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## APITHERAPEUTIC PYRAMID (UKRAINIAN PATENT NO. UA 160916, AUTHOR: ANATOLII OLSHANSKYI): INTEGRATION OF HONEYBEE COLONIES INTO WELLNESS APITECHNOLOGIES AND IMPLEMENTATION WITHIN THE AMERICAN PROGRAMS "HIVES FOR HEROES" AND "HONEYBEE PROGRAMS"

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*The article presents an interdisciplinary analysis of the integration of api-oriented non-pharmacological interventions based on controlled interaction with live honeybee colonies into rehabilitation and preventive care practices in the United States. The study examines two interconnected domains: inhalation practices using "beehive air" and therapeutic beekeeping in veteran-oriented programs, while also introducing a technologically codified Ukrainian case, the Apitherapeutic Pyramid (Ukrainian Patent No. UA 160916). The methodological basis combines critical-analytical synthesis of scientific publications, differentiation of evidence levels, sociological analysis of patient acceptability and communication barriers, and an applied institutional analysis of transfer conditions for the U.S. rehabilitation context. The findings indicate that institutional acceptance in the United States depends primarily on biosafety, procedural reproducibility, and measurable outcomes compatible with rehabilitation administration and quality-improvement practice, including the use of EQ-5D-5L in the HIVES program. Using VA and partner communications, the article also clarifies the role of local dissemination channels referred to as "Honeybee Programs" in translating therapeutic beekeeping from innovation platforms to facility-level recruitment and service delivery. The patented Apitherapeutic Pyramid is interpreted as a technologically structured model for integrating live honeybee colonies into wellness apitechnologies and as a candidate for further standardization in ventilation parameters, sensory exposure composition, biosafety control, and clinical-ethical supervision. The article substantiates the need for subsequent studies that separate inhalation, vibroacoustic, and auditory components of exposure and apply valid quality-of-life indicators in multidisciplinary veteran care trajectories.*

**Key words:** apitherapy, beehive air, therapeutic beekeeping, veterans, rehabilitation, complementary medicine, Apitherapeutic Pyramid, HIVES, Honeybee Programs.

**Ольшанський А.І. Апітерапевтична піраміда (Патент України № UA160916, автор: Анатолій Ольшанський): інтеграція бджолиних колоній в оздоровчі апітехнології та впровадження в межах американських програм Hives for Heroes («Вулики для героїв») та Honeybee Programs («Програми медоносних бджіл»)**

*У статті здійснено міждисциплінарний аналіз можливостей інтеграції апіорієнтованих нефармакологічних втручань, заснованих на контрольованій взаємодії з живими бджолиними сім'ями, у практики реабілітації та профілактичного супроводу в США. Предметом розгляду є поєднання двох напрямів: інгаляційні практики "вуликового повітря" та терапевтичне бджільництво у ветеранських програмах, а також технологічно кодифікований український кейс – «Апітерапевтична піраміда» (патент України № UA 160916). Методична основа включає критико-аналітичний синтез наукових публікацій, порівняння рівнів доказовості, соціологічний аналіз прийнятності комплементарних практик і прикладний аналіз інституційних умов трансферу в американський реабілітаційний сектор. Показано, що для інституційної легітимізації таких втручань у США визначальними є показники безпечності, відтворюваність процедури та наявність вимірюваних результатів, сумісних зі статистикою реабілітаційних служб (зокрема використання*



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*EQ-5D-5L у програмі HIVES). На підставі матеріалів VA та партнерських ресурсів уточнено роль локальних комунікаційних майданчиків ("Honeybee Programs") у поширенні терапевтичного бджільництва на рівні окремих медичних закладів. Патентований виріб «Апітерапевтична піраміда» розглянуто як технологічно структурований варіант інтеграції живих бджолиних сімей у wellness-апитехнології, придатний для подальшої стандартизації за параметрами вентиляції, сенсорного навантаження, біобезпеки та клініко-етичного супроводу. Обґрунтовано доцільність подальших досліджень із розмежуванням інгаляційного, віброакустичного та аудіального компонентів впливу й використанням валідних індикаторів якості життя.*

**Ключові слова:** апітерапія, вуликове повітря, лікувальне бджільництво, ветерани, реабілітація, комплементарна медицина, апітерапевтична піраміда, вулики, програми бджільництва.

**Problem statement.** The rehabilitation and preventive care sector in the United States requires non-pharmacological interventions that combine an acceptable safety profile, procedural reproducibility, and measurable outcomes suitable for institutional reporting and quality improvement [3; 4]. Against this background, apitherapeutic practices based on controlled interaction with live honeybee colonies are of practical interest in two formats: inhalation exposure to beehive air and therapeutic beekeeping in veteran-oriented programs [3; 4].

**Analysis of recent research and publications.** The analytical corpus includes studies on beehive-air volatile composition and chemometric profiling, consumer acceptability of apitherapeutic means, technical aspects of beehive-air sampling and sensing, and preclinical assessments of beehive air and pollen exposure [1; 2; 9; 10; 12]. A separate block of sources documents therapeutic beekeeping for veterans in the United States, including Department of Veterans Affairs materials and partner communications on program organization and dissemination [3; 4; 13-16; 22].

**Identification of previously unresolved parts of the general problem.** An unresolved issue is the scientific and organizational linkage between inhalation-oriented apitherapeutic practices, institutionally structured therapeutic beekeeping for veterans, and a technically codified Ukrainian design solution that may be adapted for reproducible wellness and rehabilitation use under safety-oriented operating conditions [4; 5; 22].

**Formulation of the article's purpose.** The purpose of this publication is to substantiate the expediency of scientifically and organizationally managed integration of api-oriented non-pharmacological interventions based on controlled interaction with live bee colonies into the U.S. veteran rehabilitation continuum, and to define the implementation potential of the Apitherapeutic Pyramid (UA No. 160916) within wellness apitechnologies and the American programs Hives for Heroes and Honeybee Programs [4; 5; 15; 16; 22].

**Presentation of the main research material with full substantiation of the scientific results obtained.** The argument is developed through three interconnected analytical lines: assessment of beehive-air inhalation literature and its evidentiary limits; institutional analysis of therapeutic beekeeping for veterans in the United States; and engineering-implementation analysis of the patented Apitherapeutic Pyramid as a potentially reproducible wellness-apitechnology platform [1-5; 9-10; 12-18; 22]. A comparative summary of these intervention formats and their institutionally relevant characteristics is presented in Table 1.

Publications on apitherapy describe beehive-air inhalation as exposure to a complex mixture of volatile and aerosol components generated in the hive microenvironment. The cited sources mention terpenes, essential oils, pheromonal components, wax fractions, alcohols, glandular secretions, propolis aerosol, trace elements, and enzymatic

Table 1  
**Comparative Characteristics of Apitherapy-Oriented Interventions by Criteria of Institutional Suitability for Rehabilitation Application in the United States**

Direction / intervention format	Primary type of impact	Available evidentiary basis within the article	Institutionally significant advantages
Inhalation practices involving “hive air”	Inhalation exposure to aerosolized and volatile components of the hive environment	Chemical profiling, microbiological observations, and preclinical data; clinical evidence remains limited	Provides a basis for further toxicological, microbiological, and infection-risk assessment; corresponds to the demand for non-pharmacological interventions
Therapeutic beekeeping in veteran programs (HIVES, Hives for Heroes, Honeybee Programs)	Psychosocial, recreational, and socially integrative impact combined with rehabilitation support	VA institutional materials, quality-improvement logic, use of EQ-5D-5L, and reported positive changes in quality of life	Social integration, mentorship, reduced isolation, compatibility with rehabilitation monitoring practices, and availability of dissemination channels
“Apitherapeutic Pyramid” (Patent UA 160916)	Complex sensory impact: inhalation, vibroacoustic, and auditory, without direct patient contact with bees	Patent-based codification of the structure, technical description, and professional and media reports on operational characteristics	Technological formalization, design reproducibility, and potential for standardization of ventilation, sensory load, biosafety, and clinical-ethical supervision

*Source: compiled by the author.*

admixtures [6-8]. However, chemical characterization should not be equated with clinical proof; it mainly supports hypothesis generation and preliminary risk analysis [1; 10].

Evidence supporting further study includes reports on volatile composition and antibacterial activity, including methyl salicylate, eugenol, and terpene fractions with reported beta-linalool prevalence, as well as activity against *Staphylococcus aureus* and MRSA [1]. For U.S. institutional settings, such data are important primarily as a basis for toxicological, microbiological, and infectious-risk assessment before wider clinical use [1; 4].

A scientifically precise description of beehive-air therapy at the current stage is a hypothesis with partial preclinical support rather than a clinically standardized intervention [10]. Preclinical models assess biochemical and immunological indicators after exposure to beehive air and/or pollen in animals, but these data do not eliminate the need for controlled human studies with defined endpoints [10].

A key methodological problem is the combination of inhalation exposure with auditory and vibroacoustic components (hive sound, rest above colonies, vibration perception). This composite practice may have recreational and psychosocial value, but it prevents clear attribution of outcomes to inhalation and therefore requires analytical separation of sensory factors in study design [11]. In U.S. implementation, this implies standardized procedural descriptions and outcome instruments compatible with rehabilitation statistics and quality-improvement practice [3; 4].

The broader apitherapy discourse demonstrates two stable tendencies in complementary medicine: growing demand for preventive practices integrated into lifestyle and expansion of health-related services in experiential and recreational formats (apitourism, wellness farms, spa services) [2; 19; 20]. At the same time, survey evidence indicates limited consumer awareness and a potential increase in willingness to use apitherapeutic means after structured information is provided [2].

This combination of demand growth and low awareness supports interpretation of an acceptance barrier as a communication problem involving risk description, expected outcomes, and the boundaries of current evidence [12]. In the U.S. setting, informed consent and patient counselling require standardized descriptive modules that specify allergological and infectious risks, procedural conditions, and actions in case of adverse events [4; 12].

The U.S. segment of apitherapeutic practice is especially important because institutional acceptance is shaped by safety, reproducibility, and measurable outcomes rather than by market popularity alone [3; 4]. Therapeutic beekeeping programs for veterans are illustrative in this regard because they combine recreational therapy, psychosocial support, and elements of social and occupational reintegration [3; 15; 16].

Particular attention should be given to the Honeybee Initiative for Veteran's Empowerment and Support (HIVES) in the U.S. Department of Veterans Affairs innovation environment [4]. The program profile uses standardized quality-of-life self-assessment (EQ-5D-5L) in a pre/post measurement logic compatible with rehabilitation administration and quality-improvement reporting [3; 4]. This format is methodologically significant as an institutionally acceptable presentation of a complementary practice, even though it is not final proof of clinical efficacy [3; 4]. The relevance of this approach is strengthened by a VA-associated quality-improvement publication reporting statistically significant changes in mobility, anxiety/depression, and overall health assessment among veterans engaged in beekeeping [3].

Non-governmental initiatives such as Hives for Heroes build a social infrastructure of veteran support through mentoring and inclusion in beekeeping communities [15; 16]. From a sociological and socio-pedagogical perspective, this supports social integration, reduces isolation, and strengthens routines of self-organization relevant to long-term recovery [15]. It also increases demand for technologically structured interventions that can be described through reproducible procedures, safety parameters, and differentiated sensory components [3; 4].

A further dissemination channel is represented by facility-level VA communications that present therapeutic beekeeping under the HIVES/Honeybee Programs designation. For example, the VA Coatesville Health Care announcement describes a free Therapeutic Beekeeping Program for Veterans, specifies the launch of the 2026 cycle, and emphasizes outpatient access through VA referral together with peer connectedness and mindfulness-oriented participation [22]. Analytically, such notices are important because they document the translation of an innovation from a central platform into routine recruitment and local service delivery [4; 22].

A significant technologically codified api-intervention is the utility model Apitherapeutic Pyramid (UA No. 160916) [5]. The patent records features relevant to biosafety and reproducibility: at least one therapeutic bed positioned on hive units with live colonies inside a pyramidal structure oriented to cardinal directions and equipped with windows and doors [5]. Wooden hives with service openings and ventilation grilles formally support controlled gas exchange between the nest volume and the interior space [5]. The structure is placed on supports, covered with reeds, and configured so hive

entrances project outward while the upper parts extend into the pyramid; access is provided by stairs through a floor hatch [5]. Variable design elements in the patent formula indicate scaling potential for different institutional sites under standardized operating conditions [5]. Professional circulation of the technology is additionally reflected in beekeeping periodicals [18]. A visualized model sample is presented in Fig. 1.



*Fig. 1. Model of the Apitherapeutic Pyramid: general view of the structure with hive module, access stairs to the working platform, and support frame (visualization sample for describing the structural elements of the patented product)*

Scientific and media descriptions of the product add operational characteristics, including multi-hive configurations, approximate colony population, and session/course duration [5; 17; 18]. The author's explanation stresses no direct patient-bee contact and a composite sensory exposure including vibration, background hive sound, and inhalation of nest air [5; 17]. For evidence-oriented evaluation, this requires parameterization of frequency characteristics, temperature and humidity, microparticle and microbial aerosol indicators, and separate assessment of allergological and infectious risks with adverse-event response procedures [3-5]. The patent provides legal codification and technical reproducibility, which is sufficient for preliminary institutional consideration in international wellness and rehabilitation contexts [5].

Conclusions and prospects for further research in this area. Beehive-air inhalation practices should presently be characterized as a promising direction of complementary medicine supported by chemical, microbiological, and preclinical data, but not yet by a sufficient volume of reproducible clinical studies with clearly defined endpoints [1; 10].

The reviewed literature also shows that European legitimation of apitherapy often proceeds through wellness markets and beekeeping traditions, whereas broader patient acceptance depends on structured communication and clinically responsible explanation of risks and expected outcomes [2; 12].

The U.S. experience of therapeutic beekeeping for veterans demonstrates an institutionally acceptable format for integrating complementary practices through

safety-oriented organization, mentoring as a socio-pedagogical resource, and standardized quality-of-life indicators such as EQ-5D-5L in a before/after quality-improvement design [3; 4; 15; 22].

The patented Apitherapeutic Pyramid may be considered a technologically structured option for integrating live bee colonies into health-oriented api-interventions. Its implementation potential in the United States and other countries depends on procedural standardization, biosafety, clinical ethics, and evidence-based outcome assessment with valid indicators [4; 5; 12; 17]. A central research task is controlled separation of inhalation, vibroacoustic, and auditory components followed by multidisciplinary evaluation of quality-of-life outcomes in veteran and other target groups [3; 4; 15; 16].

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