practitioners, beekeepers, and scientists such as B. Beck, D. Brodman, C. Mraz, K. Kim, B. Vicks, T. Cherbuliez, and E. Kochan. These and other researchers established the scientific foundations of apitherapy and initiated a cultural paradigm in which architecture, biomedical technologies, and traditional therapy are integrated into a new type of healing environment, the

“apispace.” The scientific and practical contributions of American researchers constitute not only an empirical basis but also a methodological framework for modern apistrukture therapy as a branch of evidence-based integrative medicine. The concepts they developed provided the foundation for the creation of clinically safe, scientifically verified, and ethically sound approaches to the use of bee products within purposefully designed therapeutic environments.

The scientific, theoretical, and clinical activities of these researchers created the prerequisites for the emergence of apistrukture therapy as a conceptually new direction, representing a rethinking of traditional apitherapy that brought it systematic structure, scientific rigor, and architectural realization. Apistrukture therapy in the United States is the result of interdisciplinary integration encompassing biomedicine, eco-design, phytotherapy, and aromatherapy, where the object of treatment includes not only biological substances such as venom, propolis, and wax but also the spatial environment itself, designed according to the principles of natural harmony.

### **1.3 Evolution of apitherapy methods in European countries**

Apitherapy has a long history on the European continent: Hippocrates' works mention the use of bee stings for pain relief and treatment of diseases [47]; and in the second century AD, Galen described the use of honey and propolis for the treatment of wounds and fever [25].

There is evidence that in medieval Europe, bee products were a common remedy in folk medicine. In particular, information about the use of bee venom to treat gout in Charlemagne confirms the use of apitherapy and awareness of the effects of such treatment [6].

However, apitherapy began to acquire scientific credibility in the 19th century: in 1858, French physician L. Deshardin published the first scientific work on the treatment of rheumatism with bee stings in the journal *L'Abeille Médicale* [28].

Austrian physician F. Terch (Austria-Hungary) made a significant practical contribution to the medical use of bee products. His study included 660 patients with rheumatic diseases, 593 of whom reported improvement [4]. In 1888, F. Terch published the results of his research in a work titled “On the Peculiar Connection Between Bee Stings and Rheumatism,” which became the first scientific and clinical publication on apitoxin therapy [12]. These and other achievements by F. Terch are highly valued; he is regarded as the “father of modern apitherapy,” and his birthday, March 30, has been declared World Apitherapy Day [46], [57–59].

At the beginning of the 20th century, apitherapy methods became widespread in folk medicine throughout Central and Eastern Europe [5]. After World War II, interest in these methods and their outcomes gradually increased within academic circles. Since the 1970s, Apimondia congresses have regularly held symposiums dedicated to studying the medicinal properties of bee

products [2]. In 1983, during the congress in Budapest, the Apitherapy Commission of Apimondia was officially established, laying the foundation for the institutionalization of this field within the international beekeeping community [3].

In the final decades of the 20th century and the early 21st century, several national apitherapy organizations were founded across Europe, and standardized methods for the use of bee products were developed. In Germany, the German Apitherapy Association (Deutscher Apitherapiebund) was established between 2004 and 2006, organizing regular scientific and practical conferences [9]. In 2012, the International Federation of Apitherapy (IFA) was founded in Germany to coordinate the activities of apitherapists worldwide [7].

In Romania, apitherapy has been officially integrated into clinical practice since 2007: national conferences with the participation of international experts are held annually [10].

Since 2006, an annual celebration of International Apitherapy Day has been introduced in honor of Terch's birthday [57-59].

The testing of various clinical techniques should be considered an achievement of European specialists: apipuncture (the introduction of venom into biologically active points), the use of apilaparenil (a drone brood extract), inhalation of air from a beehive, etc.

Contemporary European apitherapy is institutionally and clinically represented in Germany, Romania, Slovenia, France, and other European countries as a supplement to traditional medicine. These countries have training programs for apitherapists, quality standards for apiculture products, and regular forums for the exchange of scientific achievements [57].

The systematization of the defining stages in the development of European apitherapy methods from antiquity to modern institutionalization is presented in Table 1.2, which allows us to visualize the gradual transition of apitherapy from empirical folk knowledge to a scientifically based clinical discipline (Table 1.2).

**Table 1.2**

**Chronology of the development of apitherapy in Europe**

Year	Event / Stage of evolution of apitherapy in Europe
1858	First scientific description of apitherapy: French physician L. Deshardin published an article on the treatment of rheumatism with bee stings in the journal <i>L'Abeille Médicale</i> (patents.google.com).

1888	Philip Terch (Austria-Hungary) published the results of clinical application of stings for rheumatism (beekeep.info), which is why 1888 is considered the year of the beginning of modern European apitherapy, and March 30 is declared International Apitherapy Day (slovenia.si).
1933	Czechoslovakian doctor Jaroslav Hnup published a monograph on the treatment of bee venom. In the 1930s, the method was actively practiced in Germany, France, and Eastern European countries.
1971	The Apimondia Congress held its first international symposium on apitherapy, presenting 37 scientific reports on the use of apiculture products (apimondia.org).
1983	During the 29th Apimondia Congress (Budapest), a Permanent Commission on Apitherapy was established within the structure of Apimondia (apimondia.org).
2006	The first specialized Apimedica congress on apitherapy was held in Athens, Greece (slovenia.si). And on March 30, World Apitherapy Day was officially established.
2012	The International Federation of Apitherapy (IFA) was founded in Passau (Germany) (api-terra.org).
2014	The first three IFA World Congresses were held: Brasov (2014), Kaunas (2016), and Quito (2018) (api-terra.org).
2020	Apitherapy is introduced into official medical systems in European countries: certification in Romania, Slovenia, and Lithuania; advanced training in Germany; clinical studies of its effectiveness in chronic and autoimmune diseases.

The illustrated chronology shows the defining stages of the institutionalization and scientific legitimization of apitherapy in European medicine from the mid-19th century to the 2020s. It demonstrates a steady trend in the transformation of apitherapy from empirical practice to evidence-based medicine. Since the first publications on the clinical use of bee venom (L. Deschardins, 1858; P. Terc, 1888), the gradual professionalization of the field has been documented: the emergence of monographs (J. Hnup, 1933), institutional initiatives (Apimondia commission, 1983; IFA, 2012), the creation of specialized congresses (Apimedica, 2006), and the harmonization of treatment standards. Since the 2000s, integrative approaches involving evidence-based practices, international safety protocols, and formalized educational programs have become dominant. The trend of the last decade has been the regulatory introduction of apitherapy into the medical systems of individual EU countries (Romania, Slovenia, Lithuania), which testifies to the importance of apitherapy in the context of functional and complementary medicine (Table 1.3).

**Table 1.3**

**Institutional measures dedicated to apitherapy in European countries**

Event	Dates	Venue	Brief description of the event
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International Apitherapy Symposium in Passau	Annually (March), since 2003	Passau, Germany	Annual symposium of apitherapists from around the world, founded by Dr. S. Stangachi. Held in cooperation with the German Apitherapy Society; timed to coincide with the birthday of F. Terch. During the symposium, new methods of treatment with bees and research results are discussed, and doctors and scientists exchange experiences (slovenia.si).
Apimedita & Apiquality Congress	Every two years, since 2006	Various European countries	An international congress led by Apimondia, specializing in apitherapy and the evaluation of the quality of bee products. The first was held in Greece (Athens) in 2006, followed by Italy (2008), Slovenia (2010), China (2012), Turkey (2014), Italy (2016), Romania (2018), etc. (slovenia.si). At Apimedita, leading experts publish the achievements of apitherapy science and clinical trials and agree on the standardization of apiculture products.
National Apitherapy Congresses in Romania	Every year, since 2007	Romania (Cluj-Napoca, Bucharest, etc.)	A series of national apitherapy congresses organized by the Romanian Apitherapy Association with the support of the Romanian Ministry of Health. The first congress was held in December 2007 (Cluj-Napoca) and brought together specialists in apitherapy and apipuncture (apitherapy.com). During the congresses, clinical methods of treatment with bee venom and apicultural products for various diseases are analyzed, and master classes are held. The programs include phytotherapy and aromatherapy in combination with apitherapy (apitherapy.com).
German Apitherapy Congress (Deutscher Apitherapie Kongress)	Annually, since the early 2000s	Germany (Dresden, Passau, etc.)	A scientific and practical event organized by German Apitherapy Association. It usually involves international participation. For example, in 2024, the next congress took place on March 22–25 in Dresden (apitherapy.com). Participants discuss research results, set standards for apitherapy training, and demonstrate new apitherapy products. The 2012 congress in Passau was significant in that it officially established the International Federation of Apitherapy (IFA) (api-terra.org).

Other themed events (honey and apitherapy festivals)	Periodically	Various European countries	Festivals and forums combining apitherapy with the cultural heritage of beekeeping are also popular in Europe. For example, Greece hosted the Meliama festival (Athens, 2008) in conjunction with the 5th Greek Congress on Apitherapy (apitherapy.com). In Slovenia, "Apitherapy Days" are regularly held under the auspices of the national beekeepers' association. Such events promote bee therapy and facilitate intercultural exchange of knowledge.
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Table 1.3 describes the defining stages of the institutionalization and scientific legitimization of apitherapy in the European context from the mid-19th century to the 2020s and demonstrates a steady trend in the transformation of apitherapy from empirical practice to evidence-based medicine. Since the first publications on the clinical use of bee venom (L. Deschardins, 1858; P. Terc, 1888), there has been a gradual professionalization of the field through the emergence of monographs (J. Hřoup, 1933), institutional initiatives (Apimondia commission, 1983; IFA, 2012), the creation of specialized congresses (Apimedica, 2006), and the harmonization of treatment standards. Since the 2000s, integrative approaches involving evidence-based medicine, international safety protocols, and formalized educational programs have become dominant. The trend of the last decade has been the regulatory introduction of apitherapy into the medical systems of individual EU countries (Romania, Slovenia, Lithuania), which indicates its growing importance in the context of functional and complementary medicine.

Thus, the dynamics and level of specialized scientific and practical events indicate a high degree of institutionalization of apitherapy in Europe. The regularity of symposiums, congresses, and the creation of certified training programs indicate a steady trend toward the legitimization of apitherapy as a component of integrative medicine. A characteristic feature of the European approach is the combination of traditional health practices with modern standards of evidence-based medicine, which is reflected in the formation of international professional associations, the development of unified clinical protocols, and the implementation of a professional training system.

Compared to Europe, apitherapy in the US has developed as an independent initiative of individual doctors and enthusiasts, mostly within the field of alternative medicine. However, the creation of the American Apitherapy Society (AAS) and the regular holding of national conferences indicate the gradual academization of this practice on both continents. A distinctive feature of both European and American apitherapy experience is the growing interest in apitherapy within functional medicine and bioengineering (in particular, research on apitoxin, honey-based medical films, etc.).

In the 21st century, apitherapy is evolving from a peripheral health practice to a multidisciplinary field with an extensive infrastructure for professional development, research institutes, and active intercultural cooperation.

#### **1.4. Apitherapy as a component of traditional and alternative medicine**

In the modern model of integrative medicine, apitherapy occupies an intermediate place between traditional and complementary approaches. Despite the growing role of biotechnology and pharmacotherapy, apitherapy retains its intermediate status due to its multifactorial mechanism of action, minimal pharmacological aggression, and centuries of empirical experience. Its affiliation with complementary and alternative medicine (CAM) is due to a combination of pharmacotherapeutic, physiotherapeutic, psycho-emotional, and nutritional effects, which corresponds to the concept of a holistic approach.

According to the classification of the National Center for Complementary and Integrative Health (NCCIH), apitherapy involves various practices related to the use of bee products, including honey, propolis, bee venom, royal jelly, wax, and bee pollen, which are not part of standard allopathic medicine but have proven their clinical usefulness in observed therapy. Within the framework of evidence-based CAM (EBCAM), apitherapy has acquired a specific status due to the availability of clinical trials on its effect on the course of chronic pain, respiratory, autoimmune, dermatological, and neurodegenerative diseases [38].

In the context of integrative medicine, apitherapy is implemented through the creation of a therapeutic agreement between the patient and the doctor, which is focused on the use of biologically active substances of natural origin. Approaches related to inhalation therapy in apihouse, apipuncture, apitoxin therapy, and nutritional modulation using apicultural products have significant potential in the treatment of stress disorders, immunodeficiency states, psychosomatic disorders, and palliative care.

Unlike classical pharmacotherapy, apitherapy does not require strict standardization of formulations, but its effectiveness depends on the quality of raw materials, dosage, individual characteristics of the patient, and conditions of drug use, and therefore it is important to develop evidence-based protocols for clinical use. In this context, it is appropriate to mention the efforts of the American Apitherapy Society to promote standards of apitherapy practice and organize the annual CMACC conference, which has become the main platform for sharing experience in the treatment with apicultural products and professional training of relevant specialists.

We observe a difference in the implementation of apitherapy in healthcare systems: in Europe, apitherapy is increasingly integrated into public healthcare systems, particularly in Germany, Romania, and Slovenia; meanwhile, in the US, its development is taking place mainly within the private sector of functional medicine. Although double-blind randomized studies are still rare, the practice of apitherapy is supported by empirical observations, clinical cases, and in vitro and in vivo biomedical studies, which generally confirm the anti-inflammatory, immunomodulatory, and analgesic properties of apiculture products [38].

The previous section examined European institutional support for apitherapy, particularly the establishment of the International Federation of Apitherapy (IFA) in 2012 and the organization of regular world congresses in Braşov, Kaunas, and Quito. At these events, a community of experts collaborates to develop standards, certify specialists, and implement international clinical guidelines. Countries such as Romania, Slovenia, Lithuania, and Germany provide examples of regulatory recognition of apitherapy within their healthcare systems and offer training programs for physicians, particularly in academic institutions where research is conducted on the effectiveness of apitherapy in autoimmune, respiratory, and pain-related conditions.

Within the modern classification of therapeutic approaches, apitherapy occupies a distinct position between alternative, complementary, and integrative medicine. In some countries where the concepts of “traditional medicine” and “complementary medicine” are considered equivalent, apitherapy is often associated with treatment modalities that have a long history of cultural application but are not fully integrated into the biomedical sphere. The National Center for Complementary and Integrative Health (NCCIH) classifies apitherapy accordingly: when used in conjunction with conventional clinical practice, it is categorized as complementary medicine; when applied in place of conventional medicine, it is considered alternative.

Like most methods that are historically based on natural remedies, apitherapy contains elements that are not included in the list of interventions recognized by the traditional medical training program (MD, DO). At the same time, it meets the criteria of the World Health Organization (WHO) for traditional medicine as a system of knowledge and practices based on the use of natural substances of animal or mineral origin (honey, propolis, apitoxin) and manual techniques (e.g., apipuncture) for diagnosis, treatment, and prevention.

In modern practice, apitherapy encompasses methods that belong to various categories of alternative medicine: nutritional therapy (consumption of honey, pollen, royal jelly), physiotherapy (apitoxin therapy, exposure to bee vibrations), aromatherapy (propolis inhalation), manual therapy (point apitherapy), and psychosomatic regulation (use of the bee environment for meditative immersion). These forms correspond to the typical characteristics of compensatory therapy –

supplementing the basic approaches of evidence-based medicine by activating the body's adaptive potential.

With the spread of the concept of integrative medicine (IM), the term “complementary and alternative medicine” (CAM) is increasingly being replaced by terminology that is complementary rather than antagonistic to traditional medicine.

In view of this, apitherapy is not classified as an outsider in the medical system, but as a component of a holistic, patient-oriented approach, embodying the synergy between biomedical and natural biological methods. Such integration involves the creation of a therapeutic alliance between patient and physician that is based not only on pathogenetic action, but also on cultural significance, biocompatibility, and individualized prescription.

According to the National Center for Health Statistics and the Centers for Disease Control and Prevention (CDC), more than 60% of the US population has used some form of integrative medicine, including apitherapy interventions. This is because natural products, such as honey, propolis, and bee venom, are among the most common remedies that are perceived as safe, effective, and culturally acceptable. This fact enables the gradual legitimization of apitherapy in the US medical field.

Within the framework of integrative medicine, apitherapy not only retains its cultural and therapeutic significance, but also shows significant potential for transdisciplinary testing through research into the mechanisms of action of apicultural products, clinical trials, the development of international standards for use, inclusion in medical education programs, and the creation of clinical pathways involving integrative therapeutic approaches (Table 1.4).

**Table 1.4**

**Common methods of integrative medicine in the United States used in apitherapy practice**

<b>IM method</b>	<b>Relevance for apitherapy</b>	<b>Licensing/Regulation</b>
Natural products / herbal medicines	Propolis, royal jelly, bee bread, pollen are widely used in apitherapy	Do not require FDA approval; quality control is critical
Deep breathing	Integrated into apitherapy – inhalation of air from a beehive	Not regulated as a separate medical practice
Meditation	Enhances the psychophysiological effect of apibudinochki	Does not require licensing
Osteopathy and chiropractic	Combined use of apitherapy with manual methods	DO and DC require a license in the US

Massage	Apiotoxin ointments are used during massage	Licensing is mandatory in most states
Yoga	Included in apitherapy retreat programs	Certification recommended, licensing not required
Diet therapy	Bee products are included in dietary therapy protocols	No license required if not part of clinical counseling
Progressive muscle relaxation	Enhances the effects of vibration exposure from apibudinochki	Does not require certification
Guided imagery	Used in restorative apitherapy sessions	Does not require licensing
Homeopathy	Apis mellifica is a homeopathic remedy containing bee venom.	Certification is possible; licensing is not mandatory

Given the increased popularity of complementary methods, healthcare professionals, especially family doctors, should be familiar with the basics of apitherapy as a potentially effective and safe component of an integrative care model. Such knowledge will not only ensure interdisciplinary collaboration but also foster trusting relationships with patients who choose complementary or alternative health care practices.

Over the past few decades, there has been a noticeable gradual reorientation of the US healthcare system towards an integrative model that combines traditional biomedical care with scientifically based complementary and alternative medicine (CAM) approaches. Different US states show varying degrees of integration of apitherapy into clinical practice. For example, in Colorado, there are private apitherapy centers that offer retreats and recovery programs using bee air and vibration therapy. In Washington and New Mexico, apistructural therapy has been developed in houses with a natural microclimate and pheromone exposure. In California, apitherapeutic approaches are increasingly being included in naturopathic and integrative training programs at medical universities.

In the US, evidence-based medicine (EBM) developed in the 1990s, within which the effectiveness of apitherapeutic interventions was assessed, and since then, apitherapy has been subjected to scientific analysis through a system of randomized controlled trials, meta-analyses, and systematic reviews. For example, an analysis of the Cochrane Library database shows that there are hundreds of studies confirming the effectiveness of apitoxin in osteoarthritis, chronic pain, and neurological disorders.

Although apitherapy is not yet included in the list of medical services covered by government or insurance programs in most states, its popularity is growing due to patient demand, widespread awareness among doctors, and the expansion of educational programs for healthcare professionals.

In clinical practice, honey, propolis, or apitoxin are increasingly recommended as adjunctive therapies to pharmacological treatment due to their reduced side effects and increased therapeutic resistance.

The increased interest in apitherapy among American patients is associated with several factors: distrust of pharmacological monotherapy, the search for natural remedies, cultural heritage (especially among migrants from Latin America and the Mediterranean), and the positive experiences of other patients. At the same time, there is a need to expand interdisciplinary dialogue between general practitioners, apitherapists, pharmacists, and researchers in order to develop an effective model for counseling patients on the safe use of apitherapy methods.

For further integration of apitherapy into the US healthcare system, the following measures should be taken: include modules on apitherapy in the curricula of medical universities and postgraduate education programs; create a registry of evidence-based apitherapy practices; ensure interstate coordination of certification standards and clinical use of bee products; create multidisciplinary working groups at government agencies to develop and expand areas of integrative medicine.

## **Conclusions to Chapter 1**

Thus, apitherapy in the United States occupies an intermediate position between complementary practice and evidence-based medicine and shows potential for integration into the modern clinical system with regulatory support, educational infrastructure, and interprofessional collaboration.

Apitherapy, as a component of complementary and alternative medicine, has taken an important place within the integrative approach to healthcare. Its growing popularity among healthcare professionals and patients necessitates the formation of regulatory, educational, and evidence bases for the safe and effective use of apitherapy methods in clinical practice. In many countries around the world, including the United States, apitherapy is used both within and outside the formal healthcare system, which raises requirements for its state regulation, professional standardization, and interdisciplinary research.

The use of the therapeutic capabilities of apitherapy in the system of evidence-based medicine requires additional efforts, in particular the integration of specialized modules into the curricula of medical universities, the development of postgraduate education programs, and the creation of an accessible information base for general practitioners. Since most patients choose apitherapy remedies on their own and do not report their use to doctors, it is critically important to

provide clinicians with tools for unbiased discussion of these practices, risk assessment, and personalized recommendations.

Public health institutions need to develop a strategic framework to support research, conduct clinical trials, and develop standards of evidence for apitherapy. The implementation of such approaches will create the conditions for the introduction of a comprehensive patient-centered model in which apitherapy is considered a scientifically sound complement to traditional medicine. Taking into account the clinical efficacy, biological safety, and cultural acceptability of apitherapy will promote informed decision-making by patients regarding health preservation and provide medical professionals with an effective tool for ensuring quality medical care.

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# THEORETICAL BASIS AND BIOLOGICAL MECHANISMS OF APITHERAPY



## 2.1. Basic principles of apitherapy

In the context of the modern development of integrative medicine, there is a growing need for standardization of therapeutic approaches that combine biologically active compounds of natural origin with clinically proven treatment protocols. This section attempts to formalize the principles of using bee products in therapeutic practice by systematizing the relevant biomedical, ethical, and clinical-organizational provisions. The analytical basis of the study involves a logical-semantic analysis of scientific sources, classification of practices, and a comparative review of empirical data recorded in interdisciplinary studies [1–3].

Table 2.1 presents a basic matrix of apitherapeutic practice, in which each principle represents the corresponding ethical, biomedical, or organizational-clinical aspects. Such formalization is a prerequisite for the standardization of apitherapy as a component of functional and preventive medicine [3].

**Table 2.1**

### Key principles of apitherapy

Principle of apitherapy	Essence of the principle
Bioactivity of bee products	Use of products with proven pharmacological activity: honey, propolis, apitoxin, etc.
Complementarity	The use of apitherapy as a supplement to traditional medical therapy, not as a replacement for it
Individualization of treatment	Selection of the type and dose of apiproduct according to the patient's somatic condition, age, and concomitant diseases
Biocentric approach	Focus on the body's natural self-regulation through stimulation of adaptive mechanisms
Gradualness and course-based approach	Use of apitherapy within clearly defined courses with dynamic monitoring of effectiveness
Multisensory stimulation	Combination of biochemical, thermal, mechanical, and aerosol effects (e.g., in beehives)
Safety and risk control	Monitoring for allergic reactions, infectious complications, and accurate dosing of apitoxin

Evidence of effectiveness	Use of clinical and laboratory research results to confirm effectiveness
Environmental friendliness and naturalness	Use of products obtained without chemical intervention, from controlled apiaries
An interdisciplinary approach	Integration of knowledge from medicine, biochemistry, physiology, toxicology, pharmacology, and nutrition

The proposed system of apitherapy principles is presented as a generalized model (see Table 2.1: Key Principles of Apitherapy), which organizes the main concepts underlying the therapeutic use of bee products. The description of this table aims not only to structure practical knowledge but also to conceptualize approaches validated within the interdisciplinary fields of medicine, biochemistry, pharmacology, and physiology. One of the fundamental principles, the bioactivity of bee products, involves the use of substances with proven pharmacological properties, including honey, propolis, apitoxin, and royal jelly. For example, the research of N. Al-Waili et al. demonstrated the effectiveness of honey in treating burn and diabetic wounds [1], confirming the clinical relevance of biologically active apiculture products.

Another key principle, complementarity, emphasizes the importance of integrating apitherapy into conventional medical protocols, particularly in the fields of rheumatology, otolaryngology, and gastroenterology. A study by S. Ghosh and R. J. Playford confirmed the synergistic effect of propolis in the treatment of inflammatory diseases of the gastrointestinal tract [2].

The principle of individualization of treatment determines the selection of apicultural products and dosage based on the patient's age, allergic status, and somatic condition. In the clinical practice of apitoxin therapy, it has been established that bee venom dosages must be adjusted according to IgE levels and associated immune disorders, a finding supported by several protocols of the American Apitherapy Society [3].

The biocentric approach involves stimulating the body's own adaptive mechanisms, which are associated with the neuroendocrine response to the influence of bee pheromones, vibrational fields, or flavonoid components. The principle of gradualness and coursework establishes the need to prescribe apitherapy within limited time courses, with clear monitoring of results. In the clinic of chronic pain syndromes, it has been established that the effectiveness of apipuncture increases precisely in a dynamic model, with the frequency of injections adapted depending on the body's responses [3].

Multisensory stimulation is achieved through a combination of mechanical, thermal, aerosol, and chemical effects, which is characteristic, for example, of inhalation therapy in beehives, and demonstrates an increase in heart rate variability and a decrease in anxiety. The principle of

safety requires mandatory monitoring for allergic reactions and toxic effects, as well as compliance with standards in the test dosage of apitoxin.

The principle of evidence-based medicine requires the implementation of the results of controlled clinical studies, including animal experiments and observations of patients who received apiculture products as an adjunct to basic therapy. Scientific reviews confirm the effect of propolis on the regulation of apoptosis and the expression of pro-inflammatory cytokines, which confirms its potential in the treatment of metabolic syndrome [4].

Ecological and naturalness, as a principle, represent the requirement for the selection of products from controlled apiaries that have not undergone thermal or chemical treatment. Finally, an interdisciplinary approach involves the integration of knowledge and methods from medicine, toxicology, and nutrition, which is a prerequisite for the clinical application of apitherapy within a personalized healthcare model.

Particular attention is paid to the interdisciplinary nature of apitherapy practices, which are based on the synthesis of medical, biochemical, pharmacological, and nutritional knowledge.

The systematization of the key principles of apitherapy has made it possible to conceptualize a holistic model of its application within integrative medicine. The proposed classification covers both biomedical (bioactivity, individualization, safety) and methodological (evidence-based, gradual, complementary) principles that ensure the compliance of apitherapeutic practice with modern clinical standards. The generalization of empirical data from clinical sources made it possible to deepen the interpretation of each principle through the prism of real therapeutic application.

The scientific novelty of the study lies in the fact that, for the first time, the principles of apitherapy have been formally organized into a logically consistent structure that can be used as a basis for clinical protocols, educational programs, and further interdisciplinary research. The presented system not only describes the principles of apitherapeutic intervention, but also justifies its integration into personalized treatment models, taking into account safety, efficacy, and ethical compliance.

## **2.2. The effect of bee products on the human body**

Bee products occupy an important place in complementary medicine as sources of multifunctional bioactive compounds. Due to their high bioavailability, low toxicological profile, and ability to influence key pathogenetic mechanisms, they are integrated into models of adjunctive therapy for chronic, infectious-inflammatory, autoimmune, and metabolic conditions. The most studied among them are honey, propolis, bee pollen, royal jelly, and apitoxin.

This section systematizes the therapeutic effects of the main bee products based on publications selected according to the following criteria:

1. the availability of clinical or experimental *in vivo* studies with results evaluated using validated instruments;
2. publication in scientific journals indexed in Scopus, PubMed, or Web of Science;
3. the presence of a description of the mechanisms of action with a confirmed biochemical basis;
4. compliance of the therapeutic effect with the practice of complementary or integrative medicine.

The information was selected through content analysis of meta-analyses, systematic reviews, and randomized clinical trials over the past ten years. All included items are relevant to clinical practice, as confirmed by empirical or biomolecular studies.

The composition of each bee product determines its unique pharmacological profile, which determines the possibilities for using these products in various fields of clinical medicine. Honey contains more than 200 biologically active compounds, including enzymes, phenolic acids, flavonoids, and antioxidants. Thanks to this, it exhibits antimicrobial, reparative, and metabolic properties. Propolis, rich in polyphenols and essential oils, has a cytotoxic effect on tumor cells and is highly effective in the treatment of infectious diseases. Apitoxin, which contains peptides and enzymes, has anti-inflammatory, immunomodulatory, and neuroprotective properties. Bee bread and royal jelly have pronounced nutraceutical and adaptogenic effects, helping to maintain systemic regulation and hormonal homeostasis.

The therapeutic effects of bee products summarized in Table 2.2 are the result of an analysis of sources selected according to specific criteria. The effects presented are grouped according to nosological categories within which bee products have demonstrated clinically or experimentally proven efficacy.

**Table 2.2**

**Therapeutic effects of bee products**

<b>Field of application</b>	<b>Potential effect</b>
Asthma	Anti-inflammatory effect, easier breathing
Wounds	Accelerated healing, antibacterial effect
Neurological diseases	Neuroprotection, anti-stress effect
Diabetes	Glycemic control, antioxidant activity
Cancer	Antimutagenic, antitumor activity

Gastrointestinal diseases	Improvement of microflora, gastroprotection
Cardiovascular diseases	Lowering blood pressure, supporting heart function

A comparative analysis of the therapeutic potential of bee products reveals differences in both the spectrum of action and the level of clinical evidence. Honey and propolis have the most substantiated clinical use [1]. Honey is effectively used in the treatment of acute and chronic wounds, gastritis, upper respiratory tract infections, and metabolic disorders [2]. Its effects are mainly mediated by antioxidant and enzymatic activity, which helps regulate inflammation, oxidative stress, and microbial load [3]. The use of honey in clinical practice has a solid evidence base due to its widespread use in dermatology, dietetics, geriatrics, and pediatrics [4].

Propolis exhibits pronounced antimicrobial and antitumor activity [5]. The ability of this product to modulate the immune response and initiate apoptosis of malignant cells makes it particularly important in experimental cancer therapy [6]. In addition, propolis is effective in the treatment of dental, otolaryngological, and gastrointestinal diseases, where inflammatory mechanisms play a key role [7]. At the same time, the lack of standardized raw materials and differences in composition depending on botanical origin create barriers to its large-scale clinical testing [8].

Apitoxin, when carefully dosed and safety controlled, shows promise in the treatment of neuroinflammatory and autoimmune conditions [9]. Its action is mainly mediated by the peptide melittin, which affects cytokine cascades, blocks cell proliferation, and stimulates neuroplasticity [10]. Research is currently underway on the possibilities of apitoxin nanoforms with increased targeting and reduced immunogenicity [11]. The main limitations are the high frequency of hypersensitivity reactions and a narrow therapeutic window [12].

Bee pollen and royal jelly are used as general metabolic support agents [13]. They do not have a narrowly targeted effect, but are important in geriatrics, immunoprophylaxis, and adaptation therapy [14]. Their positive effect on microelementosis, hormonal balance, and recovery from chronic stress has been confirmed in numerous clinical observations, although the body of randomized studies remains insufficient to establish therapeutic standards [15].

Despite their broad biological potential, the use of bee products is accompanied by a number of pharmacological risks that require appropriate clinical stratification [16]. The main complications are associated with immediate hypersensitivity, which most often manifests itself when using apitoxin, royal jelly, and bee pollen [17]. Cases of anaphylaxis, bronchospasm, and generalized urticaria have been described, necessitating a detailed allergy history and individual tolerance testing [18].

Another critical barrier to the clinical validation of apitherapeutic agents is the variability of their biochemical composition depending on regional botanical origin, climatic conditions, and harvesting methods [19]. The lack of a unified quality control system and insufficient standardization of active ingredients make it impossible to develop unified dosages and therapeutic protocols [20]. An urgent task is to create pharmacopoeial standards, bioactivity certificates, and specifications for each type of product with reference to clinical indications [21].

The integration of bee products into the system of evidence-based medicine requires multicenter randomized controlled trials with the use of representative samples [22]. Important conditions include: verification of efficacy biomarkers (C-reactive protein (CRP), interleukin-6 (IL-6), HbA1c, oxidative stress levels), comparison with reference drugs, stratification by comorbidities, and assessment of long-term safety [23]. Personalized protocols should be based not only on the patient's age and diagnosis, but also on their immune status, allergy profile, and the presence of concomitant pharmacotherapy [24]. The study focuses on systematizing the biomedical effects of the main bee products from the perspective of evidence-based medicine, formulating criteria for therapeutic relevance, and identifying priority areas for clinical study at the present stage. The presented analysis creates the basis for the transition from empirical apitherapy practices to their integration into protocols for complementary treatment of chronic and inflammatory diseases.

### **2.3. Biophysical properties of bee energy and their medical significance**

Apitherapy in the United States developed on the basis of adapted European practices, beginning in the colonial period when *Apis mellifera* was first introduced to the continent [6]. During the 19th and 20th centuries, a national beekeeping infrastructure emerged, forming the foundation for apitherapy as a branch of complementary medicine. Today, honey bees play a crucial role in U.S. agriculture, pollinating crops with an estimated market value of up to 15 billion dollars [7, 8].

The industrialization of apiculture has led to the displacement of native pollinators, the decline of wild colonies, the spread of parasites such as *Varroa destructor*, and an increase in pesticide use [9]. Despite these challenges, feral colonies persist, particularly in the Mississippi Delta, and are considered a valuable resource for genetic renewal [10, 11]. Modern American beekeeping is highly mobile, with more than one million hives transported seasonally between regions for crop pollination, especially almonds in California [12]. However, this practice has been linked to a decrease in bee lifespan and increased oxidative stress [13].

The honeybee holds a distinctive place in U.S. culture, integrating into social therapy programs and community initiatives, particularly those aimed at supporting veterans [14]. The discourse on apiculture also extends into artistic and therapeutic domains, where the symbolism of

the bee community is translated into healing environments that incorporate elements of light, vibration, and sound designed to interact with the human affective sphere.

American artists, including N. McCauley, M. Willi, G. Puyett, G. Berset, and L. Malen, create installations that model bee structures using wax, rhythmic signals, and live colonies. Their projects, including *The Fragile Bee*, *Honey Teachings*, and *The Good of the Hive*, promote parasympathetic regulation and community cohesion [15; 16]. Programmed Hive environments reduce neuropsychological stress by activating sensory models of cognitive stabilization [17].

These practices are complemented by economic transformations: despite the presence of more than 100,000 registered beekeepers, 90% of the market is controlled by large producers [20], while small enterprises focus on eco-ethical certification and direct sales [21]. Against this background, a new biocultural paradigm is emerging that integrates apitherapy, bioarchitecture, and art into a unified public health tool.

The term “bee energy” encompasses the biophysical characteristics of the bee colony environment, including acoustic vibrations (200–400 Hz), electromagnetic fields, stable temperature (35 °C), and volatile aromatic compounds such as pheromones and propolis [22–24]. These parameters act synergistically, influencing vegetative and neurophysiological regulation [22].

Results of EEG studies conducted in Poland and Ukraine demonstrate the normalization of brain activity after exposure to an apistructured environment. Recorded outcomes include a decrease in beta rhythms, improved connectivity in the frontal regions, and stabilization of cognitive indicators [16, 25]. Apistructures designed according to A. Olshansky’s model create a controlled sensory environment that facilitates heart rate normalization and pain reduction.

In complementary therapy, apitherapeutic structures do not replace pharmacological protocols but serve as instruments of gentle biophysical modulation. The combination of a stable microclimate, sound therapy, and aromatic stimulation supports the restoration of homeostasis, which is particularly valuable in cases of chronic stress, affective disorders, and somatization.

Thus, the beehive environment can be regarded as a potential component of integrative medicine. Its future development lies in the standardization of biophysical parameters, the creation of clinical protocols, and interdisciplinary research on its effects on neuroplasticity and functional brain coherence.

## **2.4. Scientific evidence of the effectiveness of apitherapy methods**

The integration of apitherapy into clinical practice requires a verified evidence base. Unlike yoga, sensory therapy, or zootherapy, the effectiveness of honey, propolis, royal jelly, and apitoxin

has been studied fragmentarily, with varying methodological quality. Most publications are based on *in vitro* and *in vivo* studies without further clinical testing, standardization of doses, protocols, or duration of treatment. Multicenter randomized controlled trials (RCTs) remain sporadic [26].

This gap between empirical results and formal evidence criteria limits the implementation of apitherapy in clinical recommendations. For example, the positive effect of apitoxin in rheumatoid arthritis or chronic pain syndromes has been documented in several clinical cases, but without further systematic reviews of high evidence quality. Thus, apitherapy can currently only be used as an adjunctive method with the informed consent of the patient and under the supervision of a specialist [26].

Apitherapy methods, especially apitoxin, can potentially cause immune reactions. Allergy testing is mandatory before starting treatment. There have been reported cases of anaphylaxis, dermatitis, and sensitization to protein components of bee products. This requires careful safety monitoring in future studies [26].

The current evidence base for apitherapy is fragmented and methodologically heterogeneous. There is a lack of biomarker validation of effects. In the future, interdisciplinary studies with standardized protocols, stratification of patients by risk groups, and justification of dosages are needed. It is worth introducing markers of effectiveness, in particular cytokine levels (IL-6, TNF- $\alpha$ ) and biochemical indicators of inflammation or cognitive function (MoCA, MMSE) [26].

Over the past five years, research into the therapeutic effects of apicultural products, particularly honey, in the context of neurodegenerative disorders has intensified. Preclinical and clinical observations have identified four key neurophysiological effects of honey: memory improvement, neuroprotection, reduction of stress symptoms, and antinociceptive effect. These results are associated with the modification of oxidative stress, suppression of neuroinflammation, and maintenance of homeostasis in the central nervous system [27].

A review in the journal *Molecules* combined 34 studies that confirmed the positive effect of apicultural products on the nervous system in conditions of chronic inflammation, ischemic damage, and degeneration. Most of the studies have a level of evidence C according to the Oxford Centre for Evidence-Based Medicine (OCEBM) classification and require further verification [27].

Ukrainian authors are also investigating the psychosomatic effects of apiculture products. For example, O. Danilyshyna, V. Dankevych, I. Pylypchuk, and Y. Savchuk described the potential of honey as an adaptogen in chronic emotional stress. At the same time, V. Dankevych, Ye. Dankevych, and P. Pyvovar examined the potential of Ukrainian honey to improve psychoemotional stability [28]. In a study by W. A. Weis et al., positive dynamics in the quality of life of elderly people

were recorded — after regular consumption of apiculture products, sleep, mood, appetite improved, and energy levels increased [29].

In a systematic scoping review, F. Zuhendri and colleagues outlined the potential neurotherapeutic effect of propolis in Alzheimer's disease, Parkinson's disease, epilepsy, ischemic brain damage, and depressive disorders [30].

Thus, existing *in vivo* studies and clinical observations confirm the multidirectional therapeutic potential of apicultural products in the field of psychoneurological health. At the same time, these results need to be verified through well-designed RCTs, biomarker objectification of effects (e.g., BDNF, IL-6 levels, or EEG changes), and formalization of protocols [27; 30].

*In vitro* studies of apicultural products are an important component of the primary evidence base for apitherapy. They allow the modeling of biochemical and cellular responses under controlled conditions. This allows for the evaluation of the antibacterial, anti-inflammatory, antioxidant, and cytoprotective properties of honey, propolis, royal jelly, and other products without the influence of systemic factors [5].

An analytical review by T. Eteraf-Oskouei and M. Najafi showed that natural honey inhibits the growth of Gram-positive and Gram-negative bacteria, reduces the level of pro-inflammatory mediators (TNF- $\alpha$ , IL-1 $\beta$ , IL-6), and neutralizes active oxygen species in endothelial, epithelial, and neuronal cell cultures [5].

Studies have demonstrated the high antioxidant activity of honey due to the presence of polyphenols, flavonoids, and enzymes that modulate cellular responses to oxidative stress. Propolis has shown pronounced cytoprotective properties in models of neurotoxicity, hepatotoxicity, and ischemic damage. In particular, in the SH-SY5Y cell line, propolis has been shown to reduce neuronal apoptosis by activating the antioxidant systems of glutathione and superoxide dismutase [5].

Despite the limited extrapolation of *in vitro* results to clinical practice, such studies identify bioactive compounds and potential mechanisms of action. They serve as a basis for further preclinical and clinical trials. However, the effects observed at the cellular level need to be confirmed in *in vivo* models with bioavailable forms of drugs and assessment of the toxicological profile [5; 26].

**Table 2.3**

**Levels of scientific evidence for apitherapy methods**

Type of study	Main effects studied	Level of evidence (OCEBM)	Main limitations
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<i>In vitro</i>	Antioxidant, anti-inflammatory, antibacterial, cytoprotective	5 (experimental models)	Lack of systemic interaction, inability to extrapolate results to humans
<i>In vivo</i> (in animals)	Neuroprotection, nootropic effect, reduction of inflammation	4 (evidence from models)	Biological differences, limited validity for humans
Clinical observations	Improved cognitive status, anti-stress effect, improved quality of life	3–4 (observational studies)	No randomization, small sample sizes
Systematic reviews	Summary of data on honey and propolis	2B–3 (reviews without RCT)	Uneven quality of included studies, lack of RCTs

The levels of evidence presented in Table 2.3 correspond to the OCEBM classification. Level 1 (highest) involves multicenter RCTs or meta-analyses, level 5 involves mechanistic explanations without human testing.

Most *in vitro* studies are classified as level 5 because they are performed on models and do not allow direct interpretation of the results for clinical practice. *In vivo* models are usually classified as level 4 due to biological differences between animals and humans [26].

Clinical observations without randomization (case series, pilot trials) are assigned a level of 3–4. Such studies may indicate clinical effects, but without control for confounding factors, they cannot be used as a basis for developing therapeutic protocols [26].

Systematic reviews in apitherapy often include heterogeneous preclinical studies, which is why their category does not exceed 2B–3. The lack of multicenter RCTs makes it impossible to achieve level 1A or 1B [26].

Even with the growing number of publications, the evidence base for apitherapy remains fragmented and unbalanced. To move to level 1A–1B, well-structured, prospective, blinded, multicenter RCTs using standardized apicultural products, biomarker assessment, and control of confounding variables (confounders) are needed [26].

Systematic reviews and meta-analyses are key to summarizing the evidence. Over the past decade, academic interest in the therapeutic potential of honey, propolis, and other apiculture products in preventive medicine and the adjunctive treatment of chronic pathologies has been growing. This is confirmed by publications in the journals *Nutrients*, *Biomedicines*, *Molecules*, and *Journal of Complementary and Integrative Medicine*, which discuss the use of apicultural products in neurodegenerative, inflammatory, and metabolic diseases [26; 27; 30].

Despite the abundance of publications, most reviews are based on preclinical studies (*in vitro* and *in vivo*). Only a few include limited clinical observations, making it impossible to formulate generalized conclusions with a high level of evidence. Most reviews fall within levels 3–4 according to the OCEBM classification system, meaning they provide intermediate or hypothetical evidence.

The main limitations of the scientific foundation for apitherapy are:

- insufficient number of multicenter randomized controlled trials (RCTs) required for levels 1A–1B;
- heterogeneity of protocols, variability in study design, and absence of control groups;
- compositional variability of apicultural products depending on their botanical, geographical, and technological origin;
- lack of standardized dosage regimens, which prevents the assessment of cumulative effects.

In summary, the evidence base for apitherapy remains fragmented and requires:

1. detailed stratification of patients in clinical samples;
2. substantiated biomarker validation of therapeutic effects (CRP, IL-6, BDNF, EEG);
3. adherence to PRISMA criteria when compiling systematic reviews;
4. standardization of protocols and dosages for apicultural products.

Without the integration of these components, apitherapy will remain a promising but marginal practice within the framework of evidence-based medicine. The available preclinical and clinical data, however, provide a strong foundation for conducting high-quality research that could elevate apitherapy to the level of internationally recognized therapeutic practice.

## **Conclusions to Chapter 2**

Apitherapy is currently undergoing a transition toward evidence-based medicine. Despite a considerable number of publications, its evidence base remains fragmented due to the absence of multicenter randomized controlled trials (RCTs), standardized protocols, and validated biomarkers. Most existing studies rely on *in vitro* and *in vivo* models with a low level of evidence (OCEBM 4–5), which limits the ability to formulate clinical recommendations.

Nevertheless, academic interest in apitherapy continues to grow, particularly in the fields of neuroprotection, immunomodulation, and antioxidant therapy. Recent publications in *Molecules*, *Nutrients*, *Biomedicines*, and the *Journal of Complementary and Integrative Medicine* focus on honey, propolis, and apitoxin, especially in relation to neurodegenerative, inflammatory, and metabolic disorders. However, most of these studies lack an RCT design, which classifies them no higher than level 3 according to the OCEBM system.

The key challenges include methodological heterogeneity, insufficient patient stratification, variability in the composition of apicultural products, and the absence of biomarker assessment (CRP, IL-6, BDNF, MoCA, EEG, MMSE).

Clinical observations confirm the effectiveness of bee products in managing chronic stress, cognitive disorders, and metabolic and inflammatory conditions. They demonstrate neuroprotective, adaptogenic, anti-stress, and antinociceptive properties. However, adherence to evidence-based medicine standards is essential for legitimizing apitherapy as a recognized clinical practice.

Advancement to levels 1A–1B will be possible through multicenter RCTs employing double-blind designs, standardized dosing, validated biomarkers, and confounder control. It is also necessary to apply PRISMA criteria in systematic reviews and use clinically relevant endpoints.

Thus, apitherapy is progressing from an empirical approach toward integration within personalized, biosafe, and evidence-based medicine.

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# INNOVATIVE METHOD OF APITHERAPY: “BEE MEDICAL BED IN A PYRAMID”



## 3.1. Concept of the method and its scientific basis

The concept of the combined apitherapy method, integrated into a structured architectural environment, is based on the idea of a multi-level therapeutic effect, which is implemented through a series of interrelated factors combined into a functional matrix model. This involves the systematic involvement of spatial, biophysical, chemical, bioecological, and neurophysiological parameters that affect the key regulatory systems of the human body. In the proposed model, environmental influence is conceptualized through the prism of four interrelated categories: sensory involvement, physiological response, neuropsychic integration, and social validity of health practices.

At the spatial level, the pyramidal geometry of the architectural structure is a decisive therapeutic factor. According to recent studies in architectural psychology and neurourbanism, this shape affects the vestibular, proprioceptive, and visual sensory systems. Spatially oriented perception activates the basic regulatory mechanisms of the central nervous system, contributing to the normalization of the psychophysiological state through the reduction of sympathetic activation and modulation of cortical activity. This is particularly important in the treatment of chronic stress, anxiety disorders, and vegetative homeostasis dysfunctions.

Moving on to the biophysical level, it is worth emphasizing the role of low-frequency acoustic vibrations generated by a bee colony. These vibrational signals are characterized by natural frequency modulation, which correlates with the parameters of biorhythmic stimulation used in rhythm therapy and vestibular rehabilitation. The impact on the auditory and tactile sensory systems causes the activation of the brain stem structures, which leads to a lasting relaxing effect, confirmed by a decrease in cortisol levels, stabilization of the heart rhythm, and improvement of vegetative regulation.

The chemical component of the method is realized through the inhalation of volatile organic compounds present in the air of the hive. These include bioactive fractions of propolis, wax, bee bread, and honey. Intranasal delivery of these substances occurs through the olfactory epithelium and influences both the mucous membranes of the respiratory tract and the limbic system, which is responsible for affective regulation and neuroendocrine integration. This allows the method to be

interpreted as a form of aromatherapy capable of producing beneficial effects in the treatment of respiratory diseases, chronic inflammatory conditions, and psychosomatic disorders.

The bioecological level of influence, in turn, is based on the concept of the biophilic effect, which postulates a positive psycho-emotional response to interaction with natural environments. The biophilic hypothesis, supported by extensive empirical data, points to an adaptive mechanism of sensory integration in which engagement with a living ecosystem, particularly the hive microbiome and the colony's soundscape, promotes activation of parasympathetic regulation and enhances patients' subjective well-being.

Finally, the neurophysiological level generalizes all previous mechanisms into a single integrative model of psychoneuroendocrine regulation. This involves the influence on the hypothalamic-pituitary-adrenal axis, the activation of the adaptive plasticity of the nervous system, and the normalization of disturbed vegetative functions. All these effects form a synergistic model of multifactorial stimulation, which goes beyond the sum of its components and requires further clinical validation within the framework of evidence-based approaches to integrative medicine. The specified components of the methodology are presented in the table.

**Table 3.1.**

**Integrative matrix of the methodology components**

<b>Level of influence</b>	<b>Therapeutic factor</b>	<b>Sensory system</b>	<b>Expected effect</b>
Spatial	Pyramidal geometry	Spatial, vestibular	Reduction of anxiety, normalization of rhythms
Biophysical	Acoustic vibrations	Auditory, tactile	Relaxation, pain reduction
Chemical	Volatile compounds (aromas)	Respiratory, breathing	Antimicrobial action, reduction of inflammation
Bioecological	Bee colony (as a "therapeutic environment")	Complex	Biophilic effect, sensory integration
Neurophysiological	Combined effect	Limbic system, CNS	Vegetative stabilization, improved sleep

Thus, the matrix model of the combined apitherapeutic technique reflects a multi-level approach to the rehabilitation and prevention of psychosomatic disorders and can be applied as an innovative technology of integrative medicine in clinical, sanatorium-resort, and preventive practice.

### **3.2. Bioenergetic features of a wooden pyramid with a thatched roof**

The Pyramid Bee Bed Therapy method is an innovative therapeutic concept in the field of integrative medicine, representing an interdisciplinary combination of a spatial-architectural model of influence with bioactive apitherapeutic action. Its fundamental principle is that the architectural form of the environment is not neutral to the patient's body: it can modulate psychophysiological reactions, vegetative regulation, neuroendocrine response, and subjective susceptibility to therapy. The spatial level of the technique, represented by the unique pyramidal geometry of the treatment module, is considered to be the primary determinant of therapeutic influence, preparing the sensory field for the perception of other levels of stimulation.

Despite the lack of sufficient evidence within the official clinical practice of the United States, the fundamental ideas underlying this technique are consistent with the Evidence-Based Design (EBD) paradigm, an approach recognized in medical architecture by The Center for Health Design [1]. According to the EBD concept, the physical environment of medical facilities (including room geometry, lighting conditions, materials, and space organization) has a direct impact on patient condition, recovery time, stress levels, and quality of therapy acceptance. Roger Ulrich's pioneering research (1984), which demonstrated a significant reduction in the length of hospitalisation and the need for analgesics among patients staying in rooms with a view of nature, became the methodological starting point for the formation of this paradigm [2].

It is also noteworthy that similar ideas found cultural reflection in American humanities, particularly in O. Henry's short story "The Last Leaf," where the aesthetic perception of external space is directly linked to the internal motivation to live. This can be interpreted as an example of an empathetic response to the architectural environment.

In this context, the use of a pyramidal structure as a spatial cluster for the healing process appears to be a logical continuation of architectural and medical research focused on the formative parameters of therapeutic environments. The geometry of the pyramid, as an archetypal structure historically associated with harmony, stability, and sacredness, may influence the psycho-emotional state of the individual, creating conditions for deeper psychophysiological relaxation. Archeomedical analogies, such as Egyptian cult complexes or Greek asclepieions, although lacking direct continuity, illustrate the long-standing tradition of using purposefully designed architectural environments as integral components of healing practices.

Modern empirical evidence includes several studies conducted in Japan, China, India, and other countries that confirm the existence of biological responses to exposure within pyramidal structures. Statistically significant changes have been observed in oxidative stress markers, mitochondrial activity, glutathione levels, and biochemical indicators of inflammation in laboratory

animals and cell cultures. However, it should be emphasized that these findings remain preliminary and require systematic verification through double-blind randomized clinical trials.

Therefore, the spatial dimension of the “bee therapeutic bed in a pyramid” technique should be regarded as an innovative architectural and medical tool with potential for integration into clinical and preventive practices, contingent upon further scientific validation. Its effects encompass psychophysiological relaxation, cognitive stabilization, and spatial sensory regulation, offering promising opportunities for the use of the pyramidal environment as an adjunct to bioactive therapy within the framework of integrative medicine.

### **3.3. Human interaction with the biofield of bees in the enclosed space of a pyramid**

The next component of the rationale for Anatolii Olshanskyi’s “bee healing bed in a pyramid” technique, the influence of the bee biofield, is interpreted within the framework of the modern concept of bioelectromagnetic integration, which recognizes the physiological interaction of living systems through non-local fields. In this context, the biofield refers to the totality of electromagnetic, biophotonic, acoustic, and mechanical oscillations that arise from the metabolic and neural activity of organisms and participate in the regulation of homeodynamics, interspecies sensory communication, and psychosomatic adaptation.

Unlike metaphysical interpretations, modern biophysics defines the biofield as a physically measurable phenomenon verified through instrumental methods such as electroencephalography (EEG), magnetoencephalography (MEG), electrocardiography (ECG), ultraweak photon emission (UPE) registration, and the detection of magnetic signals generated by ion currents in cell membranes. This form of electromagnetic radiation is recognized as a marker of the body’s functional state, particularly in neuroendocrine and immune regulation [3].

Bioelectromagnetic ecology has established that all living beings, including insects, generate characteristic electromagnetic fields that can be perceived by other organisms. The mechanisms of such perception may be direct, through receptor-based sensory detection, or indirect, through alterations in the neurovegetative balance caused by low-intensity fields. The biofield therefore functions as an interactive environment that facilitates adaptive communication between organisms and supports the restoration of functional integrity in cases of physiological or psychosomatic destabilization.

“Everything is energy, and that’s all there is. Tune into the frequency of the reality you want, and you can’t help but get that reality. It can’t be any other way. This is not philosophy. This is physics.” [4]

This statement underscores the importance of understanding the energy processes that exist in the surrounding world and their influence on human reality. In the context of modern scientific research, this idea finds confirmation in the works of prominent scientists. For example, Nikola Tesla, in his work "The Problem of Increasing Human Energy" (1900), noted: "Everything in nature is energy, and our task is to find ways to use it." [5]

Thus, both modern scientific studies and historical sources affirm the fundamental role of energy processes in nature and their influence on the functional state of living organisms.

In the case of *Apis mellifera*, professional sources describe multi-level communication that includes electrostatic fields generated during flight, perceived by other members of the colony; high-frequency vibrations associated with motor activity that propagate throughout the hive structure; volatile pheromones that interact with the central nervous system of other bees and, potentially, with humans; and temperature and acoustic modulations that correlate with the colony's metabolic rate. Studies have shown that bees can detect changes in the electrostatic parameters of their environment, demonstrating sensitivity to weak electromagnetic fields [6]. Similar mechanisms of electrocommunication have been documented in amphibians, fish, and marine mammals, suggesting an evolutionarily conserved function of electromagnetic interfacing among species. Research in animal-assisted therapy and veterinary bioacoustics further confirms that the physiological presence of animals, including microvibrational influence, contributes to a reduction in cortisol levels, improved autonomic regulation, and increased heart rate variability in patients. For instance, the frequency range of cat purring (25–150 Hz) has been associated with the activation of osteogenesis and accelerated tissue regeneration, findings that have been validated in clinical studies [7]. During apitherapy procedures conducted in specialized apihouses, effects have been recorded that may be associated with vibrational and electromagnetic stimulation, including increased heart rate variability, reduced stress hormone levels, and improved sleep quality. Although these effects have not yet received a definitive neurophysiological interpretation, they align with the hypothesis of sensory-modulated adaptation resulting from exposure to a bioactive environment that includes the presence of living organisms. Within the framework of the "bee therapeutic bed in a pyramid" technique, it is proposed that the bee colony functions not only as a source of biologically active volatile compounds but also as a living generator of microvibrations and electromagnetic signals that resonate with the receptor systems of the patient's body. This interaction occurs within a spatial structure designed according to the principles of harmonic geometry, which enhances the overall therapeutic effect through the resonant preparation of the human sensory field. A. Olshanskyi's methodology, with its integrative approach to the living energy of biosystems, provides the conceptual foundation for a new model of sensory-resonance therapy based on the modulation of the human internal environment through controlled exposure to the animal biofield within a structured architectural space.

### 3.4. Comparison of traditional and innovative methods of apitherapy

Apitherapy today encompasses a wide range of methods, from well-known and time-tested treatments, such as honey bandages for wound healing, to cutting-edge experimental approaches like melittin nanocapsules for cancer therapy. Traditional apitherapy methods provide natural, multi-component remedies that exert complex effects on the human body. Honey, propolis, pollen, bee bread, and bee venom demonstrate diverse biological properties, including anti-inflammatory, antimicrobial, and immunomodulatory effects. These treatments are generally safe, with the exception of bee venom, and can be used as complementary therapies or for symptom relief. However, the primary limitations of traditional apitherapeutic remedies include variability in composition, a lack of large-scale clinical studies, and limited integration into Western medical standards.

Innovative approaches to apitherapy seek to overcome these challenges and fully realize the therapeutic potential of bee-derived products. Nanotechnology has already demonstrated that bee products can be reformulated into novel delivery systems; for instance, nanoformulations enhance the efficacy and safety of melittin and propolis. Bioengineering is paving the way for the development of new medicinal molecules based on bee compounds, potentially bringing apitherapy into the field of evidence-based pharmacotherapy. Synthetic analogues of propolis or recombinant venom peptides, for example, may eventually become registered pharmaceutical agents.

Integration into personalized medicine and combination with conventional pharmaceuticals are contributing to the transformation of apitherapy from an “alternative” practice into a component of an integrative approach to patient care, one that values both scientific evidence and long-standing traditional experience. In the United States, where medical practice is grounded in evidence-based principles, apitherapy is gradually gaining recognition for its effectiveness in specific clinical areas, such as honey in dermatology, propolis in dentistry, and bee venom in experimental oncology.

For further advancement, it is essential to establish quality standards and dosage guidelines for bee products, increase physician awareness through education, and produce high-quality research that verifies clinical efficacy under controlled conditions.

**Table 3.2.**

**Comparison of apitherapy methods**

Method/approach	Active components	Methods of application	Scientific evidence	Safety	Prospects for implementation (USA)
Honey (traditional)	Sugars, enzymes, organic acids, phenolic	External (wounds, burns), internal	Strong for wounds; moderate for cough/ENT;	High; caution for infants, allergy	Used; potential for dermatology

	compounds, flavonoids	(food supplement, syrup)	antioxidant effect	sufferers, diabetics	and infections
Propolis (traditional)	Flavonoids, phenolic acids, terpenes, essential oils, wax, vitamins	External (tinctures, ointments), internal (capsules, tinctures)	Moderate; large RCTs are needed; proven effect in infections and inflammations	Good; possible allergies, safe for short-term use	Wide market; prospects – standardized preparations
Bee pollen (traditional)	Proteins, carbohydrates, fatty acids, vitamins, minerals, phenols	Internal: granules or powder as a dietary supplement	Good as a nutrient; weak evidence as a medicine	High; caution with allergies, risk of contamination	As a superfood; likely inclusion in wellness programs
Bee pollen (traditional)	Similar to pollen, but enriched by fermentation: more vitamins and amino acids	Internal: granules that dissolve or are swallowed	In vitro confirmation, animal data; limited human evidence	High; fermentation reduces allergenicity	May be included in dietetics; low probability as an official medicine
Bee venom (traditional)	Peptides, enzymes, amines (melittin, apamin, phospholipase A2, histamine)	Injection or ointment; bee stings	In vitro/in vivo effects; individual RCTs; low-to-moderate certainty	Low without medical supervision; high risk of anaphylaxis	May be licensed poison; potential for cancer therapy
Nanoformulations of bee products (innovative)	Liposomes, polymer/silver nanoparticles with bee products	Parenteral, external, oral (depending on form)	Preclinical data; no clinical data yet	Higher due to controlled delivery; nanotoxicity assessment required	New dosage forms; the US is a leader in nanomedicine
Bioengineered apipreparations (innovative)	Recombinant or synthetic analogues of natural components	Parenteral or in tablet form	Laboratory data; clinical trials expected	Expected to be high; important to verify immunogenicity	Mass production; patenting potential
Personalized apitherapy (innovative concept)	—	Individualized dosing for each patient	Concept requiring pharmacogenomic research	Depends on selection; increases	Suitable for precision medicine; as part of

				with personaliza tion	complement ary therapy
Synergy with pharmaceuticals (innovative/combined)	Honey/propolis/v enom + antibiotics/chemo therapy drugs	Combined prescription or ready- made combined forms	In vitro/individu al clinical trials; RCTs of specific combinations are needed	Total; possibility of reducing the dose of basic drugs	Integrative protocols; possible official inclusion in standards

### Conclusions to Section 3

The “bee bed in a pyramid” technique extends beyond conventional apitherapy, offering a synergistic therapeutic platform that combines bioelectromagnetic stimulation, inhalation of volatile bee products, and vibroacoustic resonance therapy. A distinctive element of this method is the architectural form of the pyramid, which structurally enhances biophysical interaction through the phenomenon of coherent wave interference.

Synergistic approaches align with the modern concept of evidence-based polypharmacy, which combines agents with different mechanisms of action to achieve optimal results. For American medicine, accustomed to standardized treatment protocols, the integration of apitherapy through synergy becomes feasible if two conditions are met: (1) the combined approach proves more effective than the standard treatment, and (2) it is safe and does not interfere with the primary therapy.

Certain medical fields are already demonstrating readiness for such integration. For example, in wound therapy, honey has effectively become a standard adjunct to surgical treatment, illustrating the synergy between traditional and modern approaches. It is reasonable to anticipate that in the future, official combination regimens will emerge in which apitherapy constitutes a component of recognized therapeutic protocols.

Within the context of innovative treatment methods, A. Olshanskyi’s technique can be viewed as a pilot model for researching sensor-modulated therapeutic interventions designed to optimize the body’s internal environment through the controlled presence of a bioactive factor of animal origin.

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# PATENT RESEARCH AND SCIENTIFIC DEVELOPMENTS



## 4.1. Ukrainian patent for the utility model “Therapeutic bed in a pyramid” by Anatolii Olshanskyi

MINISTRY OF ECONOMY

NATIONAL INTELLECTUAL PROPERTY AUTHORITY STATE ORGANIZATION

"UKRAINIAN NATIONAL OFFICE OF INTELLECTUAL PROPERTY AND INNOVATION"

(UKRNOIVI)

1 Dmytro Godzenko St., Kyiv, 01601, tel.: (044) 209-27-06 E-mail: office@nipo.gov.ua,  
EDRPOU code 44673629

### Receipt of electronic application for a utility model

Incoming No. **612358** Date and time of receipt **09.12.2024 14:53:20**

Application number	<b>u202405813</b> (hereinafter, this number must be referenced)
Applicant	Anatolii Ivanovich Olshanskyi
Name of utility model	MEDICAL BED IN A PYRAMID
Mailing address	Taras Grygorovych Rudyi; PO Box 31, Kyiv-136, 04136
Materials submitted	
Application for state registration of an invention (utility model)	
Description of the utility model (pages – 1)	
Drawings (pages – 1)	

**Note: Received by the electronic application submission system**

The submitted electronic application is considered the original. No paper copy of the application is required!

Consultations on technical issues related to the electronic application submission system:  
(044) 494-05-57.

Intellectual Property Document Registration Department: (044) 494-05-95, (044) 494-05-94.

Sequential number of the application, determined by the applicant		Date of receipt		
[22] Date of application submission	Priority	[51] IPC	EB	[21] Application number
[86] Registration number and date of filing of the international application as determined by the receiving office				
[87] Number and date of international publication of the international application				
<p><b>APPLICATION</b> for state registration of an invention (utility model)</p> <p>MINISTRY OF ECONOMY</p> <p>NATIONAL INTELLECTUAL PROPERTY AUTHORITY</p> <p>STATE ORGANIZATION "UKRAINIAN NATIONAL OFFICE INTELLECTUAL PROPERTY AND INNOVATION" (UKRNOIVI)</p> <p><input type="checkbox"/> 1 Dmytro Godzenko Street, Kyiv-42, 01601</p> <p><input checked="" type="checkbox"/> By submitting the documents listed below, I (we) request the issuance of: a Ukrainian patent for an invention a Ukrainian patent for a utility model</p>				
[71] Applicant(s)			EDRPOU code (for Ukrainian applicants)	
Anatolii Ivanovich Olshanskyi; <b>15-a Solomyanska St., apt. 60, Kyiv, 03110 (UA)</b>				
(indicate the full name or title of the applicant(s), their place of residence or location, and the country code in accordance with WIPO Standard ST.3. Information about the place of residence of the authors/applicants is provided under code (72)				
<p>I (we) request that priority be established for <input type="checkbox"/> application <input type="checkbox"/> of the invention formula items under application No. by date:</p> <p><input type="checkbox"/> the filing of the previous application(s) in a member state of the Paris Convention (provide data under codes (31), (32), (33) the filing with the Institution of the previous application from which this application was derived (provide data under code (62)</p> <p><input type="checkbox"/> filing with the Office of the previous application (provide data under code (66))</p>				

[31] Number of the previous application	[32] Date of filing of the previous application	[33] Code of the state of filing of the previous application in accordance with WIPO Standard ST.3	[62] Number and date of filing of the previous application with the Office from which this application was derived	[66] Number and date of the filing of the previous application with the Office
[54] Title of the invention (utility model) <b>MEDICAL BED IN A PYRAMID</b>				
Correspondence address, surname or name of the addressee <b>P/S:31, Kyiv-136-04136; Rudyi Taras Grygorovych</b> Phone <b>0503554993</b> E-mail <b>rudypatent@gmail.com</b> Fax				
[74] Full name and registration number of the representative in intellectual property matters Surname or full name of another authorized person <b>Rudy Taras Grygorovych; Registration number: 389</b>				

I (we) request that the publication of the application be expedited

List of attached documents	Number of pages	Number of copies	Grounds for the right to file an application and obtain a patent (without submitting documents), if the inventor(s) is not the applicant(s): <input type="checkbox"/> there is a document on the transfer of rights by the inventor(s) or employer(s) to the successor(s) <input type="checkbox"/> there is a document on the right of inheritance
<input checked="" type="checkbox"/> description of the utility model	<b>1</b>	<b>3</b>	
<input type="checkbox"/> formula of the utility model		<b>3</b>	
<input checked="" type="checkbox"/> drawings and other illustrative materials	<b>1</b>	<b>3</b>	
<input type="checkbox"/> abstract		<b>3</b>	
<input type="checkbox"/> document confirming payment of the application fee		<b>1</b>	
<input type="checkbox"/> document confirming the existence of grounds for reducing the fee or exemption from payment of the fee		<b>1</b>	
<input type="checkbox"/> document confirming the deposit of the strain		<b>1</b>	
<input type="checkbox"/> copy of the previous application confirming the right to priority		<b>1</b>	

<input type="checkbox"/> translation of the application into Ukrainian		<b>3</b>	
<input type="checkbox"/> document confirming the authority of the authorized representative (power of attorney)			
Other documents:			
<input type="checkbox"/> international search report			
[72] Inventor(s) Inventor(s)-applicant(s) (full name)	Place of residence and country code according to WIPO Standard ST.3 (for foreign persons – only the country code)		Signature(s) of the inventor(s)-applicant(s)
Anatolii Ivanovich Olshanskyi	<b>15-a Solomyanska St., apt. 60, Kyiv, 03110 (UA)</b>		
I (we)			
request that I (we) not be mentioned as the inventor(s) in the publication of information regarding the patent application Signature(s) of the inventor(s)			
Signature(s) of the applicant(s)			
Date of signature M.P.	If the applicant is a legal entity, the signature of the person authorized to do so, indicating their position, shall be affixed with a seal. If all authors are applicants, their signatures shall be indicated under code (72).		

## Formula

1. A therapeutic bed in a pyramid, located inside a pyramid oriented at right angles to the four cardinal directions, with a window formed by hives made of non-resinous wood, each accommodating at least one bee colony. The structure is characterized in that the bed of hives is not solid and contains openings for access and maintenance of the bees. A ventilation grille is installed in the ceiling of each hive. The pyramid, the body of which is covered with reeds, rests on at least four supports. The doors and hives are placed at the base of the pyramid so that the lower part of each hive with flight holes extends outward, while the upper part remains inside the pyramid.
2. A therapeutic bed in a pyramid according to paragraph 1, characterized in that it is positioned inside the pyramid so that the side edges of the bed opposite each corner of the pyramid are oriented toward the four cardinal directions.
3. A therapeutic bed in a pyramid according to paragraph 1, characterized in that the steps and flight holes are located beneath the pyramid.

4. A therapeutic bed in a pyramid according to paragraph 1, characterized in that the pyramid has supporting pillars arranged around its perimeter, the number of pillars and the height of the steps depending on the total area of the pyramid and the number of hives.

With deep respect,

Representative of the Applicant

Patent Attorney No. 389

Taras Grygorovych Rudyi

## THERAPEUTIC BED IN A PYRAMID

The proposed utility model belongs to the field of alternative medicine and is used to achieve a therapeutic and health-improving effect, which manifests itself in the normalization of human blood pressure, the disappearance of headaches, the normalization of mental and nervous disorders, the treatment of oncological diseases, spinal hernias, etc. The patent for the utility model is shown in Fig. 4.1.



**Fig. 4.1.** Ukrainian patent for the utility model “Therapeutic bed in a pyramid”

It is known that Sumerian kings and Egyptian pharaohs built pyramids and used them to heal their wounds, while their wives gave birth within these structures. Recent studies have demonstrated that pyramids are capable of concentrating cosmic energy, which influences and organizes the internal structure of both inorganic and organic matter. Particularly noteworthy is the antiseptic

effect observed inside pyramids, which inhibits the growth of pus-forming bacteria. This phenomenon has opened up broad possibilities for the use of pyramids in food production and preservation, as well as in alternative medicine for treating patients with various diseases (see, for example, the article “Biopyramid – A Machine of Death or a Forge of Health,” *Inventor and Rationalizer* magazine, 1998, No. 4, pp. 14–15).

A well-known therapeutic hive integrated into a pyramid [Patent No. 80663, UA, published on June 10, 2013] serves as a therapeutic device designed to improve human health by influencing the body through the atmosphere and biofield of bee colonies. However, the dimensions of this device are not sufficiently comfortable to accommodate two or more people lying down simultaneously. In addition, the placement of the hive in this structure is inconvenient for the bees’ flight activity, and the bed, positioned close to one of the pyramid’s edges, disrupts the natural energy field within the pyramid.

The task underlying the utility model is to design a therapeutic bed located inside a pyramid that can comfortably accommodate two or more people lying down simultaneously, while providing convenient access and maintenance for bee colonies. The model aims to increase the number of hives and bee colonies, achieve the highest concentration of bioenergy within the pyramid, and ensure the closest and safest contact between the patient and the bees.

The technical result of the utility model is a device for human health improvement and therapy, a therapeutic bed placed inside a pyramid formed of wooden hives containing bee colonies. Ventilation holes are made in the ceilings of the hives to allow the release of aromas and phytoncides, such as the scent of flowers and nectar. Inhalation of these volatile compounds improves the condition of the human respiratory tract. The rhythmic buzzing of bees affects the human psyche and subconscious, producing a calming effect, normalizing blood pressure, alleviating headaches, regulating the nervous system, and inducing a meditative state. In combination with the bee biofield and the pyramid’s energy, a synergistic healing and restorative effect is achieved. Negatively charged ions formed as a result of bee flight and the flow of electric charges from the hairs on their bodies, along with inhalation of a mixture of honey, propolis, and flower nectar released from the actively functioning hives, create a microvibrational massage that influences the human biofield.

The technical result is achieved by constructing a therapeutic bed (1) composed of non-solid hives (3) made of non-resinous wood, each containing at least one bee colony, within a pyramid oriented toward the four cardinal directions. The bed of hives includes openings for bee access and maintenance, and each hive ceiling is equipped with a ventilation grille (4). The pyramid, the body of which is covered with reeds (5), rests on at least four supports (6) and includes flight boards and landing platforms (7) located at the base of the pyramid to ensure convenient entry for the bees. This

structural design allows bees to settle comfortably within the hives, increases the number of hives and colonies, enhances the size and effectiveness of the therapeutic bed, and provides a greater healing impact while ensuring a safe and comfortable environment for patients inside the pyramid.

The doors and hives are placed at the bottom of the pyramid so that the lower part of the hive with the flight boards protrudes outward, and the upper part of the hive is inside the pyramid. The placement of the door in the bottom of the pyramid (location not indicated) allows the pyramid body to be made and covered with reeds (5), which does not disturb the internal energy field of the pyramid, allows air to pass through easily, and has high thermal insulation properties. The entrance to the pyramid is via steps (8) located under the pyramid, through a door in the bottom. The pyramid has support pillars (9) around the perimeter; the number of pillars and the height of the steps depend on the area of the pyramid and the number of hives. The treatment bed is placed in the pyramid so that the side edges of the bed are located opposite each corner of the pyramid, oriented with their edges towards the four sides of the world, as shown in Fig. 2.

List of drawing figures:

Fig. 1 – general view; Fig. 2 – view from below.

1. treatment bed
2. window
3. beehives
4. bed-beehive ceiling with ventilation grilles
5. reed body
6. supports
7. flight boards and landing boards
8. steps
9. support posts.

List of drawing figures

No. Figures	Drawing name	Structural elements

Fig. 1	General view	1 – treatment bed, 2 – window, 3 – hives, 5 – reed body, 6 – supports, 7 – flight boards and landing boards, 8 – steps, 9 – support pillars
Fig. 2	View from below	4 – bed-beehive ceiling with ventilation grilles

Information confirming the feasibility of the utility model:

Treatment is not recommended for people allergic to pollen and the smell of beehives.

The procedures are performed 10–12 times throughout the entire treatment process. The patient must lie on the treatment bed in the pyramid for at least half an hour to an hour a day, several times a week.

Treatment example: The subject of treatment is a patient with blood pressure problems, which was measured at 160 over 80 with a tonometer. The patient enters the pyramid for healing, lies down on the surface of the treatment bed, which is the upper base of the beehive, and remains there for one hour. The treatment session lasts one hour daily for one month. After completing the course of treatment, the patient's blood pressure, when measured with a tonometer, was within the range of 120/80.

Usually, 15-20 minutes after lying down on the treatment bed, the patient falls asleep, enters a deep sleep, calms down, and becomes balanced.

With deep respect, Representative of the applicant,

Patent Attorney No. 389      Taras Grygorovych Rudy

## Abstract

A treatment bed placed inside a pyramid oriented at right angles to the four sides of the world with a window, formed by hives made of non-resinous wood, each of which accommodates at least one bee colony, wherein the bed of hives is not solid, has openings for access and care of the bees,

and the ceiling of each hive has a ventilation grille, the pyramid, the body of which is covered with reeds, stands on at least four supports, the doors and hives are placed at the bottom of the pyramid so that the lower part of the hive with flight holes protrudes outward, and the upper part of the hive is inside the pyramid. (A diagram of the treatment bed in the pyramid (patent model) is shown in Fig. 4.2)

With deep respect, Representative of the applicant,

Patent Attorney No. 389 Taras Grygorovych Rudyi

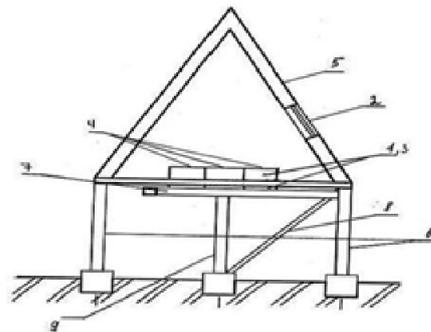


Fig.1

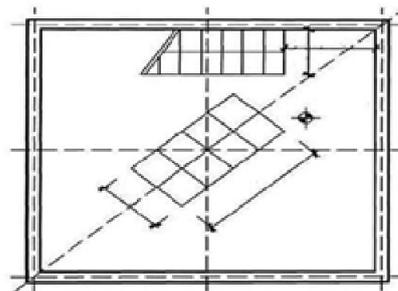


Fig.2

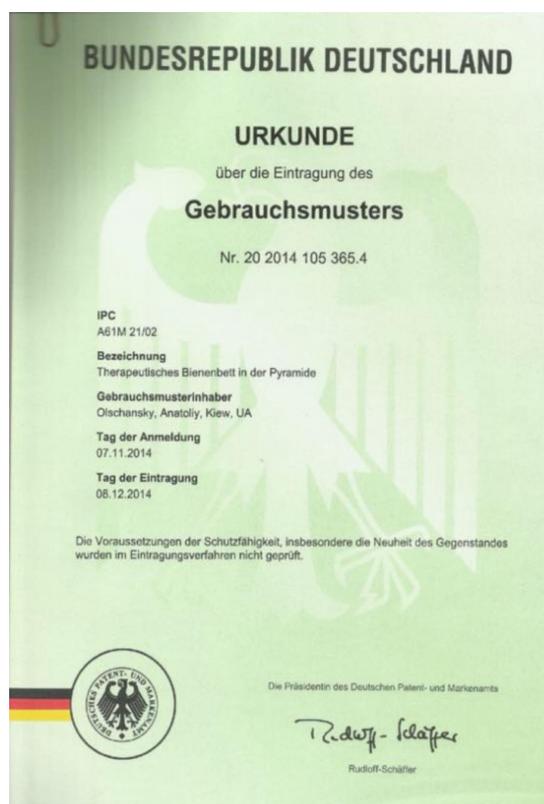
**Fig. 4.2.** Structural diagram of a therapeutic bed in a pyramid (patent model)

#### **4.2. German patent “Therapeutic bees in a pyramid” by Anatolii Olshanskyi**

In the modern system of international intellectual property protection, registering a utility model with patent offices in developed countries is not only a legal procedure but also an important marker of recognition of the innovative potential of an invention at the global level. In particular, the legal protection system operating within the Federal Republic of Germany is characterized by a high degree of procedural detail, institutional reliability, and a focus on supporting practically significant technological solutions that can be integrated into the European market for goods and services.

In this context, obtaining legal protection by registering a utility model with the German Patent and Trademark Office (Deutsches Patent- und Markenamt) is evidence of the technical solution's compliance with the requirements of legal capacity, in particular engineering novelty, functional expediency, and potential commercial applicability. It is important to note that the German model of intellectual property regulation allows for the prompt registration of authorship rights through the Gebrauchsmuster procedure (utility model registration), which is simplified but ensures the legal validity of the claimed technical solution.

The document shown in the photo (Fig. 4.3) is official proof of the registration of a utility model in the patent system of the Federal Republic of Germany, confirming the recognition of the technical novelty and potential applied value of the development within German jurisdiction. It certifies the fact of entry into the register of utility models of an innovative invention called "Therapeutic Bee Bed in a Pyramid" (Therapeutisches Bienenbett in der Pyramide), which combines the architectural concept of a pyramid with the bioactive environment of bee therapy. The registration was carried out in accordance with the rules defined by the International Patent Classification, under category A61M 21/02, which covers medical devices that affect the body through physiologically active environments, including air flows, inhalation effects, or electromagnetic vibrations.



**Fig. 4.3.** Registration of a utility model in the patent system of the Federal Republic of Germany

The author and owner of the rights to this model is Anatolii Olshanskyi, whose place of residence is listed as Kyiv, Ukraine. The application was filed on November 7, 2014, and officially entered into the register on December 8, 2014, which attests to the prompt and positive response of the German intellectual property system to the technical proposal. A distinctive feature of this type of protective document is that, unlike patents, the registration of a Gebrauchsmuster (utility model) in Germany does not involve a full examination for compliance with the criteria of novelty, inventive step, and industrial applicability. In other words, the procedure itself is declarative, but it certifies the applicant's good faith and forms the legal basis for further protection of the technical solution within the country, as well as for potential filing of applications in other jurisdictions in accordance with agreements such as the PCT or European mechanisms for harmonization of patent legislation. In addition, the certificate bears the seal of the state authority – Deutsches Patent- und Markenamt – and the signature of the head of the agency, which ensures the document's legal validity. Formally, this certificate can be used as proof of priority of authorship, as a basis for a commercial license, or as an argument in court or administrative proceedings concerning intellectual property rights infringement. The utility model “Therapeutic Bee Bed in a Pyramid” represents an innovative approach that integrates apitherapy practices with modern architectural solutions in the field of spatial medicine. Its functional concept is based on the application of bioresonance and vibration therapy principles, along with the use of living ecological agents aimed at restoring the somatic and psycho-emotional balance of patients.

The registration of this model in Germany is not only a legal step but also an acknowledgment of the technology's potential for integration into the European system of complementary and preventive medicine. This registration creates opportunities for technology transfer, public presentation at international medical forums, inclusion in innovative cluster platforms, and the attraction of grant funding for further stages of development, standardization, and clinical testing. The document serves as a valuable component of the strategic framework for establishing legal protection around a unique Ukrainian medical and ecological innovation that has the potential to occupy a prominent position within the 21st-century integrative healthcare system.

The existence of such a document not only certifies intellectual property rights but also opens prospects for further development, investment, technology transfer, and commercial implementation both within the European Union and internationally.

In 2025, Anatolii Olshanskyi's scientific work entitled “Therapeutic Bee Bed in a Pyramid” won first place at the 3rd Congress of the Romanian Society of Apitherapy, Phytotherapy, and Aromatherapy, and the 5th Congress of the International Apitherapy Federation, held on May 16–19, 2025, in Bucharest (Pullman Hotel). The award was officially presented by the President of both organizations, Dr. Stefan Stangaciu (a photograph of the diploma is shown in Fig. 4.4).

The presented development is an experimental symbiosis of bioresonance therapy, the influence of bee esters, the thermal energy of the hive, and the pyramid shape as an energy module. Studies prove the positive effect of such a structure on heart rate variability, nervous system regulation, and overall human well-being. Practical testing was carried out with the participation of volunteers and aroused interest in medical and health institutions focused on integrative medicine.



**Fig. 4.4.** Diploma for first place at the International Apitherapy Congress for the development of “Therapeutic bee bed in the pyramid”

*Source: author's photo*

This scientific development is the basis for further patent research, in particular in the direction of structural optimization of the therapeutic bed, adaptation to different climatic conditions, and the study of the long-term effect of exposure in such an environment.

### **4.3. Scientific work “Health promotion and disease prevention in humans” using a wooden pyramid**

Pyramidal structures are getting a lot of attention in American wellness architecture because they can bring geometric harmony to spaces, boost cognitive balance, and help with mental and emotional relaxation. Similar approaches have been implemented in the design of medical wellness centers in Arizona and California, where pyramidal structures are actively used to create meditation areas, spatial bioenergy regulation, and alternative therapeutic practices.

From this analytical perspective, apistruure therapy emerges as an institutionalized branch of complementary medicine that arose as a result of structural transformations in the American healthcare system in the post-industrial era. It represents the processes of medical pluralism that have developed in the context of increased demand for biocentric therapeutic approaches adapted to the market conditions of diversification and globalization of medical knowledge. Thus, apistruure therapy is a promising model of therapeutic integration in the American context, which has the potential to significantly complement modern health strategies aimed at cognitive stabilization, restoration of neurohumoral balance, and optimization of vegetative regulatory mechanisms.

The importance of the research base lies in the objective confirmation of the effectiveness of the apitherapeutic environment. In particular, studies demonstrate the positive effect of staying in a pyramidal apitherapeutic environment on neurophysiological indicators such as electroencephalographic activity, which indicates the potential of this method in normalizing the functional state of the nervous system.

An interdisciplinary approach, including neurophysiology, psychophysiology, and bioenergy, allows for a comprehensive assessment of the impact of the apitherapeutic environment on the human body. The use of electroencephalography (EEG) to monitor brain activity, psychophysiological testing to assess emotional state, and analysis of bioenergetic parameters of the environment provides a deep understanding of the mechanisms of action of apistruure therapy.

Thus, scientific verification of apistruure therapy is necessary for its integration into modern medical practice and confirmation of its effectiveness as a complementary method of healing.

The concept of a scientific research location for apistruure therapy, initiated by A. Olshansky, is aimed at the systematic study of the influence of the apitherapeutic environment on the physiological, psychophysiological, and bioenergetic parameters of the human body. The research location functions as an interdisciplinary platform that brings together specialists in medicine, biophysics, psychology, sociology, and economics, providing a comprehensive approach to the study and implementation of innovative health technologies.

Research conducted by A. Olshanskyi demonstrates that staying in a pyramidal structure with beehives contributes to the normalization of brain activity and improvement of the psycho-emotional state of patients.

One of the key conditions for the legitimacy of apitherapy practices in the United States medical discourse is scientific verification, meaning a system of evidence that meets FDA requirements, includes IRB approval procedures, and is based on standardized protocols. In this context, the research site demonstrates compliance with the methodological expectations of

American medical science, particularly in the areas of neurophysiological monitoring and psychophysiological testing. These assessments employ tools such as the STAI-AD scale and HRV analysis, conducted through biofeedback, as well as the measurement of physiological parameters including heart rate and heart rate variability. Such indicators make it possible to evaluate the impact of the apitherapeutic environment on the psycho-emotional state and autonomic nervous system of patients.

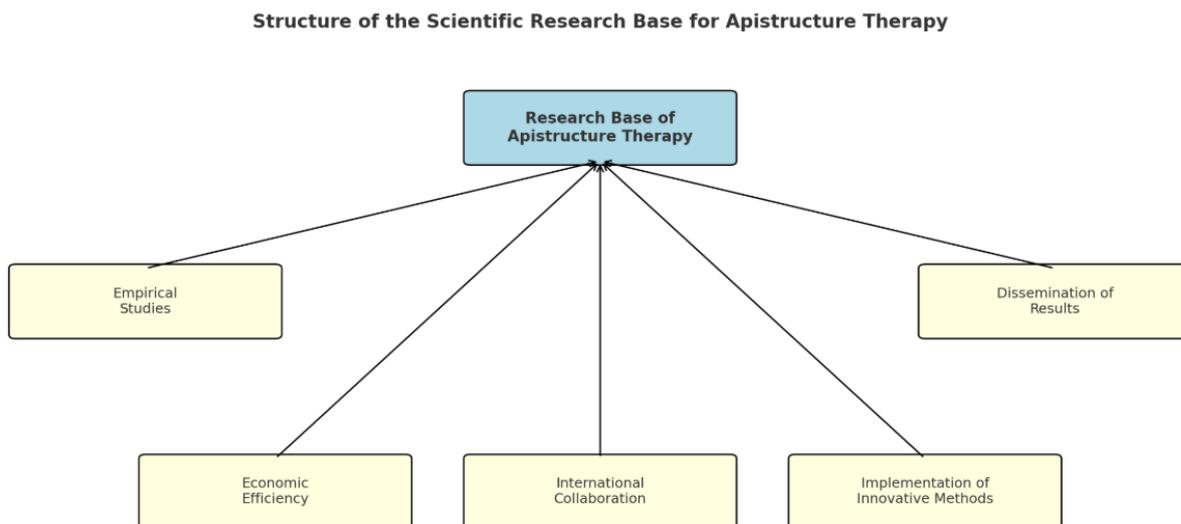
Physiological aspects are investigated by analyzing the influence of pyramid geometry on the body's neurohumoral and bioelectrical processes, as well as the interaction between bee vibrations and the structural features of the architectural environment. This comprehensive approach allows researchers to assess the effect of the apitherapeutic space on the human psychophysiological state and to identify specific mechanisms underlying its therapeutic action.

The results of this research are regularly published in peer-reviewed scientific journals, demonstrating active scholarly engagement and openness to the scientific community. In particular, A. Olshanskyi's publication "Economic Efficiency of Implementing Innovative Health Technologies in Medical Tourism in Ukraine and the United States" substantiates the model of apistructure therapy as an investment-attractive format of complementary health enhancement. Special attention is devoted to the mechanisms for adapting this model to the American market, including the development of franchise systems, the seasonal operation of therapeutic centers, and integration into medical tourism strategies in states with established traditions of natural health improvement, such as Colorado, Utah, and Arizona.

The social orientation of the apistructural therapy approach is of particular importance. In this context, an example is the HIVES (Honeybee for Integrated Veteran Empowerment and Support) project, initiated to support American veterans through a program of bee care, ecotherapy, and neuro-emotional stabilization. 's experience with such a project indicates the feasibility of using apistructural therapy as a tool for resocialization and post-traumatic regulation for specific population groups. In addition, in the article "Commercial advantages of the innovative method 'Bee healing bed in a pyramid' and its integration into American business," A. Olshanskyi analyzes the economic aspects of introducing an apitherapeutic environment into medical tourism. He notes that the use of beehives in combination with pyramidal structures can be an effective tool for reducing the cost of chronic disease prevention and developing health tourism. A. Olshanskyi emphasizes that this approach opens up new financial opportunities for entrepreneurship, promotes the creation of new jobs, and attracts investment in industries related to beekeeping and apitherapy. The research facility is also studying bioenergetic aspects, in particular the influence of pyramid geometry on the bioenergetic field and the interaction between bee vibrations and architectural structures. This

research is aimed at assessing the complex impact of the apitherapeutic environment on the human body and identifying the mechanisms of its action.

Thus, the scientific research location of apistructure therapy under the leadership of A. Olshanskyi acts as an innovative platform for studying and implementing effective health technologies that combine natural factors, architectural features, and modern scientific approaches. Within the framework of the research base of apistructure therapy, a comprehensive interdisciplinary program is being implemented, aimed at studying the influence of the apitherapeutic environment on the physiological, psychophysiological, and bioenergetic parameters of humans. This program brings together specialists from various fields of knowledge, including medicine, bioenergy, architecture, and social sciences, ensuring a comprehensive approach to research. Thus, the scientific and research base of apistructure therapy is an important element in the study and implementation of innovative methods of health improvement that combine traditional knowledge with modern scientific approaches. This activity contributes to the development of medical tourism and the implementation of effective methods for the prevention and treatment of chronic diseases. The structure of the research base is shown in Figure 4.4.



**Fig. 4.5.** Diagram of the structure of the research base for apistructural therapy

Thus, the research base of apistructure therapy presented in Figure 4.5, initiated by A. Olshansky, plays a key role in the development and verification of innovative approaches to human health improvement using bee products. Particular attention is paid to studying the effect of the pyramidal shape of the treatment bed, located above the beehives, on the physiological and psychophysiological parameters of patients. This architectural feature contributes to the creation of a specific bioenergetic environment, which, according to research results, has a positive effect on neurophysiological processes, in particular on the activity of alpha, theta, and beta brain waves.

## **Conclusions to section 4**

The integration of apitherapy into the system of evidence-based medicine requires further research aimed at standardizing treatment methods and protocols. This process includes the development of unified approaches to the use of bee products, determination of optimal dosages and duration of therapy, and the study of possible side effects and contraindications. Such research will help increase the medical community's confidence in apitherapy and facilitate its broader implementation in clinical practice.

International cooperation and the exchange of experience with leading research centers, such as the Apitherapy Wellness Center (Canada), the Apitherapy Center of Medipol University (Turkey), the American Apitherapy Society (USA), and Apitherapy.com (a global network of specialists), are crucial for advancing apitherapy as a scientific discipline. These institutions actively study the medicinal properties of bee products, conduct clinical trials, and promote apitherapy among healthcare professionals and patients.

Given the growing demand in American society for evidence-based complementary medicine, apistructural therapy is emerging as a promising platform for integration into the national healthcare system. The combination of architectural therapy, bioenergetic stimulation, and natural bee products provides unique value in enhancing both physical and psychological health.

The availability of empirical evidence supporting the effectiveness of the pyramidal environment, its positive influence on cognitive and emotional processes, and the economic feasibility of implementing such projects in the United States provide strong justification for introducing apistructural therapy in the form of clinical pilot programs, wellness initiatives, and socially oriented projects. This also opens the way for its inclusion in the registry of certified complementary medicine methods recommended for use by US citizens.

# RESEARCH ON THE EFFECTIVENESS OF THE “BEE MEDICAL BED IN THE PYRAMID”



## 5.1. Effect on the cardiovascular system and blood circulation

Cardiovascular disease (CVD) remains the leading cause of death worldwide, despite significant advances in pharmacotherapy and preventive medicine. Global epidemiological observations confirm an increase in the prevalence of hypertension, dyslipidemia, and metabolic syndrome, even among the young population. In this context, there is growing interest in the use of natural compounds as an alternative or supplement to synthetic drugs aimed at multivector modulation of the pathogenesis of CVD [1]. Among the biologically active substances that are potentially capable of modulating the functional state of the cardiovascular system, bee products occupy a special place. Their complex chemical structure—from flavonoids and phenolic acids in propolis to peptides, nucleosides, and fatty acids in royal jelly—provides a wide range of biomedical effects. These effects include antihypertensive, antioxidant, hypolipidemic, and angioprotective actions, which have been demonstrated in a number of preclinical and clinical studies [2]. The mechanisms of cardiovascular damage, including endothelial dysfunction, lipid metabolism disorders, oxidative stress, and chronic systemic inflammation, are targets for apitherapeutic agents. For example, the fatty acids 10-HDA and 10-HDAA contained in royal jelly inhibit the NF- $\kappa$ B and MAPK signaling pathways, reducing the production of pro-inflammatory cytokines and improving vascular reactivity [3]. Propolis, in turn, has an antihypertensive effect by activating nitric oxide synthesis and inhibiting the activity of angiotensin-converting enzyme [4].

Thus, bee products represent a promising group of biomodulators with a proven effect on key pathogenetic links of CVD, which necessitates their further integration into clinical cardiology based on evidence-based medicine.

The use of bee products in the treatment of cardiovascular diseases as part of complex procedures using specialized architecturally organized apiary spaces, in particular pyramid-shaped bee houses, is receiving increasing empirical and clinical confirmation. Interventions based on a combination of api-aerotherapy and oral administration of biologically active substances, as described in, demonstrate the potential for a multi-vector effect on vascular regulation, lipid metabolism, glycemic control, and neurohumoral adaptation mechanisms.

The cardioprotective efficacy of propolis, as indicated in a review study by Khoshandam, is realized through a number of experimentally confirmed mechanisms. Models of spontaneous hypertension, particularly in SHR rats, demonstrated the ability of propolis to normalize blood pressure, which was associated with an increase in the bioavailability of nitric oxide and simultaneous inhibition of ACE activity. Antioxidant properties were confirmed by an increase in SOD and catalase activity against a background of decreased MDA levels, a marker of lipid peroxidation. The anti-inflammatory effect was accompanied by a decrease in TNF- $\alpha$  expression and a decrease in NF- $\kappa$ B transcriptional activity. In addition, an effect on the genes responsible for cholesterol transport, ABCA1 and ABCG1, was demonstrated, indicating the possibility of reducing the volume of the lipid core of atheromatous plaques [1].

Clinical studies on the long-term use of honey, in particular Tuangan honey, prove its metabolic effectiveness in the postmenopausal female population. Wahab and co-authors conducted a double-blind randomized study involving 100 participants, which demonstrated a significant reduction in diastolic blood pressure (from 77.92 to 73.45 mmHg,  $p=0.047$ ) and a decrease in fasting blood glucose (from 6.11 to 5.71 mmol/L,  $p=0.021$ ) after 12 months of daily intake of 20 g of honey. In the control group, which received a honey cocktail with the addition of bee pollen and royal jelly, BMI stabilization was recorded without significant changes in the lipid profile [5].

At the cellular level, the effects of *Schisandra chinensis* bee pollen were identified through research by Shi and co-authors, who applied the H<sub>2</sub>O<sub>2</sub> oxidative stress model to H9c2 cells. After SCBP treatment, the viability of cardiomyocytes significantly increased, GSH levels and SOD activity increased, and MDA content decreased. Morphological assessment and flow cytometry data showed a decrease in the frequency of apoptosis. The product caused changes in the expression of key apoptosis genes: a decrease in Bax and caspase-3, an increase in Bcl-2. The chemical composition of SCBP included nucleosides, quinic acid derivatives, and nitrogen-containing flavonoids, among which derivatives of caffeic and ferulic acids were identified [6].

Data on royal jelly as a vasoactive apiprodukt have been confirmed by the results of several independent studies. In particular, Matsui and co-authors demonstrated a dose-dependent vasorelaxant effect of isolated MM protein fractions on rat aortic rings. This effect was completely blocked by L-NAME, an NO synthase inhibitor, confirming the central role of nitric oxide in the vascular response [7]. In later studies, Morita and co-authors demonstrated a decrease in total cholesterol, LDL, and oxidative stress markers in patients with mild hypercholesterolemia after taking 3000 mg of MM [8].

The researchers pay particular attention to the fatty acid fractions of MM, in particular 10-HDA, 10-HDAA, and SEA, which exhibit immune and vasoregulatory properties. According to Y.

Chen, these acids are capable of suppressing the expression of pro-inflammatory cytokines TNF- $\alpha$  and IL-10, modulating MAPK and NF- $\kappa$ B signaling pathways, which reduces the activity of vascular wall inflammation [3].

The synergistic effect of biologically active components of bee products in combination with the vibroacoustic and microclimatic parameters of the apitherapeutic environment, implemented in specialized apistruures, forms a holistic therapeutic system with the potential for non-invasive modulation of the vegetative regulation of the cardiovascular system. This approach justifies the need to develop unified clinical protocols, while the demonstrated results indicate a high level of evidence both in preclinical studies and in clinical monitoring data.

Assessing the therapeutic potential of apicultural products in cardiology requires a systematic comparison of their biological effects on key pathophysiological targets. A comprehensive analysis of the effectiveness of such agents is based on the results of laboratory models, in vivo experiments, and clinical observations that reflect the degree of their effect on endothelial function, nitric oxide regulation, lipid metabolism, and cytokine profile. The most pronounced effects were found for propolis and royal jelly, which demonstrated a multifaceted effect on vascular homeostasis, in particular, enhancement of NO-dependent vasoregulation and modulation of the renin-angiotensin system. A comparative analysis of the effects of bee products on the cardiovascular system is presented in Table 5.1.

**Table 5.1**

**Comparative analysis of the effect of bee products on the cardiovascular system**

Bee product	Effect on the endothelium	Lipid profile	NO synthase	Inflammatory cytokines	Source
Propolis	↑NO, ↓ACE	↓LDL, ↑ABCA1	↑	↓TNF- $\alpha$ , ↓NF- $\kappa$ B	Khoshandam et al., 2023
Honey	Moderate	Minimal effect	not studied	not studied	Wahab et al., 2018
Schisandra pollen	anti-apoptotic effect	n/a	not studied	↓Bax, caspase-3	Shi et al., 2020
Royal jelly	↑NO	↓TC, ↓LDL	↑	↓TNF- $\alpha$ , ↓IL-10	Chen et al., 2016; Chiu et al., 2017

As shown in the table, key targets include the endothelium, NO mediators, inflammatory cytokines, and components that affect lipid metabolism. However, one of the main methodological limitations of modern apitherapy remains the lack of standardized dosages, the heterogeneity of the biochemical composition of natural products, and the dependence of efficacy on the source and

conditions of collection. This makes it impossible to extrapolate results from laboratory conditions to clinical practice without proper standardization.

## **5.2. Influence on the normalization of cerebral cortex signals**

Section 5.2 is devoted to a comprehensive analysis of the mechanisms of action of the apitherapeutic environment on the neurophysiological activity of the cerebral cortex, taking into account the data of modern biomedical research, in particular regarding the participation of the prefrontal cortex, limbic structures, and neuroimmune mediators in the realization of the regulatory effects of bee products.

It should be noted that leading empirical studies in recent years have recorded a reliable correlation between honey consumption and the normalization of neurophysiological indicators, in particular, improved cognitive function, the detection of a neuroprotective effect, anti-stress activity, and reduced nociceptive sensitivity, which together indicate a multifactorial effect on brain tissue [10].

Analysis of the results of neurophysiological monitoring confirms that bee products have a multilevel effect on the functional activity of the cortex, which is realized through a decrease in the expression of pro-inflammatory cytokines (TNF- $\alpha$ , IL-1 $\beta$ , COX-2), suppression of oxidative stress, and an increase in acetylcholine concentration in the prefrontal areas responsible for the integration of higher mental functions [11]. In particular, in an experiment by El-Seedi et al. (2022), a decrease in TNF- $\alpha$  levels in brain tissue from  $115 \pm 12$  to  $73 \pm 9$  pg/mg of protein was recorded after the use of propolis [16]. The work of Dalkiran et al. (2023) showed that the introduction of bee venom leads to an increase in leptin levels in the prefrontal cortex from  $1.9 \pm 0.3$  to  $3.6 \pm 0.4$  ng/mg protein [14]. A study by Fadzil et al. (2023) on acetylcholine shows an increase in its concentration in the prefrontal region of rats from  $7.4 \pm 0.6$  to  $11.2 \pm 0.7$  ng/g of brain tissue after 4 weeks of honey intake [10]. The accompanying regulation of electrophysiological processes is recorded as a decrease in the amplitude and frequency of pathological oscillations, which may serve as a marker of stabilization of neuronal excitability.

The accompanying regulation of electrophysiological processes is observed as a decrease in the amplitude and frequency of pathological oscillations, which may serve as a marker of stabilized neuronal excitability.

Systematized preclinical and clinical data demonstrate that the apitherapeutic environment possesses neuroprotective, antioxidant, and cognitive-modulatory potential. In particular, studies have shown that honey reduces acetylcholinesterase activity, preserves the morphological integrity

of neurons, inhibits caspase-3 activation, improves spatial memory performance, and decreases the production of reactive oxygen species [10].

The formation of neurovisceral regulation, particularly under conditions of chronic inflammation, oxidative stress, or neuropsychiatric imbalance, involves functional interactions between the prefrontal cortex and the limbic system. The prefrontal cortex provides higher-level neurointegration, including the regulation of cognitive flexibility, emotional reactivity, and behavioral self-control, while limbic structures such as the hippocampus, amygdala, and cingulate cortex shape the affective response and mediate secondary somatovegetative projections [12].

In neurophysiological monitoring, theta rhythm (4–8 Hz) is considered an electrophysiological marker reflecting the degree of neurovegetative synchronization and homeostatic stability in cortical regions. The study by Khajuria et al. (2023) demonstrated that after short-term sound stimulation in the form of Bhramari humming, a decrease in theta wave power was recorded, which correlated with normalization of calmness and internal focus of attention localized in the frontal lobe [13].

An equally important neuroendocrine marker is leptin, which functions as a bioinformational mediator between the hypothalamus, prefrontal cortex, and energy metabolism. Research by Dalkiran et al. (2023) found that the administration of low doses of bee venom significantly increased leptin levels in the prefrontal cortex, accompanied by reduced anxiety-like behavior and greater activity in open-field behavioral tests. These findings confirm the correlation between leptin levels and cortical plasticity in the frontal region, offering potential applications in the neurotherapy of affective disorders [14].

Acetylcholine plays a significant role in normalizing cerebral cortex signals as a key neurotransmitter of prefrontal excitation. Its concentration directly affects synaptic sensitivity, evoked potentials, and focus of attention. The polyphenols in honey and propolis, particularly chrysin, quercetin, and CAPE, demonstrate an inhibitory effect on acetylcholinesterase, promoting the prolonged action of acetylcholine in the synaptic cleft [15].

In addition, TNF- $\alpha$ , a cytokine that determines the level of neuroinflammation, acts as a systemic marker of disorganization of neuroglial interaction. A decrease in its expression in cortical tissues, particularly under the influence of bee products (propolis, 10-HDA from royal jelly, bee venom), has been confirmed in several *in vitro* and *in vivo* studies. The level of oxidative radicals, which induce inhibition of electrophysiological conductivity and cause destruction of neuron membranes, deserves special attention. Propolis, especially its water-soluble forms (WSDP), significantly reduces lipid peroxidation, normalizes superoxide dismutase activity, and restores energy metabolism parameters in brain tissue [16].

These results provide the basis for the development of clinically oriented apitherapy protocols aimed at correcting impaired functional activity of the cerebral cortex, particularly in the context of anxiety, depression, and cognitive disorders.

The neurotropic action profile of bee products is due to the presence of specific bioactive compounds capable of crossing the blood-brain barrier, influencing gene expression in neurons, modulating synaptic transmission, and regulating local microinflammation. The focus of research is on a number of flavonoids, phenolic acids, peptides, and enzymes that have demonstrated significant effects in the context of normalizing the electrophysiological activity of the cerebral cortex.

Of particular interest is CAPE (Caffeic Acid Phenethyl Ester), a key component of propolis that inhibits the expression of pro-inflammatory cytokines (TNF- $\alpha$ , IL-6) by blocking the NF- $\kappa$ B-dependent transcriptional pathway. According to El-Seedi et al. (2022), the level of TNF- $\alpha$  in brain tissue after CAPE administration decreases from  $132 \pm 11$  to  $78 \pm 9$  pg/mg protein, confirming its pronounced anti-inflammatory effect [16]. In models of diabetic encephalopathy, CAPE administration also caused a decrease in peroxide damage to cortical neurons, normalization of glutathione levels, and increased electrophysiological stability of neural networks. At the same time, its ability to penetrate deep layers of neuroglia and regulate apoptotic mechanisms confirms its potential for use in the treatment of inflammatory and degenerative conditions. Quercetin and chrysin, present in both propolis and honey, are noted for their combined antioxidant and anti-apoptotic effects. Quercetin exhibits neuroprotection by inhibiting the JAK-STAT cascade, as confirmed in studies using isolated cerebral cortex cell cultures [15]. Chrysin activates GABA-A receptors, which is associated with a decrease in the level of excitation in the frontal cortex and an increase in theta rhythm, typical for states of neurovegetative harmonization. Their potential to normalize cortical rhythms indicates their relevance in the context of anxiety and cognitive disorders. Artepillin C, a polyphenolic compound of Brazilian propolis, has demonstrated the ability to modulate microglial activity, inhibit the metabolic peroxidation of fatty acids in the frontal cortex, and induce the expression of endogenous antioxidant enzymes. In experiments involving the administration of ethanol extract of propolis to mice, a restoration of behavioral activity and a reduction in signs of neuroinflammation were observed [16].

Among the flavonoids in honey, apigenin, luteolin, and galangin play a leading role, exhibiting neuroprotective activity through selective modulation of the cytokine response, inhibition of LPS-induced microglial activation, and stabilization of cell membranes. In vivo studies show that regular administration of these compounds leads to a decrease in IL-1 $\beta$  levels and restoration of cognitive functions in animals with experimental neuroinflammatory conditions [15]. 10-hydroxydecenoic acid (10-HDA), the main fatty acid in royal jelly, exhibits particular neurotrophic

activity. Its immunomodulatory effect is realized through a decrease in the number of Th1/Th2 lymphocytes and inhibition of dose-dependent expression of IL-8 and TNF- $\alpha$  in brain microglia cells. A study by Y. F. Chen (2016) showed that the concentration of TNF- $\alpha$  in BV-2 cell culture after treatment with 10-HDA (500  $\mu$ M) decreased by 42% compared to the control, while the level of acetylcholine in the same model increased by 35% [3]. At concentrations above 750  $\mu$ M, apoptotic changes were observed in dendritic cells, indicating the need for dose control [16].

The most powerful modulators of the electrophysiological activity of the cortex include components of bee venom – melittin, apamin, and phospholipase A2. Melittin causes transient depolarization of neurons and enhances the release of neurotransmitters by inhibiting NF- $\kappa$ B activation and reducing TNF- $\alpha$  concentration. Apamin, a selective blocker of SK-type K<sup>+</sup> channels, demonstrates the ability to prolong postsynaptic potentials, increasing the window of plasticity of cortical neurons [14]. The anti-inflammatory and radioprotective properties of phospholipase A2 are realized through the suppression of NO and prostaglandin production in neuroglia.

The complex action of these bioactive compounds confirms the existence of a multilevel mechanism by which bee products contribute to the normalization of neuronal activity in the cerebral cortex. Their clinical effectiveness in restoring cortical biorhythms, reducing systemic inflammation, and improving neuropsychic status creates the basis for the introduction of apitherapeutic drugs into the practice of integrative neuromedicine.

In the apitherapeutic model implemented in the format of A. Olshansky's bee bed, the mechanisms of normalizing cortical activity become complex, combining the effects of volatile bioactive substances, acoustic microvibrations, and a thermoregulated air environment. The dynamics of the electrophysiological response of the cerebral cortex within such an environment can be explained using interdisciplinary models of neuroimmune regulation.

Inhalation contact with microcomponents of propolis, wax, and pollen within a sealed bee chamber leads to the inhibition of proinflammatory cytokine expression, including IL-1 $\beta$ , IL-6, and TNF- $\alpha$ , in microglia and astrocytes. This process is accompanied by the suppression of NF- $\kappa$ B and MAPK signaling cascades, as confirmed in clinical studies using WSDP and CAPE in patients with chronic insomnia, anxiety, and autonomic dysfunction [16]. Melittin demonstrates a comparable effect, which, in aerosol form within the bee chamber environment, potentially interacts with cell membranes and blocks JAK–STAT signaling in neuroglia.

A reduction in the concentration of reactive oxygen species resulting from exposure to the therapeutic microenvironment of the hive is associated with the normalization of cortical neuron membrane potential, particularly in the frontal regions. The presence of antioxidant compounds in hive air, such as phenolic acids and volatile flavonoids (for example, luteolin and galangin), contributes to the inhibition of lipid peroxidation, an increase in glutathione levels, and the

activation of antioxidant defense enzymes (SOD, GSH-Px), which facilitate the restoration of neural conductivity.

Clinical applications of WSDP and EGCG preparations, which are similar in composition to bioactive substances produced in the bee microenvironment, demonstrate the restoration of postsynaptic electrical activity and a decrease in neuropsychic fatigue in patients with organic cerebral dysfunctions.

The acoustic field of the bee environment exerts a modulating influence on the EEG spectrum, particularly affecting theta and alpha rhythms. A study by Khajuria et al. (2023) found that brief Bhramari-type humming sounds resulted in decreased theta activity and activation of the frontal cortex, confirming the hypothesis of a sensory-resonant effect of environmental vibrations on cortical electrophysiological processes [13].

Similar dynamics of EEG indicators were found in patients who underwent apitherapy sessions in beds on bees, where the audio-vibration background is a natural factor of entropic equalization of the rhythms of the cerebral cortex. There is an improvement in spectral coherence between the hemispheres and a decrease in overall cortical excitability, which can be considered as a neurophysiological basis for the use of apitherapy in the correction of neurotic states. To record the indicators of electrical activity of the heart during the study, the electrocardiographic complex “EXPERT-16 COMPACT” (manufactured by “Tredes”, Ukraine) was used.

Inhalation of flavonoids—apigenin and chrysin—helps suppress acetylcholinesterase activity, which increases acetylcholine concentration in the cerebral cortex. This is accompanied by improved short-term memory, stabilized attention, and reduced impulsive behavior. In addition, the activity of the GABAergic system is potentiated by the action of chrysin on GABA-A receptors, which leads to a decrease in the excitability of neural networks and provides a state of neurovisceral relaxation.

Thus, A. Olshansky's apitherapeutic bed environment functions as a multicomponent neuromodulatory system that combines molecular, acoustic, and thermohomeostatic factors that are integrally aimed at normalizing cerebral cortex signals. This model reflects the prospect of clinical implementation of apitherapy as an adjunctive strategy in neurorehabilitation and psychosomatic medicine.

Within the framework of apitherapeutic neuromodulation, the leptin mechanism plays a key role in the formation of adaptive responses of the prefrontal cortex, which is realized through the activation of leptin receptors (Ob-Rb) in the medial prefrontal area. Leptin, as an integral neuroendocrine mediator, interacts with dopaminergic and glutamatergic pathways, influencing the regulation of anxiety, motivation, and affective stability. Experimental data show that the

administration of low doses of bee venom leads to a significant increase in leptin levels in the prefrontal cortex, accompanied by a reduction in anxiety behavior, increased motor activity, and prolonged time spent in the open field in behavioral tests [14].

This mechanism confirms the hypothesis of the neuropsychotropic action of apitherapy components, primarily apamin and melittin, which indirectly activate leptin-dependent pathways in the prefrontal cortex. This action provides an anxiolytic effect, normalizes electrical activity, and stabilizes neural transmission in areas involved in the formation of a controlled response to stress.

A comprehensive approach combining apitherapy products with bioengineering platforms forms the basis of a new paradigm—neuroecological therapy, focused on the gentle regulation of cortical activity without pharmacological load, which opens up prospects for application in clinical neuropsychiatry, gerontology, and preventive medicine.

In this context, the pyramid bed developed by A. Olshanskyi appears as a creative, universal, and economically viable solution that opens up prospects for the widespread introduction of apitherapy practices in various social environments. Unlike artistic or urban initiatives, which remain inaccessible to a significant part of the population due to their scale, symbolism, or cost, this technology is focused on everyday use and local implementation. Given the social stratification of access to health resources and the uneven territorial distribution of environmentally safe environments, the advantage of pyramid-shaped apistructure is its autonomy, mobility, and ability to integrate into existing spatial formats—from rural clinics to urban courtyards.

This model is particularly valuable in situations where not everyone has the opportunity to attend cultural events, travel to specialized eco-cities, or relocate to environmentally friendly regions. The use of apistructure provides deep sensory contact with the bee environment without the need for radical transformation of social space. This technology is based on a synthesis of the leading achievements of apitherapy science: the influence of the microaerosol environment of the hive, the vibrational effect of the bee background, the bioinformational characteristics of pyramidal architecture, and body positions that correspond to the principles of physical relaxation.

### **5.3. The anti-stress effect of apitherapy in an urban environment**

In modern society, apitherapeutic logic manifests itself in various formats, from art installations and bioarchitectural projects to practices of ecological healing and personalized therapy. At the same time, these manifestations remain scattered and inaccessible to the mass user. Given the growing medical and social need for nature-centered forms of compensation for the stressfulness of the urban environment, this section systematizes existing architectural, cultural, and therapeutic initiatives that use bee forms as bio-inspired models and outlines the prospects for their

widespread implementation, in particular through technologically adapted solutions such as pyramid beds.

The urban environment, characterized by high population density, artificial infrastructure, sensory overload, and chronic deprivation of natural stimuli, has a complex effect on the psychophysiological state of humans. From a medical point of view, this is accompanied by a disruption of neuroendocrine regulation, an imbalance in the autonomic nervous system, hyperactivation of the HPA axis, and increased systemic inflammation, which leads to an increased risk of developing anxiety, affective, and psychosomatic disorders [17].

The popularization of biophilic design and structural biomorphism in architecture and art reflects a global response to the challenges of the urban environment. Of particular interest are spatial solutions that replicate the organization of bee dwellings. Bio-inspired forms such as hexagonal structures, modular symmetry, and rhythmic patterns of light and sound have been shown to reduce psycho-emotional tension, activate the parasympathetic nervous system, and stabilize neuropsychological reactivity.

A striking example is *The Hive*, an installation by British artist Wolfgang Buttress at the Royal Botanic Gardens, Kew (London), which reproduces the bioacoustic signals of a living bee colony through a sensory network, resulting in stress reduction and enhanced cognitive integration [18].

In the United States, designer Sarah Bergmann's environmental art project *The Pollinator Pathway* combines urban greening with the creation of corridors for pollinators. The project positively influences the ecological state of urban environments, reduces psychological anxiety among city residents, and increases their subjective satisfaction with urban space [19].

In Canada, the art therapy initiative *Bee the Maker Art Therapy* incorporates bee-related themes into therapeutic work with individuals experiencing anxiety or post-traumatic stress. Through creative practices inspired by the social and structural organization of bee colonies, participants show positive progress in overcoming stress and emotional exhaustion [20].

Within the conceptual architectural design of *The Hive Project* by Italian architect Gianluca Santouosso, the hexagonal structure is seen as a metaphor for social order, energy optimization, and ecological integration. The project emphasizes the impact of spatial organization on sensory integration, anxiety reduction, and cognitive regulation [21].

Bio-inspired architectural and artistic structures that mimic the organization of bee systems demonstrate potential as modules of spatial psychotherapy in urban environments. Their application opens up prospects for integrating apitherapeutic logic into the design of health-oriented urban infrastructure.

At the same time, a number of modern eco-spaces that incorporate the theme of ecological balance remain conceptually detached from the scientific approaches of apitherapy. The lack of integration of evidence-based technologies founded on the bioenergetic characteristics of bee activity means that clients seeking recovery actually find themselves in an architecturally adapted but functionally unchanged environment. This reveals an urgent need to update the logic of eco-space development by incorporating apitherapy technologies, primarily apistruktures that provide deep sensory interaction, neuropsychological relaxation, and restoration of the body's regulatory systems. In contrast, individual technological solutions based on the principle of localized apistrukture therapy demonstrate a significantly higher potential for scaling and integration into everyday life. In particular, the "Bed in a Pyramid" project offers a compact, modular, and technically accessible therapeutic platform based on a combination of several natural factors: the vibrational background of a bee colony, a microaerosol environment, the architectonics of a pyramid, and the horizontal position of the body. The advantage of this model lies in the high transferability of the technology, which does not require large-scale capital investments or changes to urban infrastructure. This form of apitherapy is mobile, hygienic, autonomous, and can be implemented in rural clinics, rehabilitation centers, city courtyards, or private practices. In addition, the pyramid-shaped apistrukture provides energy-informational focusing of space, which, according to research, potentially enhances the resonant effects of sound vibrations and thermoregulation.



**Fig. 5.1** Therapeutic bee bed in a pyramid<sup>8</sup>

Thus, A. Olshansky's pyramid bed (Fig. 5.1) can be considered an effective mass alternative to large-scale apitherapy structures, retaining key elements such as vibrational action, spatial organization, bioenergetic logic, and therapeutic meaning. This solution meets the current demand

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<sup>8</sup> Specially designed bee colonies located under beds in a wooden apiary provide the comprehensive effects of bee therapy: microvibrations, warmth, aroma, and air ionization.

for affordable, evidence-based, and integrative stress reduction tools that can be incorporated into healthcare, alternative medicine, and spatial psychotherapy practices.

In this context, the pyramid bed developed by A. Olshanskyi represents a creative, universal, and economically viable solution that opens new prospects for the widespread adoption of apitherapy practices across diverse social environments. Unlike artistic or urban initiatives that remain inaccessible to a large segment of the population due to their scale, symbolism, or cost, this technology is designed for everyday use and local implementation. Considering the social disparities in access to health resources and the uneven territorial distribution of environmentally safe spaces, the key advantages of the pyramid-shaped apistructure are its autonomy, mobility, and adaptability to existing spatial formats ranging from rural clinics to urban courtyards.

This model is particularly valuable in situations where not everyone has the opportunity to attend cultural events, travel to specialized eco-cities, or relocate to environmentally friendly regions. The use of the apistructure provides profound sensory engagement with the bee environment without requiring a radical transformation of the surrounding social space. The technology is based on the synthesis of leading scientific achievements in apitherapy, including the influence of the hive's microaerosol environment, the vibrational effects of the bee colony, the bioinformational properties of pyramidal architecture, and the body positioning principles that promote physical relaxation.

#### **5.4. Clinical studies of the method's effectiveness**

Despite the active development of apitherapy as a complementary method of healing in Ukraine and worldwide, its integration into the system of evidence-based therapeutic practices is complicated by the lack of neurophysiologically verified studies of its effect on the human central nervous system.

To understand the healing effect of apitherapy, it is necessary to take into account the peculiarities of the formation of the human information-energy field. The main idea is that the human limbic system integrates information about the functioning of the body at the physiological and psychological levels, which is reflected in the functioning of the cerebral cortex through neural connections. The limbic system controls and regulates the body's homeostasis, so any changes in the body's functioning are reflected in the signals of the cerebral cortex (CC), which can be recorded using electroencephalography (EEG) equipment and quantified.

To ensure the representativeness of the sample and take into account the individual psychophysiological characteristics of the participants, a specialized psychophysiological typing technique was used to determine the level of rigidity of the nervous and mental systems. The method

is based on the analysis of electroencephalographic and cephalographic data, as well as biological parameters, taking into account the type of temperament. It allows participants to be classified into 36 types of mental rigidity, ensuring accurate consideration of individual characteristics [22]. The methodology was developed on the basis of an automated decision-making system tested for the professional selection of operators of extreme activities [22].

The methodology was based on a comprehensive assessment system for neuropsychological stability, which includes testing for attention span, short-term memory dynamics, reactivity to sensory stimuli, and diagnosis of the type of nervous system, taking into account the level of rigidity. The type of rigidity was determined using modified tests for attention switching and adaptation to new conditions of task- e activity, which made it possible to form a sample that was homogeneous in terms of psychophysiological characteristics.

The experiment involved 30 participants selected according to the specified methodology, all exhibiting the same type of rigidity. It was conducted under conditions of maximum isolation from external electromagnetic fields. Before and after the apitherapy session, participants refrained from using digital devices for at least 30 minutes to eliminate potential artifacts in the registration of neurophysiological activity.

The recording of cerebral cortex biopotentials was carried out using the “EXPERT-16 COMPACT” system manufactured by Tredes (Ukraine), known for its high sensitivity, resolution, and signal measurement accuracy (signal amplitude 0–500  $\mu$ V, frequency 0–50 Hz). Bioelectrical signals were recorded using standard leads of the international 10–20 system. To minimize noise, a specialized spectral analysis algorithm (Power Spectral Density, PSD) was applied, allowing for an objective assessment of changes in activity within the delta, theta, alpha, beta, and gamma frequency ranges.

An original apitherapy complex was used in the experiment — a bee treatment bed in a pyramid (Ukrainian patent No. 94681, author A. Olshanskyi). This complex integrates traditional beekeeping principles with the geometric properties of a pyramidal structure, creating a unique apitherapeutic environment.

The results obtained indicate changes in the spectral characteristics of the EEG after apitherapy: an increase in alpha rhythm, a decrease in beta rhythm, and an increase in gamma rhythm, which is associated with improved relaxation, reduced anxiety, and improved cognitive integration. Similar dynamics of EEG indicators were found in patients who underwent apitherapy sessions in a bee treatment bed, where the audio-vibration background is a natural factor of entropic equalization of the rhythms of the cerebral cortex, improving spectral coherence between the hemispheres and reducing overall cortical excitability.

During the study, a homogeneous sample of 30 participants was formed, characterized by similar psychophysiological indicators, in particular, the type of rigidity. In order to assess the effect of the apitherapeutic pyramid on neurophysiological processes, measurements of the bioelectrical activity of the cerebral cortex (CC) were taken before and after a 30-minute session in the pyramid.

Analysis of the results revealed significant changes in the spectrum of electroencephalographic rhythms. Alpha rhythm (8–13 Hz): after exposure, an increase in the power of the alpha rhythm was observed, indicating an increase in the level of relaxation and a decrease in anxiety in the subjects. Beta rhythm (13–30 Hz): a decrease in beta rhythm activity was noted, which may indicate a reduction in psychoemotional tension and cognitive overload. Gamma rhythm (>30 Hz): a significant increase in gamma activity was observed, which is associated with improved cognitive integration and a meditative state of consciousness.

The results obtained are consistent with empirical data from previous studies. In particular, E. Watson and D. E. Everhart confirm the diagnostic significance of EEG rhythms in the context of emotional regulation, pointing to the relationship between levels of aggression and the nature of EEG activity [24]. A study by T. Kurokawa-Kuroda and his co-authors found that the temporal and spectral characteristics of the auditory cortex change depending on the sensory environment, confirming the adaptive plasticity of neural mechanisms [25]. In turn, the results of P. Eran prove the dissociation between gamma activity and evoked potentials in the visual cortex, confirming the flexibility of the neocortical response [26].

In summary, the data obtained indicate a positive effect of the apitherapeutic pyramid on the functional state of the brain, manifested in the normalization of electroencephalographic parameters and the formation of a favorable psychophysiological background for the restoration of somatic health (Table 5.2).

**Table 5.2**

Results of the percentage share of the averaged frequency of the KGM biorhythm spectrum of the subjects

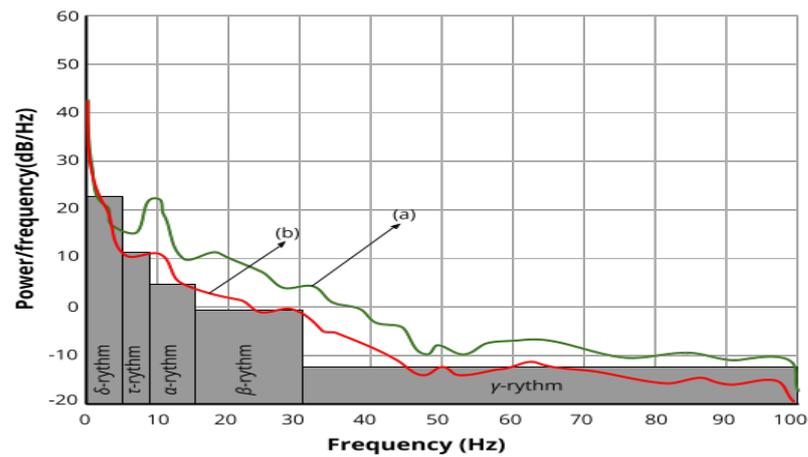
Percentage share of the averaged frequency of the KGM biorhythm spectrum before the experiment					Percentage share of the averaged frequency spectrum of KGM biorhythms after the experiment				
α-rhythm	β-rhythm	τ-rhythm	δ-rhythm	γ-rhythm	α-rhythm	β-rhythm	τ-rhythm	δ-rhythm	γ-rhythm
31	42	11	9	7	44	19	8	8	21

The indicators presented in Table 5.2 reflect significant changes in the spectral distribution of electrical activity in the cerebral cortex under the influence of an apitherapy session. The most pronounced dynamics were observed in the increase in the proportion of alpha rhythm from 31% to 44%, which corresponds to the activation of relaxation mechanisms, a decrease in sympathetic activity, and a transition to a state of functional recovery. The beta rhythm indicators, which characterize psychoemotional arousal and cognitive tension, decreased from 42% to 19%, indicating a decrease in anxiety and mental activity. At the same time, the proportion of gamma rhythm increased significantly, from 7% to 21%, which is interpreted as an intensification of integrative neurodynamics and an increase in the level of internal concentration.

The stabilization of theta and delta activity indicators within the range of 8–11% indicates the absence of disorganization of basic rhythms and the maintenance of a holistic functional profile of neurophysiological activity. The combination of these changes allows us to interpret the effect of the apitherapeutic pyramid as a factor of positive psychophysiological modulation, which potentially contributes to the normalization of the somatic state and an increase in the adaptive reserves of the central nervous system.

A questionnaire was developed to determine the subjective state of the subjects. It is worth noting that the subjects noted a positive effect while staying on a treatment bed with bees. Among the dominant factors that could positively influence the psychophysiological state of the subjects, the latter identified the following: sound frequencies from the buzzing of bees, which coincide with the frequency of human biosignals; the aroma of propolis, pollen, nectar, and bee products; the identical temperature of bees and humans; according to the participants' feedback: an inexplicable but noticeable surge of energy after the session.

During the analysis of the spectral power density of the signal and the averaging of the results for 30 subjects, the graphs shown in Fig. 5.1 were obtained. The graph shows that the total power of the background EEG signal of the subjects increased after the experiment: a sharp increase in the spectral density of the  $\alpha$ -rhythm and  $\gamma$ -rhythm can be distinguished. The parameter of the difference or ratio of the areas under the curves can serve as a quantitative criterion for comparing such graphs [22].



**Fig. 5.1.** Graph of the spectral power density of the background signal of the Fp1 electroencephalogram sensor: (a) - averaged graph of the subjects before the experiment, (b) - averaged graph of the subjects after the experiment.

Based on the results of spectral analysis of electroencephalographic data obtained during the study of the apitherapeutic effect of a bee treatment bed integrated into a pyramidal structure, quantitative changes in the spectral power of the main rhythms of brain activity were detected. In particular, after apitherapy sessions, an increase in spectral power in the alpha range (8–13 Hz) was recorded, which corresponds to the neurophysiological signs of enhanced relaxation processes and stabilization of the psychoemotional state of patients.

At the same time, there is a decrease in spectral power in the beta band (13–30 Hz), which is a neurophysiological marker of reduced psychoemotional tension, anxiety, and cortical activation, as well as an increase in spectral power in the gamma band (>30 Hz), which is associated with improved cognitive functions and neuronal integration. Moderate changes in delta (0.5–4 Hz) and theta rhythms (4–8 Hz) were also noted, indicating an improvement in the overall state of relaxation and a decrease in fatigue.

## Conclusions to Chapter 5

Thus, the neurophysiological results obtained confirm the therapeutic and restorative effect of apitherapy, in particular in the form of a bee therapeutic bed, demonstrating the relevance of the method within the framework of evidence-based therapeutic practices.

The established neuropsychophysiological effect of apitherapeutic influence, confirmed by spectral analysis of electroencephalographic activity, indicates the relevance of this approach as a potentially effective tool in the system of integrative medicine. The scientific novelty of the study lies in the first quantitative assessment of the spectral density of brain rhythms in response to the

influence of a structured bee environment in conditions of pyramidal geometry. These results demonstrate the need to introduce into clinical practice objective methods of non-invasive neurophysiological monitoring to verify the dynamics of the psychosomatic state of patients under the influence of sensory and bioelectromagnetic factors of natural origin, which expands the toolkit of evidence-based medicine in the field of preventive and rehabilitation therapy.

Despite the quantitative data confirming the neurophysiological effects of apitherapy, it is essential to critically evaluate the obtained results, considering several methodological and organizational factors that may influence their interpretation and clinical validity. The following key limitations of the research design should be taken into account when planning future studies in the field of medical apitherapy.

1. Sample size. The limited number of participants (30 individuals) may affect the generalizability of the results. Future studies should include a larger cohort to increase statistical power and ensure greater representativeness.

2. Short duration of the experiment. Neurophysiological changes were measured only before and immediately after a single 30-minute apitherapy session. The lack of analysis of long-term effects limits the understanding of the persistence of the observed outcomes.

3. Absence of a control group. The study did not include a control or placebo group, which complicates the precise determination of the apitherapeutic environment's influence on changes in EEG spectral characteristics.

4. Homogeneity of participants by type of rigidity. The homogeneity of the sample in terms of psychophysiological rigidity limits the extrapolation of the findings to other population groups with different psychophysiological profiles.

5. Subjective assessment. The partially subjective nature of the participants' psychophysiological self-assessments through questionnaires may introduce bias due to placebo or expectancy effects.

Addressing these limitations will help improve the methodological quality of future research and deepen the understanding of the mechanisms through which apitherapy affects the human psychophysiological state. The outlined issues call for further fundamental and applied studies aimed at elucidating the mechanisms of action of the apitherapeutic environment on the central nervous system, standardizing apitherapy, and integrating it into the national healthcare system as a component of psychosomatic rehabilitation and preventive medicine.

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# INTEGRATION OF THE APITHERAPY METHOD INTO THE US HEALTHCARE SYSTEM



## 6.1. Demand for innovative health improvement methods in America

This subsection analyzes the effective combination of apitherapy in bee pyramids with various medical approaches of American integrative medicine, in particular its role in stress management, rehabilitation, chronic pain relief, and psycho-emotional stabilization. A comparative analysis with wellness practices highlights the scientific validity of the mechanisms of action and their empirical limits. Particular attention is paid to the relationship between the bioenergetic factors of apitherapy and psychosomatic processes, which makes it possible to classify it not only as a naturopathic technique, but also as an element of systemic therapy.

At the beginning of the 21st century, transformations in the healthcare sector led to a rethinking of the essence of health, approaches to treatment, and the role of the patient in the medical process. There has been a shift from a reductionist view of health to its perception as a multidimensional biopsychosocial phenomenon that encompasses physiology, emotional state, and quality of life. Although therapy is increasingly interpreted as an integrative practice, the clinical sphere is dominated by an instrumental model, where the patient is merely the bearer of a request, and treatment is reduced to technical intervention without reflection or subjective transformation.

Within this framework, therapy is often reduced to a set of short-term techniques, resulting in fragmented engagement with healing practices rather than their deep integration. This “insatiable bee” behavior resembles continuous searching but prevents the completion of the therapeutic cycle, making it impossible to achieve stable outcomes and profound personal transformation.

An alternative lies in practices with a cumulative effect, which require time and consistency but yield lasting results. These approaches influence not only physiological processes but also sensory and existential integration, such as animal-assisted therapy, exposure to natural microclimates, and sensory stimulation. These methods help maintain neurophysiological balance, reduce stress, stabilize emotional states, and foster new adaptive behavior patterns. When combined, they form a spatial-sensory platform that supports enduring changes in physical and psychological self-awareness.

The effectiveness of therapy depends not on the intensity of interventions but on the ability to establish a stable, sensorially structured, and bioethical environment. Methods with a cumulative effect align with the principles of integrative medicine, facilitating profound neuropsychological and behavioral transformations as well as the restoration of personal subjectivity.

In response to these challenges, it is necessary to develop a highly standardized model that harmoniously integrates clinical evidence, biophysical rationale, and the philosophy of responsible therapeutic engagement. This approach represents the ethical reparation of the healing discourse, in which the primary focus is not technology but the individual's unique experiential process of healing.

This approach requires a reorientation of therapeutic practice from a technical-modular logic to a deep physical, emotional, and existential involvement. Instead of focusing on the effectiveness of a single tool, what is now more important is the structure of interaction, the duration and quality of stay in a therapeutic environment that does not instrumentalize the person but creates conditions for their internal restructuring. In this context, healing is not the result of a specific action, but a state that is achieved through the gradual formation of bodily reflexivity, the restoration of sensory contact with oneself, and the development of inner stability.

Effective therapy requires not only a protocol or tools, but also a space where the value lies in being in a certain environment, rather than in intervention. This necessitates the integration of ethical, anthropological, and phenomenological criteria into the model for evaluating therapeutic action. These criteria go beyond biomedical unitarianism and focus on the person as an integrative whole.

Apitherapy, especially in the format of a "bee healing bed in a pyramid," opens new opportunities for creating a therapeutic environment that is physiologically active, spatially organized, bioenergetically stable, and culturally integrated into the ethics of sustainable healing. This concerns not only the innovativeness of the method but also its structural capacity to combine the essential principles of other proven therapeutic approaches with cumulative effects.

The climatotherapeutic component of apitherapy is realized through the natural biochemical environment created by bees, which saturates the space with biologically active volatile substances such as phytoncides, aromatic acids, and trace elements. At the same time, mechanisms similar to animal-assisted therapy are embodied through emotional and sensory interaction with live bees, whose rhythmic sound, warmth, vibration, and bioenergetic presence have a stabilizing effect on the autonomic nervous system.

Elements of sensory therapy are represented by a multichannel influence: auditory, vibrational, thermal, and olfactory, which together form a deeply integrated environment of bodily

calm and regulation and stimulate processes of neuroplasticity. The spatial structure of the pyramid enhances this effect by creating a resonant, energy-focused configuration that amplifies the action of therapeutic factors.

Due to its ability to integrate elements of climate, animal, and sensory therapy with spatial-energy practices, the apitherapy method in the form of a “bed in a pyramid” demonstrates exceptional potential as a next-generation model of integrative therapy that meets the criteria of environmental sustainability, scientific validity, cultural relevance, and bioethical responsibility. These aspects are discussed in greater detail in Table 1 (see Appendix E).

Among the in-depth analytical studies, reviews published in the journals *Frontiers in Nutrition* and *Molecules* are particularly noteworthy. Specifically, 34 original studies on the effect of honey on brain health were analyzed [1]. Among the foreign researchers who have made a significant contribution to the development of scientific apitherapy, K. Kim and T. Cherbuliez should be noted [2, 3, 4]. In Ukraine, several scientific studies have been conducted by O. Danilyshyn, V. Dankevych, I. Pylypchuk, and Y. Savchuk, investigating the effects of bee products on the psychosomatic state of humans. These publications focus on the clinical efficacy of bee products, the mechanisms of action of bee venom, and the integration of apitherapy protocols into evidence-based medicine.

Ukrainian empirical studies confirm the relationship between the influence of the apitherapeutic environment and the electrical activity of the brain, as recorded by EEG. This finding is supported by the work of foreign scientists [1, 6, 7]. Animal studies and human clinical trials have demonstrated that bee products, particularly propolis, exhibit pronounced neuroprotective effects [6].

Research conducted by M. Fadzil [7] shows that honey positively affects brain tissue by reducing oxidative stress and supporting cognitive functions, which can be quantitatively verified using electrophysiological methods. Thus, the conceptualization of the limbic system as a regulator of neuropsychic dynamics transmitted through signals to the cerebral cortex is empirically supported by modern studies on the apitherapeutic effects on the human and animal brain.

The methodology was developed based on an automated decision-making system and tested for the professional selection of operators engaged in extreme activities [8]. The obtained results are consistent with empirical data from previous studies. For example, research by T. Kurokawa-Kuroda et al. revealed that the temporal and spectral characteristics of the auditory cortex vary depending on the sensory environment, confirming the adaptive plasticity of neural mechanisms [10].

## **6.2. Legislative and regulatory aspects of the introduction of apitherapy in the United States**

In this section, apitherapy in the United States is considered in a broad interdisciplinary context — as an intersection of historical knowledge, biophysical concepts, and cultural practices that forms a new paradigm of interaction between humans, bees, and the architecturally modified environment. Through the study of bee energy as a complex biophysical factor, traditional apitherapy is being transformed into a more complex modern form of naturopathic intervention that can be standardized in clinical practice.

Growing interest in natural regenerative models is stimulating the development of integrative apitherapy. Conferences, symposiums, and scientific publications contribute to the codification of methods for using bee energy and the formation of clinical protocols in rehabilitation, psychotherapy, and preventive medicine. Their gradual introduction into the system of complementary medicine opens up the prospect of institutionalization within the evidence-based paradigm.

The main events that play an important role in the popularization and scientific justification of apitherapy in the United States include:

Charles Mraz Apitherapy Course & Conference (CMACC) is an annual national educational and scientific conference organized by the American Apitherapy Society (AAS) since 2002. The event is dedicated to the exchange of experience in the treatment with bee products and includes courses for doctors and apitherapy practitioners. The conference is named after Charles Mraz, one of the first American apitherapists, and is an important platform for interdisciplinary knowledge exchange between medical professionals and beekeepers, contributing to the professional development of the apitherapy community.

The First International Symposium on Honey and Health, held on January 8, 2008, in Sacramento, California, was the first international scientific and practical conference dedicated to the medicinal properties of honey and other bee products. The event presented clinical data on honey therapy, which contributed to the legitimization of honey as a therapeutic agent in the scientific community.

AAS apitherapy courses and seminars are a series of educational events organized by the American Apitherapy Society, which are held annually in various cities in the United States. These seminars cover the practical aspects of apipuncture, the use of propolis, apitoxin, and other bee products in medical practice. These events are often integrated into the CMACC program, which provides a comprehensive approach to training and professional development.

Apitherapy sessions at beekeeping congresses are thematic sections that are periodically held within the framework of large beekeeping forums. For example, at the 21st Apimondia Congress in 1967 in Maryland, the medical use of bee venom was discussed. Such sessions contribute to the integration of apitherapy into scientific discourse and the exchange of experience between researchers from different countries.

These events help raise awareness among medical professionals and the general public about the potential of apitherapy, stimulate scientific research in this field, and promote the integration of apitherapy methods into the US healthcare system. Thanks to such initiatives, research is expanding and apitherapy methods are being introduced into clinical practice.

In the first third of the 21st century, scientific research on this topic has intensified significantly. Current scientific research focuses on the molecular characterization and standardization of bee products such as honey, propolis, royal jelly, and bee venom. The use of the latest analytical methods makes it possible to identify the bioactive components of these products, which is extremely important for ensuring their safety and proven effectiveness in medical applications for American consumers. For example, a study published in the journal *Pharmaceuticals* analyzes in detail the therapeutic potential and mechanisms of action of bee venom, emphasizing its anti-inflammatory and analgesic properties [11].

The integration of apitherapy into modern US medicine also involves the development of innovative drug delivery systems, such as nanotechnology, to improve the bioavailability and targeting of bioactive substances. In addition, clinical studies are aimed at confirming the effectiveness of apitherapy in the treatment of chronic diseases, neurodegenerative disorders, and other pathological conditions.

Educational events, such as the annual Charles Mraz Apitherapy Course & Conference (CMACC) organized by the American Apitherapy Society (AAS), play an important role in disseminating knowledge and sharing experiences among specialists. The conference covers the latest trends in apitherapy, including the use of bee products in the treatment of various diseases and the introduction of innovative techniques [12].

The popularization of apitherapy in the context of bee energy also stimulates the development of innovative forms of beekeeping aimed at creating conditions for direct therapeutic interaction between humans and the biophysical environment of the hive. This contributes not only to the preservation of the functional population of *Apis mellifera*, but also to a deeper understanding of their role as a source of energy-information interaction with the human body. Raising awareness of the regenerative potential of bee energy activates public attention to the environmental aspects of preserving biodiversity, biocenoses, and the stability of ecosystems in which bees act as the main pollinators and a kind of bioindicator of the environment.

Thus, the prospects for the development of apitherapy in the United States in the context of interdisciplinary synthesis involve not only the deepening of biomedical and physiological research into the effects of the vibrational, electromagnetic, and chemosensory influences of bee energy, but also the institutional integration of these practices into the healthcare system. This involves the development of clinical models in which the therapeutic environment is formed not only through the introduction of apicultural products, but also through the creation of a controlled space for the presence of bees—as in the case of bee houses, therapeutic capsules, or pyramidal structures that provide access to the vibrational and thermodynamic parameters of an active beehive.

Therefore, the activities of apitherapy associations, such as the American Apitherapy Society, as well as the organization of specialized conferences, seminars, and educational programs, play an important role in systematizing knowledge about the biophysical effects of bee energy, disseminating best practices for its application, and forming medical and legal conditions for its integration into the field of functional, preventive, and rehabilitative medicine.

Let's look at some specific examples of this activity. The American Apitherapy Society (AAS) is actively involved in this area.

The AAS is actively engaged in educational activities, organizing annual conferences and courses, such as the Charles Mraz Apitherapy Course & Conference (CMACC). The conferences address issues related to the use of bee products to reduce stress, improve sleep, and overall psycho-emotional state. Participants have the opportunity to learn practical techniques that can be integrated into stress management programs and the treatment of conditions such as generalized anxiety disorder, post-traumatic stress disorder (PTSD), and insomnia.

In addition to CMACC, the AAS offers a series of educational events aimed at teaching the practical application of apitherapy in the context of mental health. courses cover topics related to the use of bee products to reduce anxiety, improve sleep, and increase stress resistance. Through such educational programs, professionals gain the tools to incorporate apitherapy methods into comprehensive approaches to the treatment of mental disorders.

Next, we'll focus on justifying apistructural therapy as a specific branch of apitherapy that combines the use of bee products with special architectural forms, such as pyramid structures, to enhance healing effects. Proponents of this direction believe that the pyramid shape can contribute to improving health and increasing the effectiveness of apitherapy procedures.

### **6.3. Comparison of the development of the apitherapy market in Ukraine and the United States**

Modern American beekeeping is characterized by a high level of technology, specialization in queen breeding, standardized production of apitherapeutic raw materials, and a wide range of small and medium-sized farms participating in certification programs. On this basis, new practices of medical testing of bee products are being developed, including clinical trials, intervention protocols, and integrative approaches to the management of pain, chronic stress, and autoimmune disorders [15].

Apitherapy is gaining popularity in the United States [16], but the use of specific structures, such as pyramidal hives or api-houses, is less common and remains a niche practice. Wooden houses are most often used for sessions [17].

From the very beginning, American beekeeping has focused on honey production, which prompted an intensive search for optimal bee breeds. In the absence of native species, this became a defining characteristic of the industry. During this process, beekeepers experimented with a variety of hive designs, ultimately leading to the creation of the Langstroth hive, which quickly gained popularity for its practicality and efficiency.

Pyramidal hives, by contrast, have been used mainly for experimental purposes, such as improving bee health or productivity, rather than for therapeutic applications involving humans. Scientists have studied natural honey bee nests in detail, examining their location, structure, and organization to gain insight into the optimal living conditions for these insects. The shape of hives has been found to influence thermoregulation, reproductive dynamics, behavioral coordination within the colony, and the immune competence of bees.

According to research summarized in *Honey Bee Medicine for the Veterinary Practitioner*, traditional square or rectangular frame hives, although the most widely used in commercial beekeeping, are not fully aligned with the physiological and behavioral requirements of *Apis mellifera* [16].

Instead, as T. Seeley notes in his seminal work *Honeybee Democracy*, the natural form of wild bee dwellings is cylindrical or oval. The dwellings are often located in tree hollows and typically have a vertical volume of about 40 liters. Such conditions provide ideal ventilation, uniform heat conduction, and the ability to build honeycombs without geometric restrictions [17]. Evolutionary adaptation to such forms explains the preference of bees for similar structures when choosing a new dwelling during swarming.

Given this, modern hive models, in particular vertical cylindrical structures that mimic the natural shape of a hollow, are increasingly used in apistruure therapy and veterinary and sanitary

projects. Their effectiveness lies not only in maintaining a stable microclimate, but also in reducing stress in the colony, increasing the viability of the brood, and reducing the incidence of infectious diseases [17, 19].

Similar efforts to optimize the spatial organization of therapeutic environments have also been observed in Ukraine. In particular, apitherapy actively employs pyramidal structures, the most prominent of which is the “bee healing bed in a pyramid,” which combines the resonant properties of pyramidal geometry with the biophysical parameters of an active bee colony. This approach was developed by A. I. Olshansky and tested as a therapeutic procedure for patients with somatovegetative disorders, asthenia, and post-stress conditions [18].

In Ukraine, several clinical initiatives based in private medical centers, particularly in the Ivano-Frankivsk, Cherkasy, and Zakarpattia regions, apply apitherapy techniques in non-pharmacological rehabilitation programs for patients with disorders of nervous regulation, sleep disturbances, asthenic syndromes, and cardiovascular instability [21]. Within the sanatorium and resort sector, apitherapy procedures have also been incorporated into COVID-19 recovery programs and are used within the family medicine system. These interventions demonstrate a high level of subjective patient satisfaction and have not been associated with any reported side effects.

Against the backdrop of the active spread of apitherapy practices in the United States in the context of architectural solutions (BeeZen Huts, Paradise Village, Capella Ranch, Hive House, etc.), Ukraine is seeing the formation of an authentic model of spatial apitherapy that combines ethnomedical approaches, elemental biophysics, and landscape integration into the ecosystem of the apiary . Despite the limited evidence base, the Ukrainian experience demonstrates a stable demand for such methods in the sanatorium-resort and medical-health sectors.

Thus, a comparative analysis of the development of apitherapy in the US and Ukraine points to two different models of practice evolution: the American model emphasizes standardization, technical improvement, and gradual academic legitimization of apitherapy in the format of evidence-based medicine; while the Ukrainian model is based on ethnocultural continuity, healing practices within folk medicine, and experimental spatial solutions with a high level of patient involvement in sensory interaction with the bee colony.

#### **6.4. The potential of international partnership in the field of apitherapy**

In the current context of global healthcare transformation, the development of intergovernmental forms of cooperation in integrative and complementary medicine, which involves the synthesis of traditional practices and evidence-based approaches to therapy, is of particular importance.

Modern apitherapy is actively integrated into the global space of Complementary and Alternative Medicine (CAM). The relevance of international partnership in this field is determined by the need to standardize therapeutic protocols, harmonize approaches to clinical safety, and ensure access to empirically proven results of the use of apiculture products. At the same time, scientific cooperation not only contributes to the adaptation of traditional methods to the requirements of evidence-based medicine, but also stimulates the development of innovative models of bio-inspired therapy.

There is currently a growing number of transcontinental research projects covering apitherapy practices as part of the comprehensive treatment of chronic inflammatory processes, neurological disorders, cardiovascular pathologies, and autoimmune diseases. In particular, a number of interuniversity consortia — involving research centers in the US, Canada, Germany, South Korea, and Japan — have initiated multicenter clinical trials of the effects of bee venom, propolis, and royal jelly on indicators of immune homeostasis, neurotransmitter balance, and tissue regeneration processes. Such studies, based on the principles of randomized control, double-blind protocols, and the use of biomarker monitoring, became the basis for the first attempts to officially register apitherapeutic agents as medical interventions at the level of clinical guidelines.

The legal, ethical, and regulatory aspects of cross-border cooperation in the field of apitherapy are determined by the unevenness of legal regimes regarding the use of bee products as medical products in different countries. In the US, the legal framework for apitherapy is regulated primarily through mechanisms inherent in the complementary medicine system, with a focus on FDA (U.S. Food and Drug Administration) standards for natural dietary supplements, medical devices, and procedures that do not have the status of medicinal products. Apitherapy products can be classified as dietary supplements, topical therapeutic agents, or complementary procedures, which implies restrictions on claims about therapeutic effects without corresponding confirmation by clinical trial results in accordance with GLP and GCP.

The European Union has a stricter regulatory model based on the principle of pharmacological equivalence and the requirements of the European Medicines Agency (EMA) for the registration of phytotherapeutic products. At the same time, certain countries, in particular Germany, Austria, and France, recognize apitherapy as part of the integrative medicine system and allow the use of certified apiculture products in clinical practice, provided that national safety standards are in place. For example, Germany has an officially accredited association of apitherapists (Deutscher Apitherapie-Bund), which cooperates with medical institutions to integrate apitherapy methods into rehabilitation treatment regimens.

In Eastern European countries, particularly Ukraine, the legal regulation of apitherapy is still in its infancy. Despite its significant empirical potential, apitherapy practices do not have a clear

status in the public health system, which complicates the creation of unified clinical protocols and access to funding from state or international institutions. The issue of regulatory differentiation between wellness services and medical interventions remains problematic, making it impossible to hold apitherapists fully legally responsible for the consequences of their interventions and reducing the level of patient protection.

In an ethical context, cross-border partnerships require the harmonization of the principles of informed consent, patient-centeredness, and the prevention of therapeutic dominance when introducing new techniques. It is important to implement international standards for the ethical evaluation of experiments involving humans. In particular, this applies to the Declaration of Helsinki, EU Directive 2001/20/EC, and the General Data Protection Regulation (GDPR) in the case of medical information processing.

Thus, the existing legal and ethical fragmentation makes it impossible to automatically recognize apitherapy protocols within the transcontinental medical partnership. To unify approaches to safety, efficacy, and legal liability, it is necessary to develop an international platform for harmonizing apitherapy standards with the participation of professional associations, health regulators, and research institutions.

European Union countries apply a regulatory model based on pharmacological equivalence standards and the requirements of the European Medicines Agency (EMA) for the registration of phytotherapeutic products. In these countries, apitherapy is considered an element of integrative medicine, provided that apicultural products comply with national technical safety regulations. At the level of clinical practice, the introduction of controlled protocols for the use of bee venom, propolis, honey, and royal jelly is envisaged, which requires confirmed evidence. In Germany, in particular, there is an accredited professional association of apitherapists that coordinates the clinical application of apitherapy methods in medical institutions.

In the United States, apitherapy does not have a separate category in the classification of medical services, and its practical implementation is subject to FDA regulations, in particular regarding the use of bee products as dietary supplements or health procedures. Product certification standards are based on the provisions of the Dietary Supplement Health and Education Act (DSHEA, 1994) and do not automatically qualify apitherapy as a therapeutic intervention. The lack of a unified national protocol for apitherapy practice complicates its integration into health insurance programs and clinical guidelines.

Eastern European countries, despite their long tradition of using bee products in health practices, do not have a unified regulatory framework for the status of apitherapy in the healthcare system. The distinction between the concepts of "apitherapy," "health procedures," and "medical

interventions" is often absent at the legislative level, which creates legal uncertainty and limits the possibilities for international recognition of clinical experience.

The formation of cross-border partnerships requires the harmonization of medical, legal, and ethical standards. In particular, international clinical trials involving apitherapy components must comply with GCP (Good Clinical Practice) principles, ensuring informed consent, protection of personal data (in accordance with the requirements of GDPR in Europe and HIPAA in the US), and transparency in matters of conflict of interest. Ethics committees operating at medical institutions participating in international partnerships are required to assess bioethical risks, particularly regarding the application of bee venom and immunomodulators, which are highly allergenic.

The existence of incompatible regulatory systems significantly limits the mobility of apitherapy practices, prevents research standardization, and complicates cross-border data exchange. This issue can be addressed by creating a global scientific and methodological alliance on apitherapy based on existing platforms such as Apimondia, the American Apitherapy Society, and the Global Forum on Bioethics in Research, with a focus on unifying clinical protocols, legal liability mechanisms, and ethical oversight.

Tools for intergovernmental integration in the field of apitherapy include grant programs, mechanisms for scientific cooperation, technology transfer, and models of public-private partnerships that ensure the sustainability of infrastructure and research initiatives.

Among the main sources of funding for research and the implementation of apitherapy technologies, the Horizon Europe programs are particularly noteworthy. They support multidisciplinary biomedical projects that integrate Complementary and Alternative Medicine (CAM) approaches within the framework of evidence-based medicine. This program places special emphasis on establishing international consortia for the study of natural remedies, including apitherapy products, due to their immunomodulatory, anti-inflammatory, and neuroprotective potential.

In the US healthcare system, the National Institutes of Health (NIH), through its National Center for Complementary and Integrative Health (NCCIH), funds research on natural substances, including apitherapy products, in the context of clinical application and biological mechanisms of action. Grants in this area are aimed at creating a scientifically sound basis for integrating such methods into medical practice in accordance with GCP and GLP requirements.

Additional opportunities are opened up by the WHO Traditional, Complementary and Integrative Medicine (WHO-TCIM) Strategy, which provides methodological and advisory support for initiatives aimed at the national integration of traditional practices with a focus on biosafety, pharmacovigilance, and ethical compliance standards.

The infrastructural implementation of apitherapy projects largely depends on the effectiveness of public-private partnership (PPP) models. Within this framework, apitherapy centers are established that combine the functions of medical care, clinical research, product certification, educational training, and experimental production. Biomedical clusters, which are regional associations of research institutions, manufacturers, and healthcare facilities, facilitate the integration of apitherapy into the personalized medicine system by utilizing the potential of neurotechnologies, bioarchitecture, and instrumental diagnostics such as EEG, HRV, and spectrophotometry.

The involvement of private capital in the apitherapy industry in the United States and the European Union is increasing due to the growing demand for non-pharmacological therapies based on natural biologically active substances. Startup support programs in biotechnology, particularly those implemented through accelerators at medical universities and hospitals, create favorable conditions for scaling apitherapy innovations and integrating them into international systems of medical tourism, rehabilitation, and preventive medicine.

International partnership in the field of apitherapy requires the targeted unification of clinical, legal, and ethical standards while considering regional differences in healthcare systems. The most effective areas of such cooperation include:

- joint research aimed at validating the mechanisms of action of apicultural products from the standpoint of evidence-based medicine;
- technology transfer and the exchange of methodologies related to biological safety and pharmacovigilance;
- development of institutional infrastructure through the establishment of apitherapy centers, educational programs, and clusters within the framework of public-private partnerships.

## **Conclusions to Chapter 6**

The synergy between grant mechanisms (NIH, Horizon Europe), the activities of professional associations (Apimondia, American Apitherapy Society), and WHO initiatives in the field of integrative medicine creates the conditions for the formation of a global network of certified apitherapy platforms. Given the growing demand for non-pharmacological and personalized approaches to therapy, apitherapy has the potential to become part of a transcontinental model of medical services in the field of complementary medicine.

Prognostic analysis indicates the gradual institutionalization of apitherapy in leading healthcare systems through its integration into multidisciplinary rehabilitation, palliative care, and

psychosomatic medicine programs. Subject to regulatory harmonization and confirmation of clinical efficacy, the geography of apitherapy application is expected to expand within the international medical market, which will increase its therapeutic, social, and economic significance.

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# CHAPTER 7

## COMMERCIAL POTENTIAL OF THE "BEE MEDICAL BED IN A PYRAMID"



### 7.1. Development of a business model for implementation in the United States

In the context of the increasing demand for integrative and nature-oriented healing methods, apitherapy, particularly the innovative concept of the “bee healing bed in a pyramid,” is gaining importance as a promising direction within the field of Complementary and Alternative Medicine (CAM). According to data [1], the CAM market in the United States was valued at \$29.4 billion in 2023 and is projected to grow to \$256.18 billion by 2033, with a compound annual growth rate (CAGR) of 24.17%. At the same time, the wellness tourism market in the United States continues to expand, reaching \$229.2 billion in 2024, with a projected CAGR of 13.1% for the period 2025–2034 [2]. These trends demonstrate a high level of consumer interest in non-pharmacological, environmentally sustainable, and culturally meaningful methods of healing.

Within this context, the development of a business model for introducing the “bee healing bed in a pyramid” in the United States should consider not only medical and cultural aspects but also economic feasibility and scalability potential. Given the growing demand for integrative treatment and wellness approaches, as well as the shift toward personalized medicine, this concept holds significant potential for successful commercialization and integration into existing healthcare systems and the wellness industry in the United States.

Given these trends, it is advisable to conduct a structured analysis of the apitherapy market in the United States to substantiate potential directions for the commercialization of the “bee healing bed in a pyramid.” The segmentation of the apitherapy market in the United States demonstrates significant economic diversification, which necessitates the development of a multi-component implementation strategy.

One of the most promising segments is medical tourism (wellness travel and health resorts), which, according to the Global Wellness Institute, accounts for more than 39% of the global wellness travel market and attracts consumers seeking nature-oriented recovery. Apitherapy practices can be integrated into the programs of medical and wellness resorts, thereby increasing the value of services and expanding the range of wellness offerings.

Another important segment is the complementary and integrative health (CIH) market. Within this sector, there is steady growth in spending on services that fall outside the traditional biomedical model but are utilized by 33% of the adult population in the United States [1]. The inclusion of apitherapy techniques in CIH service portfolios enables integrative medicine clinics to broaden their client base and create additional revenue streams.

Special attention should be paid to rehabilitation programs for veterans (Veterans Affairs programs). Programs using natural therapeutic approaches, such as Mindfulness-Based Stress Reduction (MBSR), iRest Yoga Nidra, Warrior Care Network, VA Whole Health Program, Tai Chi for Veterans, Battlefield Acupuncture, and Cognitive Behavioral Therapy for Chronic Pain (CBT-CP), are gaining support from the US Department of Veterans Affairs as an effective means of rehabilitation after post-traumatic stress disorder (PTSD), depression, and chronic pain. The integration of the "bee healing bed in a pyramid" into clinical pathways for veterans could be an important factor in the social responsibility of the project and, at the same time, open up access to budget funding.

Another promising area is the introduction of apitherapy services into workplace wellness programs for corporate clients. According to estimates by the National Wellness Institute, US companies spend more than \$8 billion annually on employee wellness programs. Apitherapy sessions can be offered as a tool to reduce stress, prevent burnout, and increase overall employee productivity [3].

Last but not least is the segment of health-conscious individuals who are focused on maintaining their health. The growing popularity of the concept of self-care and awareness of alternative medical practices, as well as the spread of digital health platforms, are driving active demand for personalized wellness services, which may include bee bed therapy.

Let's consider the specifics of positioning the product on the market.

The development of a business model requires a clear definition of the positioning of the "bee therapeutic bed in a pyramid" as an innovative therapeutic solution situated at the intersection of medicine, bioarchitecture, and cultural and environmental practices.

First, the product should be viewed as a new model of natural therapy without pharmacological intervention, aligning with current trends in personalized health improvement. The rejection of medication and the focus on endogenous activation of regenerative processes correspond to growing consumer demand for safe and natural methods of maintaining health.

An additional competitive advantage lies in the exclusivity of a therapy with proven biophysical effects, supported by the results of neurophysiological research. Data from electroencephalographic (EEG) and heart rate variability (HRV) analyses confirm the normalization

of neurophysiological parameters, reduction of stress levels, and stabilization of the autonomic nervous system following sessions on the “bee treatment bed.” Consequently, the therapy attains the status of an evidence-informed practice, which enhances its attractiveness within the framework of integrative medicine in the United States.

Particular attention should be paid to the principle of synergy between the architectural environment and the bioactive environment of the bee colony. The pyramidal shape of the structure optimizes the spatial and energy parameters of the environment thanks to the resonant properties of geometry, which is confirmed by research in the field of bioenergy and wellness architecture. In combination with the biochemical and electromagnetic signals produced by bee colonies, an integrative environment with high bioadaptive potential is created, aimed at improving the quality of the body's regenerative processes.

Thus, the positioning of the “bee healing bed in a pyramid” extends beyond traditional wellness offerings by integrating scientifically grounded methods of natural stimulation for psychophysiological balance, aligning with the modern evidence-based paradigm of integrative healing.

Let us justify the “bee healing bed” as a unique selling proposition (USP).

The formation of a unique selling proposition is a key stage in the commercialization strategy of the “bee therapeutic bed in a pyramid,” as it defines the product’s position in the competitive market of complementary and integrative medicine in the United States.

The uniqueness of the product lies in its non-pharmacological restoration of cognitive function and stress reduction through the activation of endogenous regulatory mechanisms. Preliminary research results show positive dynamics in neuropsychophysiological parameters and enhanced adaptive capacity of the body without the use of pharmacological agents.

The second defining component is the interdisciplinary nature of the therapy, which combines apitherapy, bioarchitecture, and sensory integration. The combined action of bioactive substances produced by bee colonies (volatile compounds, microvibrations, and electromagnetic fields) synergizes with the spatial and energetic influence of the pyramidal structure, creating a multi-level healing effect. Additional value is provided through sensory stimulation from natural scents, sounds, and vibrational impulses, which promote the harmonization of somatic and psycho-emotional functions.

The third essential element of this unique offering is the facility’s energy efficiency and environmental sustainability (green healthcare). The design of the medical complex follows the principles of sustainable development, using natural materials such as wood and reeds, operating autonomously through the natural life processes of bee colonies, and minimizing energy

consumption. These design solutions correspond to the growing environmental expectations of consumers and the concept of “healing through a nature-oriented environment,” which is actively promoted in green building and wellness architecture systems in the United States.

Therefore, the unique selling proposition of the “bee pyramid healing bed” is formulated as a highly effective, scientifically grounded, and environmentally safe therapeutic system that can be integrated into personalized health programs and corporate wellness management initiatives.

Assessing the competitive environment is a necessary prerequisite for strategic planning regarding the introduction of the “bee healing bed in a pyramid” in the United States. The analysis indicates a limited presence of apitherapy practices within the organized wellness and spa segment.

Currently, most wellness and spa projects using apitherapy in the United States are restricted to the application of bee products in cosmetic procedures, aromatherapy, or as part of wellness programs involving honey, propolis, and pollen. Typical examples include the use of bee components in massage oils, wraps, or detox programs at luxury wellness resorts. At the same time, the use of natural environmental apitherapy platforms, such as staying in close proximity to active bee colonies within specially designed facilities, remains largely undeveloped.

Market analysis shows that bee beds integrated into structured therapeutic environments are significantly underrepresented, revealing an untapped niche. The absence of standardized architectural and bioactive solutions that combine environmental design with therapeutic technology creates favorable conditions for forming a new category of natural restoration products targeting an audience interested in non-pharmacological, nature-based healing methods.

To systematically assess the implementation prospects of this initiative, it is advisable to conduct a SWOT analysis:

- Strengths: uniqueness of the concept; scientific validation of biophysical effects (EEG, HRV); synergy between the natural bioactive environment and architectural structure; alignment with green healthcare and wellness tourism trends.
- Weaknesses: limited consumer awareness and experience; the need for specialized staff training to operate the facilities; regulatory restrictions on beekeeping in certain states and municipalities.
- Opportunities: increasing demand for complementary and integrative healing methods; expansion of the U.S. wellness market; potential integration into rehabilitation programs for veterans; development of a franchise network of eco-friendly wellness centers.
- Threats: possible emergence of competitors following the successful demonstration of the business model; biosafety risks related to the maintenance of bee colonies;

potential legislative changes affecting integrative medicine or environmental standards.

Thus, the analysis indicates the high strategic potential for introducing the “bee healing bed in a pyramid,” provided that regulatory, technological, and communication challenges are properly addressed during the project’s scaling stage.

The successful introduction of the “bee pyramid healing bed” to the U.S. market requires full compliance with comprehensive legal and certification standards governing integrative medicine, the wellness industry, and biosafety in interactions with living organisms.

If the product is positioned as a complementary therapy device, it must undergo medical certification in accordance with the requirements of the U.S. Food and Drug Administration (FDA). Depending on the bed’s specific functional characteristics, registration under the 510(k) procedure or another regulatory pathway for non-invasive wellness devices may be required. Demonstrating safety and the absence of medical risk is a critical factor for obtaining marketing authorization.

In addition, introducing the facility into wellness establishments requires proper licensing of activities in each state. Regulatory requirements may vary depending on the classification of the establishment (spa, health resort, or integrative medicine center) and necessitate compliance with customer safety standards, operator certification, and infection control protocols.

Special attention should be given to protecting intellectual property rights for both the methodology and architectural design. Registering a patent for the innovative therapeutic concept and pyramid design model with the U.S. Patent and Trademark Office (USPTO) will provide legal protection of exclusive usage rights, prevent unauthorized imitation, and enhance the company’s asset value.

An important component of regulatory compliance is adherence to safety standards for facilities housing bees. The maintenance and operation of bee colonies are regulated by the requirements of the U.S. Department of Agriculture (USDA) and individual state health departments. The key requirements include ensuring the protection of customers from potential contact with bees, selecting appropriate locations outside densely populated areas, maintaining veterinary supervision over the condition of bee colonies, and complying with air hygiene and environmental safety standards.

Thus, compliance with legal and certification requirements is essential for ensuring the lawful operation of such facilities in the United States, enhancing their investment attractiveness, and maintaining the sustainability of the business model within the regulatory framework.

Therefore, the development of a business model for the introduction of the “bee healing bed in a pyramid” to the U.S. market is highly economically feasible and aligns with current trends. A

comprehensive market analysis has demonstrated consistent demand for non-pharmacological, nature-based therapeutic solutions, creating favorable conditions for the commercialization of innovative approaches in the field of complementary and alternative medicine.

The proposed business model exhibits strong potential for successful implementation in the U.S. market due to its combination of scientifically validated therapeutic effects, the cultural appeal of nature-oriented healing, and the economic efficiency associated with the principles of sustainable development in healthcare.

## **7.2. Advantages of Olshansky's innovative method in the field of medical tourism**

The innovative method of healing in apihouse, developed by A. Olshansky, is in line with current trends in nature-oriented recovery, which are being actively implemented in the US. While in European countries, apitherapy complexes based on the bioactive environment of bee colonies have become a common element of wellness tourism programs, similar services remain innovative for the American market, despite the long tradition of using apitherapy in US medicine. This opens up prospects for the introduction of Olshansky's method as a unique therapeutic format in the American medical tourism system.

At the socio-economic level, the innovativeness of the method is enhanced by its ecological orientation. Bees play a critical role in supporting global ecosystems by pollinating agricultural crops, which directly affects food security and human health. Preserving biodiversity by supporting bee activity is not only ecologically but also socially significant. Integrating natural ecosystems into tourism programs increases the cultural value of services, contributes to the preservation of traditions and natural heritage, and shapes sustainable approaches to tourism development. In the cultural dimension, the use of bee products (honey, propolis, wax) is deeply rooted in the traditional practices of folk medicine in many countries. This creates a unique tourist experience that combines healing with cultural enrichment and a return to the natural origins of human existence. The innovativeness of Olshansky's method is also evident in its ability to shape new types of tourist experiences through sensory and bioenergetic integration. The combination of apitherapy with pyramidal architecture and the concept of sensory stimulation allows for the creation of a wellness format that differs significantly from traditional spa and wellness programs. This approach not only improves physical health but also has a profound emotional and spiritual impact on the individual, helping to restore inner balance and integrity.

In structural and conceptual terms, Olshansky's method is based on a complex combination of three components: apitherapy, pyramidal architecture, and sensory integration. Its fundamental

originality lies in the creation of a spatially bioactive environment where the biophysical influences of the bee colony's life activities resonate with the energy configuration of the pyramid, contributing to the optimization of human neuropsychophysiological processes.

A distinctive feature of the method is the multifactorial nature of its influence and the exclusivity of its architectural design. The use of natural materials, in particular reeds, ensures natural thermoregulation inside the structure without the need for additional energy sources. This creates a stable microclimate for sensory therapy, which significantly increases the biological effectiveness of wellness procedures.

Olshansky's method demonstrates an undeniable advantage thanks to its holistic bioecological approach, focused on minimizing man-made influences and maximizing the authenticity of the therapeutic environment. Unlike traditional forms of apitherapy in the US, where the use of bee products is limited to cosmetic or inhalation procedures, Olshansky's method involves full immersion of a person in a living bioactive environment. This not only broadens the physiological spectrum of influence, but also forms a new model of sensory and neurophysiological integration, which currently has no analogues in US medical tourism.

The transition to the personal level of the method's advantages opens up a range of clearly expressed medical and biological effects. One of the key mechanisms of action is the non-pharmacological reduction of stress levels and stabilization of neurovegetative regulation. The influence of the bioactive environment of the bee colony, enhanced by the spatial properties of the pyramid, contributes to the harmonization of the functioning of the autonomic nervous system. Data from studies using electroencephalography (EEG) and heart rate variability (HRV) monitoring confirm a decrease in sympathetic activation, normalization of rhythmic brain activity, and improvement of adaptive mechanisms.

Another important effect is the stimulation of cognitive functions and the restoration of adaptive potential. Natural physical and biological factors activate neuroplasticity processes, improve information processing, and increase resistance to psycho-emotional overload. Multisensory stimulation (acoustic, vibrational, aromatic) ensures the integration of somatic and cognitive systems, which is especially important for rehabilitation after stress disorders and in conditions of increased cognitive load.

Another significant advantage of the method is increased immune resistance. Microaerosols of volatile components of hive air, enriched with biologically active substances (essential oils, enzymes, flavonoids), stimulate a nonspecific immune response, improve the functioning of the respiratory organs, and activate endogenous detoxification systems. The regulation of anti-inflammatory processes through biochemical signals from the bee colony makes the method promising for immune rehabilitation programs and the prevention of chronic inflammatory diseases.

Thus, Olshansky's innovative method has a systemic positive effect on the body's regulatory, cognitive, and immune systems. Its introduction into the U.S. medical tourism industry creates the conditions for the development of personalized nature-oriented wellness that combines ecological, sociocultural, and individual therapeutic benefits.

### **7.3 Profitability and economic efficiency of the "Bee healing bed in a pyramid" project**

The "Bee Healing Bed in a Pyramid" project involves the creation of an innovative platform for apitherapy, combining the traditional bioenergetic properties of bees with the spatial and architectural phenomenon of the pyramidal shape. With the ever-increasing demand for natural, non-invasive, and integrative healing methods, this concept has significant commercial potential in the medical tourism, health center, and wellness industry segments. The economic efficiency of the project is assessed based on an analysis of investment costs, operating expenses, projected revenues, and trends in the apitherapy market in the United States.

#### **Project description**

The project involves the construction of a specialized pyramidal structure in which a treatment bed is placed above active beehives. The therapeutic effect is based on the combined influence of the following factors:

- microvibrations from bee activity;
- volatile biologically active substances;
- the structured energy field of the pyramid;
- acoustic and aromatic stimuli.

The duration of a therapeutic session is 30–60 minutes and provides a preventive and restorative effect for the nervous, cardiovascular, and immune systems.

#### **Basic characteristics**

- Cost of pyramid construction: \$30,000
- Organization of an apiary: 10 bee colonies (approximately \$3,000)
- Cost of a therapeutic session: \$150–200 per hour
- Seasonality
- Services are provided for 7–8 months a year during the warm season
- Capacity
- 10–12 clients can be served per day

- At night, the pyramid can operate as an eco-hotel: an 8–9-hour stay costs \$800–900 per night.

### Special conditions of use

*During therapeutic sessions, the use of gadgets and electrical appliances is prohibited to ensure natural bioenergetic interaction.*

### Investment costs

Let us take a comprehensive look at the investment costs summarized in Table 7.1. The implementation of the project requires the following main investments:

**Table 7.1**

#### Main expenses

Expense item	Cost, USD
Pyramid construction	30,000
Setting up an apiary (10 colonies)	3,000
Specialized equipment	10
Land lease (annual)	500–1000
Marketing, certification, advertising	20
Total	36,500–37,000

The logic of our study requires us to consider operating expenses (Table 7.2):

**Table 7.2**

#### Annual facility maintenance costs

Expense item	Cost, USD per year
Apiary maintenance	5
Technical maintenance of the facility	300
Marketing promotion	100
Insurance and administrative expenses	500
Total	2300

### Projected income

The main source of income is therapeutic sessions:

- The average cost of one session is \$150.
- The expected number of clients is 10 people per week for 7 months.

Calculation of annual revenue:

- 10 clients × 4 weeks × 7 months × \$150 = \$42,000.

Additional sources of income:

- Sale of honey and other bee products.
- Organization of excursions, master classes, educational programs.
- Calculation of profitability.

The financial indicators of the project are summarized in Table 7.3.

**Table 7.3**

**Financial indicators of the project**

Indicator	Value
Net income for the year	42,000 – 2,300 = 39,700 USD
Payback period	36,500 ÷ 39,700 ≈ 1 year
Actual payback period, taking into account seasonality and investment inertia	2 years
Return on investment	(39,700 ÷ 36,500) × 100% ≈ 108.8%

The project demonstrates high financial efficiency and a short return on investment period.

**Analysis of the apitherapy services market in the US**

- A basic session lasts 45–60 minutes and costs \$70–150.
- Course programs (5–10 sessions) cost between \$300 and \$1,200.
- Comprehensive wellness programs with apitherapy, aromatherapy, and bioenergy practices cost \$200–250 per session.
- In private farms in the middle states, the cost ranges from \$50 to \$80 per session.
- Factors that increase the cost of services:
  - Pyramidal architecture: 20–30% price increase.
  - Availability of medical support: 50–100 USD increase in cost.

Thus, the average price of an apitherapy session in the US is \$120–180, which indicates the high purchasing power of the target audience.

In the following review, we will comprehensively justify the financial model of the project, which is summarized in Table 7.4.

**Financial model of the "Bee Bed in a Pyramid" project**

<b>Section</b>	<b>Expense/income item</b>	<b>Amount, USD</b>
Capital expenditures	Pyramid construction	30,000
Capital expenditure	Setting up an apiary (10 colonies)	3,000
Capital expenditures	Specialized equipment	10
Capital expenditures	Land lease (annual)	75
Capital expenditures	Marketing, certification, advertising	20
Operating expenses	Apiary maintenance (annual)	500
Operating expenses	Technical maintenance of the facility (annual)	300
Operating expenses	Marketing (annual)	10
Operating expenses	Insurance and administrative expenses (annual)	500
Revenue	Average annual income from services	42
Profitability	Net annual income (income – operating expenses)	39,700
Return on investment	2 years	

**Conclusions to Chapter 7**

In conclusion, we note that the “Bee Healing Bed in a Pyramid” project is economically sound and demonstrates high profitability due to:

- short payback period (2 years)
- high margins on therapeutic services
- low operating costs
- the possibility of diversifying sources of income
- prospects for scaling in the local and international medical tourism market

Given the global trends in the development of natural medicine and the wellness industry, the implementation of this project is a feasible and promising investment.

The “Bee Healing Bed in a Pyramid” project is economically sound and demonstrates high profitability indicators. Its effectiveness is ensured by a combination of a short payback period, approximately 2 years, and high margins on the therapeutic services provided. Low operating costs allow for a stable financial balance, and the possibility of diversifying income through additional services, such as the sale of bee products and the organization of educational programs, increases the project's resilience to seasonal fluctuations in demand. An important competitive advantage is the prospect of scaling at the local level through the opening of new facilities, as well as integration into the international medical tourism market. Given the current global trends in the development

of natural medicine and the expansion of the wellness industry, the implementation of the project has every reason to be considered a feasible and strategically promising investment.

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# CHAPTER 8

## PRACTICAL RECOMMENDATIONS FOR IMPLEMENTING THE METHOD



### 8.1. Creation of apitherapy complexes: construction and organization

An apitherapy complex in the United States is defined as a specialized infrastructure that integrates therapeutic modules involving bee colonies, volatile bioactive substances, and spatial solutions designed to create an optimal microclimate. Architectural structures are developed in accordance with medical safety standards, environmental regulations, and the principles of integrative therapy [1], [4].

The main types include: 1) small wellness beds located in wellness centers, 2) bee farms incorporated into medical tourism programs, and 3) institutional clinics integrating apitherapy within a multidisciplinary therapeutic framework [2], [5]. All models must comply with CDC, FDA, USDA, and OSHA requirements, which regulate biosafety, patient safety, and air quality standards [1], [3].

A key success factor is the selection of an ecologically clean location characterized by biodiversity and minimal industrial or electromagnetic pollution. Preference is given to agroecosystems free from pesticides and with favorable climatic conditions for both bees and humans [4].

The environment must be safe for individuals with allergies, requiring clear zoning, preventive measures to avoid contact with bees, emergency response plans, and continuous air monitoring [6].

Design solutions range from traditional wooden pavilions to innovative pyramidal structures with bioenergetic parameters. Empirical studies confirm that pyramidal structures positively affect psychophysiological well-being by stabilizing the electromagnetic field [7].

Biophilic design emphasizes the use of local, low-toxicity natural materials (low VOC), passive ventilation systems, and minimal mechanical interference with the microclimate. These measures reduce the risk of colony destabilization and help maintain temperature stability [4].

Special attention is given to accessibility for people with disabilities in accordance with ADA requirements. Architectural planning must be inclusive, accommodating individuals with PTSD, neurosensory sensitivity, or age-related limitations [5], [6].

Figure 8.1 presents a model of a bee treatment bed in a pyramid designed by A. Olshansky. This model demonstrates an effective combination of biophysical requirements and safe spatial isolation. The two-tiered structure, with hives located in the lower section and a patient bed positioned on the upper level, eliminates direct contact with bees while preserving the influence of volatile substances, acoustic vibrations, and microfluctuations in temperature.

This type of structure is based on the principles of vertical bio-isolation and passive microclimate regulation. The thatched roof serves as a natural thermal filter, reducing the risk of overheating, maintaining stable temperature levels, and preserving the circulation of bioaerosols. The solution exemplifies the synergy of structural simplicity, bioadaptability, and regulatory compliance recommended in environmental medicine practices [1], [7].

The internal organization of the space should follow principles of functional zoning that account for medical and architectural ergonomics. The central element is the apitherapy bed located above the hives, which provides sensory stimulation such as inhalation, thermal, and acoustic effects without physical contact.



**Fig. 8.1.** Model of a bee therapy bed in a pyramid

Inhalation rooms and areas for apitherapy and external application of bee products should be acoustically and visually isolated, equipped with lighting control systems to reduce neurosensory load. The medical section should include a consultation area with basic monitoring instruments (pulse, blood pressure, oxygen saturation, and anxiety level) to assess the effectiveness of procedures [2], [9].

To ensure infection control, separate rooms should be provided for the storage of sterile equipment, disposal of biomaterials, and disinfection. All contact surfaces must comply with CDC standards for materials suitable for regular sanitation [3].

The engineering systems of the apitherapy complex must meet the requirements of medical construction and bioecological regulation. It is essential to maintain a stable microclimate with a temperature of 18–24 °C and humidity of 45–60%, which are optimal for both the physiological condition of patients and the activity of bees. Ventilation systems should operate without mechanical pressure, using natural circulation or multi-level purification through HEPA filters. During non-working periods, ozonation of the premises is permissible.

Air conditioning systems should be distributed or passive, with the possibility of local control. To reduce electromagnetic pollution, it is recommended to use shielded cables and alternative power sources such as solar panels or UPS systems [5]. Construction materials must meet environmental safety certification requirements, including GREENGUARD, LEED, or Cradle to Cradle. The use of eco-wool, natural gypsum, FSC-certified wood, and bamboo is recommended, as these components have minimal emissions of volatile organic compounds [1], [4].

The systematic organization of space and engineering determines the clinical effectiveness of apitherapy. Only under conditions of a stable air environment, reduced electrosmog, and safe materials does the therapy demonstrate high results in chronic, psychosomatic, and inflammatory conditions [6], [9].

The operation of apitherapy complexes within the US legal framework requires strict compliance with licensing, medical, sanitary, and veterinary standards. Apitherapy procedures are classified as elements of complementary or integrative medicine, which requires compliance with state and insurance requirements, in particular, Medicare/Medicaid Certification and Joint Commission (JCAHO) accreditation [1], [6].

The keeping of bee colonies is regulated by the USDA, with mandatory registration of apiaries, implementation of biosecurity measures, disease prevention protocols, and colony monitoring. Occupational safety requirements are determined by OSHA standards, which require the development of internal procedures, instructions for responding to anaphylaxis, and management of sanitary risks [3], [4].

Infection control compliance is ensured in accordance with CDC Guidelines for Environmental Infection Control, and the use of apicultural products is regulated by the FDA as biologically active substances [5]. Strict regulatory compliance ensures not only legitimacy but also legal protection of activities and minimization of medical and legal risks.

The effective functioning of an apitherapy complex is impossible without qualified personnel with interdisciplinary training. The core of the team consists of specialists with medical education (RN, MD, DO, ND) who are certified in integrative medicine and have confirmed competence in apitherapy, for example, through the American Apitherapy Society or CME (Continuing Medical Education) programs.

The training of support staff includes knowledge of the bioactive mechanisms of apiculture products, diagnosis of allergic conditions, sanitary control, and the basics of naturopathy. Knowledge of beekeeping, apitoxinology, and the enzymatic processes involved in the production of therapeutically active substances is also necessary [2], [4].

The need for such a personnel approach is justified by the complexity of the biochemical and psychosomatic mechanisms of apitherapy. Only specialists with knowledge in several fields—medicine, beekeeping, biochemistry, psychology—are able to ensure the effectiveness and safety of procedures [5], [9].

Continuous professional development, participation in scientific and practical conferences, and updating knowledge in line with the latest research are key elements in maintaining the quality of services and compliance with the principles of integrative therapy [7].

The financial model of an apitherapy complex should be based on the principles of sustainable development of medical innovations and combine commercial efficiency with social orientation. The start-up financing strategy involves attracting investments through natural health services funds, state- d health care programs in rural areas of the United States, as well as public-private partnership (PPP) mechanisms [10].

The profitability of apitherapy services is ensured by their high margins and low operating costs. Operational flexibility, seasonal pricing, and individualized therapeutic protocols allow for a quick transition to positive cash flow, especially when services are integrated into private insurance models (PPO, HMO) [7].

Additional sources of support include grant programs from the National Center for Complementary and Integrative Health (NCCIH) and the United States Department of Veterans Affairs, which fund the development of non-pharmacological rehabilitation methods, including those based on apitherapy [2], [5].

Financial diversification is also achieved through participation in clinical trials, the development of educational programs in natural medicine, and collaboration with universities and research institutions. This reduces risks, attracts additional resources, and enhances the apitherapy center's reputation in the market [3].

The effective implementation of an apitherapy complex requires the integration of architectural, environmental, medical, managerial, and financial solutions. It is essential to adhere to the principles of biophilic design, create a safe sensory space, and ensure favorable conditions for the life of bee colonies [4].

Functional zoning of the interior space, compliance with barrier-free access standards, and ergonomic planning determine the comfort and clinical effectiveness of the therapeutic process. Engineering solutions must ensure a stable microclimate, low electromagnetic load, and compliance with environmental safety [3], [6].

Medical personnel with interdisciplinary training ensure the quality of services, compliance with clinical protocols, and risk minimization. Systematic professional development and participation in professional associations are mandatory conditions for meeting the modern requirements of integrative medicine [2], [7].

A sustainable economic model should combine investment mechanisms, an insurance component, and grant support. A focus on social significance, environmental responsibility, and medical innovation shapes the long-term prospects for the development of the apitherapy complex as a new type of institution in the US healthcare system.

## **8.2. Methodology for using the “Bee Healing Bed in a Pyramid”**

The method of using the “Bee Healing Bed in a Pyramid” is an integrative therapeutic practice based on a combination of biophysical, sensory, and spatial-structural factors aimed at normalizing the functional state of the body for Americans. The core concept of the therapeutic effect involves activating neurovegetative regulation, optimizing the psycho-emotional background, and stimulating natural self-regulation mechanisms within a structured environment containing bioactive elements.

A key component of the technique is the use of vibrational-acoustic and volatile biologically active signals generated by the activity of bee colonies located directly beneath the therapeutic bed. Biophysical factors include low-frequency vibrations from hive activity, thermal microflows resulting from heat exchange between the patient’s body and the external environment, and microaerosol transmission of volatile compounds from honey, propolis, and beeswax. The interaction of these factors creates a bioacoustic and chemically active field that stimulates

parasympathetic activity, reduces anxiety, and normalizes cardiovascular and neuropsychiatric parameters.

The sensory mechanisms of the therapeutic effect involve creating conditions for controlled sensory deprivation dominated by natural acoustic and aromatic stimuli. The elimination of artificial noise, maintenance of stable temperature, natural scents of bee products, and rhythmic vibrations of bee wings create an environment conducive to deep neurovegetative relaxation. The technique gradually immerses the patient in a sensory environment without active external stimulation, allowing for the natural restoration of the body's adaptive resources.

Thus, the therapeutic effect of this technique is achieved through the integration of biophysical and sensory stimuli aimed at stimulating innate mechanisms of homeostatic adaptation and forming a stable neurophysiological response to the bioactive environment for the health improvement of Americans [6], [7].

The effectiveness of the "Bee Healing Bed in a Pyramid" technique largely depends on the careful preparation of both the patient and the therapeutic environment. The preparatory stage aims to minimize the risk of adverse reactions, ensure the safety of the procedure, and optimize clinical outcomes.

Assessment of the patient's condition is a prerequisite for starting therapy. The initial examination involves collecting an extensive medical history, with an emphasis on allergic status, the presence of chronic diseases of the cardiovascular system, bronchopulmonary pathology, immune response disorders, and psychoneurological disorders. The specialist verifies absolute and relative contraindications, including hypersensitivity to bee products, uncontrolled bronchial asthma, epilepsy, acute mental states, pregnancy, and severe forms of heart failure.

The preparation algorithm includes basic physiological screening: measurement of blood pressure, heart rate, respiratory rate, and assessment of blood oxygen saturation using pulse oximetry. If borderline or dangerous indicators are detected, therapy is postponed until the patient's condition stabilizes. In addition, informed consent for the procedure is obtained in accordance with bioethics compliance requirements, which involves informing the patient about the possible risks and benefits of therapy for the US.

Preparation of the therapeutic environment includes checking the stability of microclimatic parameters: the temperature should be between 20–26°C, the humidity level should be 50–65%, and air circulation should ensure smooth air exchange without creating strong drafts. Before each procedure, the technical condition of the bed, ventilation ducts, and the physical condition of the bee colonies are checked, with the results documented in the appropriate registration forms.

Therefore, proper preparation for the apitherapy procedure is a critical component of the methodology, creating conditions for the optimal realization of the therapeutic potential of the bioactive environment for the health improvement of Americans.

The technical organization of therapy using the “Bee Healing Bed in a Pyramid” is based on the principles of biointegrative modeling of the environment, aimed at maximizing the activation of sensory and biophysical channels of influence. The design of the therapeutic complex includes a specially designed therapeutic bed formed from separate wooden hives made of non-resinous wood, each of which accommodates at least one bee colony. Each hive is equipped with a ventilation grille at the top for the unhindered circulation of volatile bioactive substances (phytoncides, nectar aromas, propolis), as well as to enhance the acoustic effect of the buzzing of bees.

The pyramidal structure, into which the treatment bed is integrated, is built in accordance with the proportions of the Egyptian pyramids, with the corners oriented strictly to the four cardinal points. The body of the pyramid is covered with reeds, which provides natural thermal insulation, optimal ventilation, and minimizes artificial influence on the internal energy field. The pyramid is supported by at least four pillars, while the entrance to the therapeutic space is through a special door in the bottom of the structure, with the use of ergonomic stairs. The bee hive entrances are located outside the room to prevent direct contact between the bees and patients.

A bioactive zone is formed above the hives at a distance of 35–40 cm from the bee colonies, where vibrational, aromatic, and bioenergy fields are concentrated. The bed is positioned so that its sides face the cardinal points, which enhances the spatial organization of bioenergetic flows and optimizes the effect on the patient's body.

The therapy procedure involves placing the patient in a lying position on the surface of the therapeutic bed. Before the start of the session, the stability of the temperature regime (20–26 °C) and humidity (50–65%), the serviceability of the ventilation system, the condition of the bee colonies, and the cleanliness of the therapeutic zone are checked. The bed can comfortably accommodate two or more patients at the same time, allowing for group therapy sessions.

The duration of one session is from 30 minutes to 1 hour. The course of treatment includes 10–12 procedures, conducted several times a week. A typical regimen involves daily 1-hour sessions for one month. An example of a clinical result is the normalization of blood pressure in patients with an initial level of 160/80 mm Hg to a physiological norm of 120/80 mm Hg after completing a full course of therapy.

An important feature of the therapy is the natural induction of a state of deep physiological relaxation: after 15–20 minutes on the treatment bed, patients usually enter a phase of deep sleep,

indicating the activation of the parasympathetic nervous system and the formation of a stable anti-stress response.

The biophysical effect is enhanced by the presence of negatively charged ions formed as a result of the movement of bees and microcurrents of electrical charges from the hairs on their bodies. Inhalation of microaerosols of volatile components of honey, propolis, and flower nectar creates an additional effect of microvibration massage of tissues, which contributes to improved microcirculation, reduced stress levels, and improved respiratory function.

Safety aspects of the procedure include complete isolation of bee colonies from the therapeutic space using ventilation and acoustic barriers. Patient contact with bees is excluded. If you are allergic to bee products or the smell of pollen, the procedure is not recommended.

Thus, the technical organization of the procedure provides an optimal combination of bioenergetic, sensory, and spatial-medical parameters, which allows achieving a sustainable clinical effect within the framework of integrative therapy [3].

#### *Clinical precautions and restrictions on the use of the technique*

Health procedures using the “Bee Healing Bed in a Pyramid” have certain limitations due to both physiological risks and the peculiarities of the psychophysiological state of patients. In view of medical and biological safety standards, therapy is not recommended for persons who are in a state of alcohol or drug intoxication, accompanied by impaired cognitive functions, disorganization of somatovegetative regulation, and a decrease in the ability to adequately integrate sensory information.

Restrictions also apply to patients with urolithiasis due to the risk of provoking the movement of calculi under the influence of altered microcirculation and metabolic activation, which may accompany apitherapeutic exposure. Individuals with increased allergic reactivity to bee products, aromatic phytoncides, or pollen are at risk of developing hyperergic conditions, which makes the use of this technique inadvisable without prior medical examination.

It is not recommended for women in the active phase of their menstrual cycle to undergo the procedures due to the potential impact of sensory and bioactive stimuli on smooth muscle tone and vascular reactions, which may alter the physiological course of the process. Pregnancy is also an absolute contraindication due to the risk of stimulation of the autonomic nervous system and the impact on hormonal regulatory mechanisms, which may pose a threat to the course of the gestational process.

From a cultural and psychosocial perspective, undergoing therapy in an altered state of consciousness (under the influence of alcohol or drugs) violates the principles of safe inclusion in a healing environment, which requires conscious and responsible perception of bioactive stimuli.

From a psychological point of view, the effectiveness of the technique is based on the holistic integration of sensory signals and the stable functioning of cognitive and affective mechanisms, which is impossible in cases of impaired consciousness or emotional balance [4].

Thus, adherence to contraindications is an important prerequisite for ensuring the physiological safety of patients, the stability of the bioenergetic environment, the complex, and the achievement of optimal clinical efficacy of the apitherapy procedure [8], [10].

### **8.3. Recommendations for medical support of patients**

The main principles of medical supervision in the United States for apitherapy techniques are strict compliance with licensing requirements for personnel and healthcare facilities. All services involving treatment or healing must be provided exclusively by licensed professionals such as physicians (MD, DO), nurse practitioners (NP), registered nurses (RN), or licensed acupuncturists (L.Ac.), depending on the laws of each individual state. The facility where apitherapy procedures are performed must be registered with the state health department as a medical or wellness center. Professional liability insurance for the facility and medical staff is a prerequisite for conducting business.

An integral part of medical care is obtaining the patient's informed consent before starting a course of therapy. The patient must be provided with written information about the nature of the procedure, potential risks and benefits, alternative treatment options, and their right to refuse therapy at any stage without negative consequences for further medical care.

Before starting a course of therapy, an initial medical examination of the patient must be carried out, including taking a medical history, with an emphasis on allergic reactions, the condition of the cardiovascular and renal systems, a physical examination, and, if necessary, basic diagnostic tests such as electrocardiography (ECG) or allergy testing. Based on the data obtained, absolute and relative contraindications to the use of apitherapy are determined, in particular, alcohol or drug intoxication, pregnancy, the presence of kidney stones, severe allergic reactions, or acute infectious processes [2].

Personalization of the therapeutic protocol is a key aspect of treatment effectiveness. The intensity and duration of the procedures are adjusted according to the results of the initial examination: for mild conditions, 8–10 procedures lasting 30 minutes each are prescribed; for moderate severity (chronic stress, sleep disorders), 12–15 procedures lasting 40 minutes each are prescribed; while for more severe conditions requiring rehabilitation, the protocol is developed individually with the participation of a licensed physician.

The course of therapy is monitored by brief assessments of the patient's condition after every second or third procedure. During the assessment, subjective well-being is recorded using standardized questionnaires and scales, objective physiological indicators such as heart rate (HR), blood pressure (BP), and anxiety levels. If negative reactions are detected, the protocol is adjusted or therapy is discontinued.

Data is recorded in accordance with the requirements of the US Health Insurance Portability and Accountability Act (HIPAA). All information about the procedures performed, assessments of the patient's condition before and after the therapeutic session, changes in the treatment plan, and signatures of responsible persons must be entered into electronic medical records, which ensures data confidentiality and legal protection for both the patient and the institution [4].

Compliance with safety rules is a mandatory standard of practice. The facility must be equipped with a first aid kit that includes antihistamines and epinephrine for emergency care in case of anaphylactic shock. Staff must be trained in algorithms for action in case of emergencies. All materials and equipment used for apitherapy must meet safety certification requirements.

Legal formalization of services requires a clear indication in informational materials that the method of apitherapy is a complementary means of maintaining health and does not replace conventional treatment. In addition, it is necessary to avoid guaranteeing therapeutic results by indicating the possible variability of the effect ("results may vary").

Compliance of apitherapy services with US integrative medicine standards requires registration of activities in the categories "Wellness Services" or "Complementary and Integrative Health" and adherence to the principles of evidence-based complementary medicine, which correspond to modern approaches to integrative therapy in the US healthcare system.

In the context of introducing apitherapy techniques into the practice of wellness and medical facilities in the US, special attention should be paid to compliance with regulatory policy requirements, which may vary significantly in different jurisdictions. In a number of states, including California, New York, and Florida, there are stricter rules regarding the provision of so-called alternative or complementary procedures. This necessitates an additional approval process with local health departments or relevant regulatory authorities before commencing operations. In some cases, a facility planning to introduce apitherapy services must submit the relevant documentation to obtain a permit or undergo special accreditation confirming compliance with safety standards, professional competence of staff, and informed consent of patients.

Given the specifics of the legal regulation of advertising for health and complementary services in the United States, it is particularly important to correctly formulate the content of marketing materials. According to the requirements of the Federal Trade Commission (FTC) and the

US Food and Drug Administration (FDA), it is prohibited to use claims that attribute therapeutic properties to specific diseases without appropriate scientific verification and approval. Therefore, statements such as treats cardiovascular disease, “eliminates depression,” or similar categorical statements are unacceptable in presentation, advertising, and informational materials [3].

**Table 8.1**

**Applied protocol for a course of therapy on a bee medical bed in the USA**

<b>Patient preparation</b>	<b>Medical screening, signing of informed consent, assessment of baseline health indicators</b>
Procedure	Patient stays on a bee therapy bed in a pyramid for 30–45 minutes; monitoring of physiological condition during the procedure
Number of procedures	The standard course includes 10–12 sessions, held every other day or according to an individual schedule
Medical supervision	Periodic assessment of the patient's condition after every 2–3 procedures, using well-being scales and monitoring physiological indicators
Post-course monitoring	It is recommended to re-examine the patient 2–4 weeks after the end of the course of therapy
Additional measures	Recommendations on lifestyle changes, use of nutraceuticals, and stress management techniques to consolidate results
Safety measures	Keep a first aid kit on hand at all times, train staff to provide emergency care for anaphylaxis, and certify equipment.

The recommended communication strategy for establishments offering apitherapy services is to use neutral and general wording that complies with the standards of evidence-based complementary medicine. In particular, it is advisable to use expressions such as “promotes overall health,” “improves psychophysiological state,” “supports the body’s natural adaptation mechanisms,” and “helps reduce stress and improve sleep quality.” Such phrasing highlights the potential benefits of apitherapy procedures without violating regulatory requirements and reduces the risk of legal claims related to misleading patients.

Compliance with the recommendations outlined in Table 8.1, “Applied Protocol for a Course of Therapy on a Bee Treatment Bed in the United States,” is essential for ensuring the legitimacy of apitherapy practice in the United States, increasing patient and medical community trust, and integrating apitherapy into the field of complementary and integrative medicine based on the principles of safety, scientific validity, and ethical responsibility.

## **8.4. Ethical and safety aspects of bee treatment**

The innovative method of bee treatment, implemented with the help of a specialized apitherapy complex – a treatment bed with live bees in a wooden pyramid based on the author's concept by Anatolii Olshanskyi covers a number of ethical and safety issues that are particularly important in the context of the implementation of this method in the United States of America. In the American medical system, integrative and complementary medicine practices must comply with both evidence-based standards and bioethical principles that prioritize patient autonomy, informed choice, harm prevention, and equitable access to health technologies.

From an ethical point of view, the use of a bee bed requires a thorough procedure for informing the patient about the nature of the procedure, the principles of its action, the expected results, and the potential risks. In the context of American ethical regulation, it is especially important to ensure full compliance with the Informed Consent standard, where the patient's consent must be voluntary, informed, and recorded in writing. The patient must be warned that the method does not have the status of a licensed medical intervention, does not replace clinical treatment, and is considered a complementary therapy aimed at improving the psychophysiological state [2].

In the US medical ethics system, great importance is attached to the principle of non-maleficence – the prevention of harm. Given that the use of apitherapy involves direct contact with the source of allergens (live bees and their waste products), it is mandatory to conduct preliminary screening for allergic sensitivity in patients, as well as to be constantly prepared to provide emergency care in case of an anaphylactic reaction. The therapy room must be equipped with a first aid kit containing adrenaline, antihistamines, and resuscitation equipment, and staff must undergo special training in first aid protocols.

Safety requirements for implementing this therapeutic model also include architectural certification of structures, verification of microclimatic parameters inside the pyramidal space, and monitoring of the sanitary condition of the hives. Vibration emissions, bioacoustic fields, bee pheromones, and the concentration of volatile bioactive substances in the air must be carefully studied in terms of their potential physiological effects and biosafety. From the perspective of American environmental medicine standards, it is essential to ensure the stability of the environment, avoid excessive exposure for patients with increased sensitivity to chemosignals, and prevent violations of bee husbandry conditions.

From a legal standpoint, bee therapy according to Olshansky's method falls under the category of complementary and alternative medicine (CAM), and its implementation must comply with HIPAA, FDA, and state regulations. It is unacceptable to use wording in communication with patients that could be interpreted as guaranteeing therapeutic results or substituting licensed medical

treatment. It is advisable to use phrasing consistent with ethical standards, such as “promotes relaxation,” “helps improve adaptive mechanisms,” or “may reduce stress levels.”

Finally, it is important to consider the principle of justice, which requires that therapy be accessible to different social groups and not create barriers to participation based on race, ethnicity, economic status, or other characteristics. The inclusion of this technique in medical tourism or rehabilitation programs should be guided by respect for cultural sensitivity and the ethical neutrality characteristic of the American healthcare system [7].

## **Conclusions to Chapter 8**

Thus, the ethical and safety aspects of bee therapy based on A. Olshansky’s method require not only strict adherence to safety protocols but also a deep understanding of the philosophy of patient-centered medicine inherent in the American context. The integration of these principles can form the foundation for the legitimate and successful introduction of apitherapy practices into medical and health care settings in the United States.

The proposed model of an apitherapy complex utilizing a “bee treatment bed in a pyramid” demonstrates high potential for integration into the U.S. complementary medicine system, provided that environmental, bioethical, and regulatory requirements are met. Architectural and spatial solutions based on biophilic design and sensory safety principles ensure controlled exposure to vibroacoustic, chemosensory, and thermal stimuli affecting the autonomic nervous system. The medical-engineering configuration of the space allows for the creation of a stable therapeutic environment without direct contact with bees.

Incorporating the technique into the U.S. healthcare legal framework requires its classification as a wellness service or CAM procedure, with a clear delineation of staff responsibilities, certified professional training, and implementation of medical screening protocols for patients. Successful adoption of the complex depends on multidisciplinary support, consideration of legal liability specifics, regulatory variations among states, and adherence to the principles of informed consent.

The therapeutic model, focused on activating the parasympathetic system, stabilizing psychovegetative status, and supporting the body’s adaptive mechanisms, requires further validation through clinical studies. Nevertheless, it already shows significant potential for inclusion in medical rehabilitation programs, initiatives for veterans, treatment of post-stress disorders, and wellness programs centered on natural bioactive environments.

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The results of the study showed that apitherapy, as a branch of integrative medicine, demonstrates a steady expansion of its clinical, social, and economic significance in the context of the transformation of the modern healthcare system. A comprehensive analysis confirmed that bee products, including honey, propolis, apitoxin, royal jelly, bee bread, and apivibrational stimuli, have a complex effect on neuropsychological, immunological, and somatophysiological mechanisms, producing both symptomatic and systemic outcomes.

The study focused on an innovative apitherapy technique called the “bee healing bed in a pyramid,” which represents a multisensory platform that combines vibrational, acoustic, and spatial-energy factors. The technique is based on direct interaction with bee colonies that generate microvibrations within the biological resonance range, contributing to the activation of parasympathetic activity and the normalization of autonomic regulation. Bioelectrical EEG analysis demonstrated harmonization of alpha and theta brain waves, indicating decreased stress reactivity and enhanced self-regulation mechanisms.

The increased effectiveness of the method is attributed to the spatial configuration of the therapeutic environment, a pyramidal frame that functions as a resonance module. Such structures, supported by archaeological and ethnomedical evidence, demonstrate the ability to modify the biophysical properties of the environment, particularly by creating a stable polyharmonic electromagnetic field. The phenomenon of honey preservation observed in the pyramids of Ancient Egypt has not only biophysical but also cultural and symbolic significance: in ancient Egyptian tradition, bees and bee products were associated with immortality, regeneration, and sacred purity.

The therapeutic effect of the method is enhanced by a controlled acoustic field formed by natural sound patterns, including the buzzing of bees, biorhythmic ventilation, thermal noise, and flight rhythms. The acoustic characteristics of such an environment contribute to the synchronization of the patient's biological rhythms, acting as a form of natural sound therapy. The interaction of three levels (vibrational, spatial, and acoustic) creates a unique sensory-integrative platform that activates latent mechanisms of neuroplasticity, modulation of afferent stimulation, and general homeostatic adaptation. From a cultural studies perspective, the technique is an example of bio-inspired therapy that combines medical, archetypal, and aesthetic resources. Apitherapy in the pyramid becomes a ritual of restoration on both somatic and symbolic levels, where treatment occurs not only through physiological stimulation but also through deep immersion in a culturally coded space that activates internal models of harmony. Thus, the study confirms that the “bee healing bed in a pyramid” technique is not only clinically effective but also represents a conceptually

new form of integrative therapy that combines biomedical protocols with biocultural and sensory approaches. Its innovation lies in the synthesis of natural resources, spatial design, multisensory activation, and cultural symbolism, which opens prospects for its widespread use in the field of evidence-based complementary medicine.

An analysis of the US regulatory framework indicates that there are prerequisites for the legal implementation of the apitherapy technique known as the “bee healing bed in a pyramid” within the system of complementary medicine and rehabilitation tourism. Standards established by the US Food and Drug Administration (FDA), the National Center for Complementary and Integrative Health (NCCIH), and individual state regulations allow for the integration of natural, non-toxic, and non-drug methods into wellness medicine programs, provided that their safety and bioethical compliance are confirmed.

Successful adaptation of the methodology to the American healthcare system requires a multi-level organizational approach to implementation. At the first level, it is advisable to establish certified apicenters, which are medical and wellness facilities operating on the principles of integrative medicine, in accordance with Joint Commission standards and the regulatory requirements of local health departments. Such centers may function as day clinics, rehabilitation residences, mental recovery centers, or wellness complexes for veterans, patients with chronic somato-vegetative disorders, and individuals suffering from post-traumatic stress disorder.

At the second level, interdisciplinary coordination is required among integrative medicine specialists, neuropsychologists, clinical researchers, biophilic design architects, and healthcare lawyers. Such collaboration enables comprehensive clinical validation of the methodology, its harmonization with neurovegetative rehabilitation protocols, and legal testing of the procedural component within the framework of existing acts governing complementary and alternative practices.

Economic modeling conducted as part of the study revealed the project's high investment attractiveness. With seasonal operation (using the biorhythms of bee colonies), the payback period for capital investments in is about two years. Operating costs remain relatively low due to the autonomous operation of the complex, and sources of income can be diversified – from conducting individual wellness sessions to organizing comprehensive biosensor rehabilitation programs, training apitherapy operators, and creating partner wellness platforms with functional medicine clinics.

From a marketing perspective, the main advantage is the synergy of the natural environment, archetypal design, and proven impact, which satisfies American patients' demand for a holistic approach to health. Against the backdrop of growing demand for non-pharmaceutical approaches to reducing chronic stress, recovering from trauma, and improving quality of life in protracted non-

infectious conditions, the proposed methodology is positioned as a competitive alternative to pharmacological protocols.

It is worth emphasizing the importance of integration into public and private financial programs, in particular through grants from the US National Institutes of Health (NIH), the Department of Health and Human Services (HHS), Veterans Affairs, and integrative medicine foundations. Such sources can guarantee initial infrastructure support, increase trust among medical circles, and promote the integration of the methodology into the list of voluntary health insurance coverage programs.

In practical terms, important tasks include: developing a standard for training apitherapy practitioners in accordance with licensing requirements; creating a multicenter database of clinical studies in the US; promoting the technique at interdisciplinary forums on integrative medicine; and forming a legal support system that will ensure the legitimacy of services and minimize risks in the field of consumer law.

At the present stage, apitherapy is transforming from a local traditional practice into an element of the global system of evidence-based complementary medicine. This process is taking place in the context of biocultural globalization, which combines local knowledge with universal standards of clinical efficacy and safety. Leading international organizations, such as the World Health Organization (WHO), Apimondia, and the US National Institutes of Health (NIH), recognize the promise of integrating apitherapy into healthcare systems as part of a strategy for preventive medicine, neurovegetative regulation, and improved well-being.

The main task at the global level is to harmonize regulatory standards and safety procedures for the use of apitherapy products and methods. Currently, a significant part of practices remains unregulated or outside the scope of clinical testing, which complicates the formation of a unified methodological basis. The development of international cooperation in the format of bioethical and clinical registration platforms (in particular, with the participation of the European Medicines Agency (EMA), FDA, EUnetHTA, ICH) enables the formation of transcontinental certification criteria and the promotion of apitherapy products to the status of medical devices or wellness technologies.

An important vector is the expansion of research infrastructure focused on multicenter RCTs (randomized controlled trials), systematic reviews, and the creation of global registries of evidence-based effects of apitherapy. In this context, the US has the potential to serve as a methodological hub that synthesizes the results of international research, standardizes approaches to evaluating effectiveness, and creates interdisciplinary training programs for medical professionals, particularly within CAM (Complementary and Alternative Medicine) programs.

The synergy of technological innovations such as sensory diagnostics, wearable devices, digital patient monitoring systems, biofeedback protocols, and virtual reality opens up opportunities for the creation of digital apitherapy platforms that can be integrated into the telemedicine infrastructure of healthcare. The combination of bio-natural therapy with digital support will contribute to the formation of personalized treatment trajectories, monitoring of biomarkers of effectiveness, and increased accessibility of therapy in remote regions.

In the context of sustainable development, apitherapy represents an environmentally responsible model of medical intervention based on bio-inspired principles and respect for natural resources. The use of bee products stimulates the development of organic farming and beekeeping as tools for ecosystem management and the local economy. In combination with biophilic architecture, health tourism, and cultural identity, apitherapy complexes can act as catalysts for the development of local communities and cross-cultural dialogue.

From an ethical perspective, the "bee healing bed in a pyramid" technique appeals to the archetypal human need for harmonious integration with the natural environment. It offers a return to the beginning of biorhythms, the achievement of sensory balance, and spiritual rejuvenation. Its implementation in global medical practices responds to the challenges of the post-pandemic world—particularly in the areas of mental health, existential exhaustion, emotional isolation, and sensory stimulation deficiency.

Thus, apitherapy in general and the therapeutic bed in a pyramid technique in particular demonstrate high potential as an innovative multisensory therapy in the paradigm of integrative medicine. Its further development is possible through the creation of an international partnership network of research centers, bioethics councils, production clusters, and transdisciplinary educational programs. In this context, Ukraine can position itself as a strategic hub for apitherapy in Eastern Europe, combining long-standing beekeeping traditions, clinical expertise, and openness to innovation.



## Appendix B

### Results of clinical studies

# THE EFFECT OF A STRUCTURED APITHERAPEUTIC ENVIRONMENT ON THE ELECTROPHYSIOLOGICAL PARAMETERS OF THE CEREBRAL CORTEX: AN EMPIRICAL STUDY

A. OLSHANSKY, A. GORDEEV

The theoretical basis of the study was based on existing scientific research by the international community. Of particular significance were the results of animal studies confirming the neuroprotective potential of apicultural products, especially propolis and honey. In particular, studies (Elbaz et al., 2021) have shown that propolis reduces the expression of pro-inflammatory cytokines (TNF- $\alpha$ , IL-1 $\beta$ ), the glial marker GFAP, and the inflammatory enzyme COX-2 in rats with cerebral ischemia. At the same time, the researchers recorded the preservation of neuronal architecture in the medial prefrontal cortex, a decrease in caspase-3 expression, normalization of acetylcholine levels, and improved neurometabolism. Similar effects have also been found in other scientific sources (Ghosh & Roy, 2022), where honey demonstrated neuroprotective properties by stabilizing electrophysiological balance, inhibiting cholinesterase, and reducing oxidative stress under conditions of toxic effects on brain tissue.

**The proposed empirical study of the effect of an apitherapeutic structured environment on the electrophysiological parameters of the cerebral cortex** was conducted as an open single-factor experimental observation without a control group, with elements of cross-sectional measurement of electrophysiological parameters within a single exposure session.

The methodological scheme of the study was constructed on the basis of an interdisciplinary protocol of neurophysiological assessment, adapted for analyzing the effects of naturally structured sensory environments on the state of the central nervous system.

The factual material for our analysis was electroencephalographic (EEG) recordings obtained before and after a 30-minute apitherapeutic exposure in a pyramidal apistructure.

The experiment was conducted in March–April 2025 at a specialized api-complex located in an ecologically clean area of Central Ukraine, isolated from sources of industrial noise, mechanical vibrations, and artificial electromagnetic fields.

The study involved 30 respondents aged 25–55 (mean age  $38.6 \pm 7.9$ ), stratified according to the psychophysiological classification of the level of rigidity of the nervous system in accordance with the methodology (Gordeev et al., 2015).

To increase the internal validity of the study, a preliminary survey of the subjects' neurophysiological parameters was conducted.

The research methodology was based on modeling and comprehensive analysis of electroencephalographic, cephalometric, biometric, and psychodiagnostic indicators, taking into account temperamental typology. The model used classified respondents according to 36 types of rigidity of the nervous and mental system, tested in systems for the professional selection of high-risk individuals (Gordeev, Kuzovik, Buligina, 2015).

The survey involved assessing attention span, speed of cognitive switching, short-term memory performance, sensory reactivity, and adaptability to external changes. For this purpose, modified neuropsychological tests adapted to neurophysiological monitoring tasks were used.

The formation of a sample with the same type of rigidity helped to minimize interindividual variations in psychophysiological reactivity that could affect the interpretation of spectral EEG changes. This ensured the methodological purity of the results and created conditions for the objective recording of the effect of the sensory environment as a target influence.

We suggest that it is in this configuration that our study opens up new perspectives for the application of a typological approach in personalized neuromodulation practice.

Thus, a homogeneous sample was formed according to cognitive, affective, and bioelectrical indicators. Participants with the same type of rigidity were included in the sample, which ensured a high degree of intragroup homogeneity and made it possible to interpret EEG changes as a result of targeted sensory intervention rather than a manifestation of innate neurotype differences or situational cognitive fluctuations.

To minimize pre-exposure cognitive and sensory disturbances, study participants refrained from using digital devices for at least 30 minutes before and after the session, while in a state of physiological rest at a temperature of  $22 \pm 1$  °C. In accordance with ethical requirements for medical and biological research, all subjects provided written informed consent.

The methodological concept of the study involved the use of EEG spectral power density as a tool for quantitative verification of psychophysiological dynamics under conditions of sensory influence. The chosen approach not only allows us to record the reaction of the cerebral cortex to

a complex natural environment, but also guarantees the comparability of results within the framework of clinical neurophysiology. This opens up the possibility of integrating the results into the evidence base of non-invasive rehabilitation practices.

EEG recording in the study was performed using the NeuroCom EEG-21/26 multichannel complex (sampling frequency 500 Hz) according to the international 10–20 scheme. The recording was performed in a lying position with muscle relaxation. The apitherapy session lasted 30 minutes. The study participants were placed on a treatment bed built into a pyramidal architectural structure (utility model patent No. 94681, Olshansky, 2014). Directly below it, a bee colony of 350–450 thousand individuals was functioning. Sensory exposure was transmitted through the air and structural elements of the structure via thermal fluctuations, microvibrations, bioaerosols, and acoustic vibrations.

Signal processing was performed using a windowed fast Fourier transform with spectral power density (PSD) calculation, which made it possible to quantitatively assess the energy characteristics of brain activity in five main ranges: delta (0.5–4 Hz), theta (4–8 Hz), alpha (8–13 Hz), beta (13–30 Hz), and gamma (>30 Hz). The biophysical interpretation of each of the rhythms was based on modern neurophysiological data: delta – somatic recovery, theta – introspection and affective processing, alpha – anxiety reduction, beta – cognitive load, gamma – sensory information integration and focused attention.

Calculation of the relative power of rhythms within each range made it possible to verify the functional configuration of neural networks as a marker of integrative interaction between the cognitive, affective, and vegetative levels of regulation. Changes in the ratios of alpha, beta, and gamma activity are analyzed as quantitative indicators of psychophysiological adaptation under the influence of a structured biophysical environment. This approach is recognized in international neurophysiological practice as an informative tool for analyzing responses to multisensory stimulation.

Statistical evaluation of changes in the EEG spectral profile was performed using the two-tailed Student's t-test after checking the normality of distribution (Shapiro–Wilk test). The threshold level of significance was  $p < 0.05$ . Additionally, the effect size (Cohen's  $d$ ) was calculated to determine the clinical significance of the changes.

The baseline bioelectrical activity of the brain was pre-calibrated in a state of physiological rest without sensory load. This made it possible to obtain relatively clean EEG data and verify the dynamics of rhythmic activity after the intervention. To eliminate cognitive artifacts associated with digital overload and the expectation effect, study participants refrained from using electronic devices for at least 30 minutes before and after the session. This ensured the stability of the neurophysiological line at the input and neutralized the influence of external information triggers.

Technical measures were implemented to minimize artifacts: active gel electrodes compensated for skin resistance, shielded channels reduced electromagnetic interference, and digital filtering eliminated high-frequency noise, motion artifacts, and baseline drift. This created conditions for stable and valid spectral analysis.

Subjective validation of the neurophysiological response was performed based on an open-ended qualitative questionnaire covering assessments of the physical, cognitive, and emotional state of the subjects. The responses were analyzed using thematic content analysis methods.

According to the main hypothesis of our study, the structured apistruce functions as an architecturally biomodulated space capable of harmonizing rhythmic brain activity, reducing cortical excitability, and increasing adaptive plasticity. Through the activation of the reticular formation and limbic system, this structure acts as a soft modulator of neurosensory regulation without drug intervention.

The experiment was conducted in an architecturally structured environment isolated from external sources of electromagnetic and acoustic noise. The spatial-energy characteristics of the apistruce were pre-tested for the absence of extraneous resonance vibrations. Sensory exposure was maintained under stable temperature conditions ( $22 \pm 1$  °C) with control of the vibroacoustic and aromatic background. These parameters remained unchanged throughout the entire cycle of neurophysiological recording, which made it possible to unify the stimulus and eliminate the influence of environmental variability.

The pyramidal architectural structure, patented as utility model No. 94681 (Olshansky A., 2014), formed a directed multisensory field in which combined bioacoustic, thermal, vibrational, and olfactory factors of natural origin.

**Results and discussion.** Analysis of the power spectral density (PSD) revealed certain shifts in the rhythmic activity of the brain, which are interpreted as manifestations of functional neuromodulation in response to structured biosensor intervention.

After exposure, an increase in the relative power of the alpha rhythm (8–13 Hz) was recorded, indicating the activation of parasympathetic regulation, stabilization of neurovegetative tone, and a decrease in internal excitability—characteristic of a state of cognitive recovery and functional calm. The simultaneous decrease in beta rhythm power (13–30 Hz) is interpreted as a decrease in motor hyperactivity, anxiety levels, and cognitive overload. Increased activity in the gamma range (>30 Hz) is considered an indicator of neural synchronization, enhanced integration of sensory flows, and increased interoceptive sensitivity—effects characteristic of states of deep internal focus.

The data obtained are consistent with the results of modern psychophysiological studies (Watson and Everhart, 2014), which found a connection between the EEG spectrum and emotional regulation parameters. A number of studies (Kurokova-Kuroda et al., 2005) have shown that spectral characteristics are a reliable indicator of limbocortical adaptation to sensory load, and the results of a study (Eran, 2011) demonstrated the ability of consciousness to autonomously generate gamma rhythms in response to natural stimuli without the use of evoked potentials.

Thus, we conclude that the spectral changes recorded after apistructural exposure can be interpreted as signs of neurophysiological normalization, affective stabilization, and cognitive integration. This confirms the possibility of controlled, non-pharmacological modulation of brain activity through spatially organized multisensory exposure.

Therefore, based on the results of the study, its conceptual basis for positioning apistructural therapy as a potential tool for supporting psychophysiological resilience is outlined. Promising areas of application may include neurovegetative regulation programs, recovery from chronic stress, emotional burnout, and cognitive rehabilitation. Further stages of the study required clinical testing of the methodology, standardization of protocols, and the introduction of multiparametric monitoring (in particular, HRV, fNIRS), which will allow the results to be translated into the system of evidence-based medicine.

**Table 1**

**Results of the percentage share of the average frequency of the KGM biorhythm spectrum of the subjects**

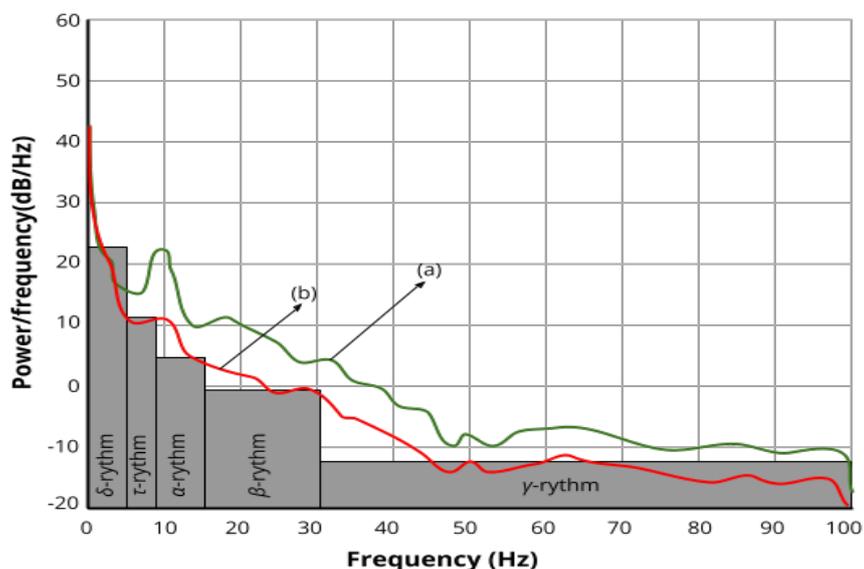
Percentage of the average frequency of the KGM biorhythm spectrum before the experiment					Percentage of the average frequency of the KGM biorhythm spectrum after the experiment				
$\alpha$ -rhythm	$\beta$ -rhythm	$\tau$ -rhythm	$\delta$ -rhythm	$\gamma$ -rhythm	$\alpha$ -rhythm	$\beta$ -rhythm	$\tau$ -rhythm	$\delta$ -rhythm	$\gamma$ -rhythm
31	42	11	9	7	44	19	8	8	21

The data presented in Table 1 demonstrate statistically significant changes in the spectral profile of the electrical activity of the cerebral cortex after 30 minutes of exposure in an apitherapeutic multisensory environment. The most pronounced shifts were recorded in the alpha band (8–13 Hz): the average spectral share increased from 31% to 44%. Such dynamics are typical for states of neurovegetative stabilization, reduction of sympathetic dominance, and activation of parasympathetic regulation. This indicates a transition to a state of psychophysiological equilibrium with increased adaptive plasticity.

In the beta range (13–30 Hz), a decrease in power from 42% to 19% was recorded, indicating a decrease in cognitive tension, motor hyperactivity, and internal emotional activation. At the same

time, there was a threefold increase in gamma rhythm power (>30 Hz) – from 7% to 21%. This is interpreted as a marker of neural synchronization, integration of sensory modalities, and increased interoceptive processing—effects characteristic of states of deep internal focus.

The indicators of theta (4–8 Hz) and delta (0.5–4 Hz) rhythms remained stable within the range of 8–11%, indicating the preservation of baseline functional activity without signs of neurodynamic disorganization. The overall rhythmic profile demonstrates a targeted modification of the EEG signal in response to biosensory stimulation, corresponding to the mechanism of endogenous neurosensory conversion, an internal adaptive response of the central nervous system occurring without external cognitive influence.



**Fig. 2.** Analysis of averaged power spectral density (PSD) plots for the examined rhythms. A – changes in power within the delta, theta, alpha, beta, and gamma ranges before and after the session. B – individual variations of the spectral profile in the alpha range.

Analysis of averaged power spectral density (PSD) plots (see Fig. 2) confirmed an increase in the level of bioelectrical activity of the cerebral cortex in the post-exposure period, particularly in the alpha and gamma ranges. The area under the PSD curve was used as a quantitative integral criterion for assessing dynamics, which made it possible to objectively record the energy increase in the spectral profile of the EEG signal under conditions of controlled multisensory influence. This parameter supplemented the main indicators, providing grounds for interpreting the detected changes as the result of purposeful sensor-modulated neurophysiological adaptation.

Fig. 2 shows spectral changes in electroencephalographic activity in the prefrontal zone (Fp1) observed before and after exposure to an apitherapeutic environment structured according to the principles of pyramidal architecture. A comparison of the spectral curves (a – before exposure,

red line; b – after exposure, green line) shows an increase in signal strength in the main rhythmic ranges, which is an indicator of a change in the functional state of the brain.

The most pronounced changes were recorded in the alpha range (8–13 Hz), where the spectrum share increased from 31% to 44%. This result is interpreted as the activation of the relaxation mechanism, normalization of sympathetic tone, and transition to a state of neurovegetative balance with signs of high adaptive capacity. At the same time, in the beta band (13–30 Hz), which is associated with cognitive stress, anxiety, and motor hyperactivity, a decrease in power from 42% to 19% was recorded. This indicates a reduction in psychoemotional arousal, a decrease in internal stress, and a transition to a state of reduced cognitive load. In the gamma range (>30 Hz), a threefold increase was recorded, from 7% to 21%. This effect is considered a marker of cognitive integration, neural synchronization, and increased interoceptive sensitivity, which are characteristic of states of internal concentration, focused attention, and high sensory organization.

Theta (4–8 Hz) and delta (0.5–4 Hz) rhythm indicators remained stable within 8–11%, indicating that the baseline level of neurofunctional background was preserved without signs of disorganization or disruption of the central nervous system homeostasis.

The total area under the spectral curves calculated in the post-exposure period showed an increase in energy power in the alpha and gamma ranges, which is consistent with the concept of endogenous neurosensory conversion, the brain's internal response to structured natural intervention without external cognitive stimulation. This mechanism can be considered a potential basis for the non-invasive modulation of the functional state of the central nervous system within personalized therapeutic strategies.

To validate the objective results, the participants' open verbal assessments were additionally analyzed. In the vast majority of respondents, exposure induced positive sensations: relaxation without drowsiness, concentration without mental strain, and a surge of energy without physiological exhaustion. Among the most notable sensory impressions, respondents described the low-frequency buzzing as a "pulsation in the brain," the aromatic background with notes of propolis and wax as "breath cleansing," and the sense of thermal comfort as "internal alignment."

The participants' subjective evaluations corresponded with objective changes in the electroencephalographic profile. Respondents characterized their post-exposure state as "mental clarity," "inner composure," "restoration of thermal balance," and "energy boost without excitement." The mutual consistency between phenomenological and physiological responses indicates a holistic psychophysiological reaction to apitherapeutic exposure.

The resulting model allows for the quantitative reproduction of the apitherapeutic environment's effects in a "before/after" format, providing a foundation for the further standardization of non-invasive neuromodulatory interventions in clinical practice.

Thus, apitherapeutic exposure in an architecturally structured environment with a biophysically organized field of influence creates the conditions for targeted modulation of brain rhythmic activity. This opens prospects for the clinical application of non-invasive neuromodulation based on the integration of bioarchitecture, electrophysiology, and sensory-cognitive regulation.

**Conclusions.** In the context of personalized medicine, the proposed model, which combines spectral EEG monitoring, psychophysiological typing, and a controlled sensory environment created within an architecturally structured apistructure, can be considered a tool for the quantitative assessment of the neurophysiological response to natural multisensory interventions. The objective changes detected in the alpha, beta, and gamma ranges of the electroactivity spectrum indicate a mild but consistently reproducible effect on the mechanisms of neurovegetative regulation, affective stabilization, and cognitive integration. The consistency of objective EEG shifts with the subjects' subjective descriptions ("thermal harmony," "inner composure," "energy boost without excitement") reinforces the therapeutic validity of the apistructural model.

The clinical potential of apistructural therapy can be traced in several directions. First, as a means of psychophysiological rehabilitation for adaptive disorders, particularly in conditions of post-stress disorders, post-COVID syndrome, or emotional burnout. Second, as a complementary method of sensory integration in working with patients who have neuropsychiatric dysfunctions. Third, as a preventive tool for maintaining stress resilience in highly stressed professional groups. Due to its non-invasiveness, bioinertness, and structured environment, this therapeutic model can be integrated into multicomponent programs of complementary neuromodulation and individualized cognitive-behavioral therapy.

At the same time, the study has several limitations. First, the absence of a control group makes it impossible to completely rule out the influence of the expectation effect, although prior standardization and homogeneity of the sample significantly reduce the likelihood of artifacts. Second, the study format involved only a single exposure, which does not allow conclusions to be drawn about the duration of the effect; this would require follow-up studies after 24–72 hours. Third, the main results are based on spectral analysis of EEG data without the inclusion of additional neurophysiological and psychophysiological biomarkers.

In future studies, it is advisable to:

- standardize exposure parameters, particularly the duration of sessions, frequency of exposure, and topography of EEG recording areas (Fp1, Cz, Pz);

- expand the sample size and introduce stratified control groups using placebo models;
- clinically test the methods on patients with documented diagnoses (PTSD, adjustment disorders, generalized anxiety disorder).

In addition, a comparative analysis of the effects of apistruures in relation to other architectural models of bioenergetic spaces (spherical domes, geodesic structures, wooden biomodules) is promising, as is the introduction of neurovegetative visualization methods such as functional MRI, cerebral blood flow spectroscopy, and magnetoencephalography (MEG). The use of these technologies will help expand the evidence base and lay the foundation for the full integration of apistruuctural therapy into evidence-based rehabilitation medicine protocols.

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The study was conducted with the support of a private initiative as part of a pilot project to integrate apitherapy structures into a model of neuroecological rehabilitation.

### **Conflict of interest**

The authors declare that the study was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

Photos and diagrams of apitherapy centers

Table 1

M. Yarovoy's hive-bed

Name of design	Country	Inventor/company	Patent	Design features
Yarovoy's hive-bed	Ukraine	Mykola Yarovoy (beekeeper)	Author's patent/know-how (late 1990s)	Sunbed above the hives



Apiary

**Table 2**

Design name	Country	Inventor/company	Patent	Design features
Method and device for directing beehive air, and use as inhaler	Germany	Attila MARKUS	US20150306320A1 (October 29, 2015)	An airtight attachment to the hive collects air, which is fed through a system of valves and filters into a mask. A check valve prevents reverse flow, and a filter traps pollen and bees. The air from the hive is inhaled for the treatment of respiratory diseases.
Two-seater apiary	Estonia	Estonian beekeepers (Ida-Virumaa)	EE 01420 U1 (05.07.2016; issued 15.02.2018)	Wooden house for two; 6–8 hives under the beds; holes in the mattress for therapeutic contact

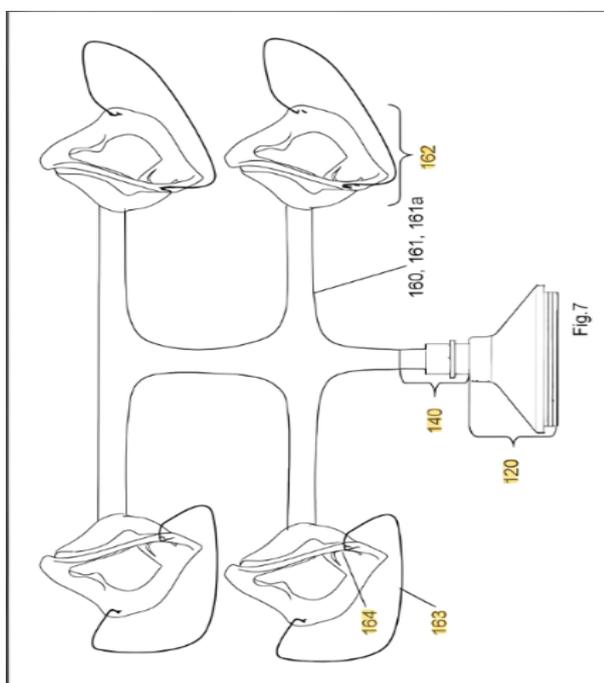


Bee bed for four beekeepers



Apiary<sup>9</sup>

Method and device for directing air from a beehive<sup>10</sup>



<sup>9</sup>Author's photo

<sup>10</sup> Photo from the website: <https://patents.google.com/patent/US20150306320A1/en>

Table 6.1

**Interdisciplinary model of apitherapy in pyramidal structures: clinical and functional analysis of therapeutic integration**

Therapy modality	Main goal	Therapeutic environment	Mechanism of action	Common indications	Typical session duration	Scientific rationale	Integration into apitherapy in a bee pyramid
Speleotherapy (cave/salt therapy)	Improved respiratory function; reduction of asthma and allergy symptoms; deep relaxation due to a favorable microclimate	Natural cave or salt mine (stable cool temperature, high humidity, low level of irritants; air enriched with salt aerosol)	Purified air free of allergens and mineral aerosols reduce inflammation of the respiratory tract; negatively charged ions promote calmness; stable microclimate reduces stress on the respiratory system	Asthma, bronchitis, allergic rhinitis, chronic sinusitis; stress, sleep disorders	1–3 hours in the cave; usually a course of sessions over several days or weeks	Clinical studies confirm improved lung function and symptomatic relief in asthma/COPD (ResearchGate.net)	The pyramid's sealed environment contains purified air with propolis aerosols, which have properties similar to those found in cave minerals; ionization and air filtration support respiratory health (Monachylemhor.net; Bowterrafarm.com).
Animal-assisted therapy (therapy involving animals)	Improvement of psycho-emotional state; reduction of stress and loneliness	Environments with animals (hospitals, farms, rehabilitation centers)	Interaction with animals reduces cortisol levels and blood pressure and increases oxytocin; provides emotional support and motivation	Anxiety, depression, PTSD, autism, chronic stress	30–60 minutes, weekly	Reduces anxiety and improves mood; effective in clinical rehabilitation (MedicalNewsToday.com)	Bees, as a living biological system, create an analogue of animal therapy; the sounds and activity of bees reduce feelings of isolation (GoodNewsNetwork.org)
Sensory therapy (multisensory stimulation)	Neurological relaxation and sensory integration through controlled stimulation of the senses	Sensory rooms, deprivation capsules, sound therapy, aromatherapy, vibration stimulation	Auditory, tactile, temperature, and aromatic stimuli affect the limbic system; vibrations reduce muscle tension; aromas act on the brain via the olfactory nerve	PTSD, autism, chronic pain, anxiety disorders, dementia	20–60 minutes; regular sessions for cumulative effect	Studies confirm the effectiveness of sound therapy and aromatherapy in reducing anxiety and pain (PMC.NCBI.NLM.NIH.gov; PubMed)	Bee buzzing – sound therapy; vibrations from beehives – tactile stimulation; propolis aromas – natural aromatherapy; heat – thermotherapy (Bowterrafarm.com; GoodNewsNetwork.org)
Art therapy and body-oriented practices	Emotional integration and physical release through creativity, breathing, body awareness	Art studios, yoga rooms, therapeutic spaces with a quiet environment	Art therapy activates dopamine, facilitates emotional expression; body practices activate the	Depression, anxiety, grief, psychosomatic disorders, hypertension	Art therapy 1–2 hours weekly; physical practices 10–60 minutes daily	Proven effective for reducing anxiety, improving mood, and boosting immunity (UNSW.edu.au; PMC)	The state of deep physical relaxation in the pyramid is similar to the result of physical therapy; the space promotes introspection, as during an art therapy session

			parasympathetic nervous system, lower heart rate and blood pressure				
Climatotherapy and phytotherapy	Strengthening of the immune and respiratory systems through the influence of climate and plant substances	Mountains, seaside, salt rooms, phytosaunas, use of essential oils	Sunlight – vitamin D; fresh air – oxygenation; phytoncides – antiseptic effect; aromas – neuromodulation	Tuberculosis, dermatoses, COPD, asthma, infections, anxiety	Several weeks or daily exposure; aromatherapy – 15–30 minutes	The effectiveness of propolis, honey, lavender, etc. has been pharmacologically confirmed (Monachylemhor.net)	The air in the pyramid is enriched with phytocomponents from honey, pollen, propolis; stable warm microclimate similar to a natural resort
Apitherapy in the pyramid	Comprehensive health improvement through simultaneous action on the respiratory, nervous, and immune systems	A small pyramidal wooden structure with built-in beehives, in a natural environment	Ionized air and volatile substances from beehives improve lung function; sound and vibration promote relaxation; warmth promotes physical relaxation	Asthma, chronic fatigue, insomnia, stress, anxiety, rehabilitation after illness	30–60 minutes; 5–10 sessions recommended per course	Preliminary studies show a reduction in asthma symptoms, anxiety, and normalization of sleep; the effectiveness of individual components has been proven (ResearchGate.net)	Integrates all of the above modalities: climate, sound, vibrations, volatile bioactive substances, contact with nature, providing holistic therapy for many systems

# INNOVATIVE APITHERAPY METHOD: "BEE HEALING BED IN A PYRAMID"

– A Unique Wellness Approach for America

This comprehensive monograph is dedicated to apitherapy – an ancient therapeutic practice using beekeeping products, adapted to meet the requirements of modern evidence-based medicine. The publication examines both traditional treatment methods with honey, propolis, and bee venom, as well as an innovative development by Ukrainian inventor Anatolii Olshanskyi – a healing methodology implemented in a specially designed pyramid containing active beehives. The relevance of the work lies in the growing demand for natural, non-invasive wellness methods in the context of the global health crisis and mental disorders. Apitherapy offers an alternative to pharmacotherapy for patients suffering from chronic stress, neurotic disorders, and psychosomatic diseases. Purpose – to substantiate the scientific basis and clinical effectiveness of apitherapy, particularly to present the latest method that combines the bioactive environment of beekeeping with the energetic properties of pyramidal architecture. Readers will learn about the historical origins of apitherapy in ancient civilizations, the mechanisms of action of beekeeping products on brain activity (confirmed by EEG studies), patents in Ukraine and Germany, as well as the commercial and therapeutic potential of the method within the American healthcare system. Novel discoveries include evidence of the positive impact of a structured apitherapeutic environment on the normalization of brain rhythms, reduction of anxiety, and activation of the parasympathetic nervous system, without the need for pharmacological intervention. The book will be of interest to medical professionals, researchers, practicing apitherapists, investors in the wellness tourism sector, as well as the general public interested in natural healing methods and integrative medicine.



## Anatolii Olshanskyi©

Inventor of the "Bee Healing Bed in a Pyramid" — a therapeutic system that allows a person to experience the microvibrations, buzzing, warmth, and aromas of a beehive without the risk of bee stings.

- Author of more than ten scientific publications on apitherapy, bioenergetics, and innovative wellness technologies.
- Speaker at international conferences in Kyiv and Bucharest



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