

APIHEALTH CURRICULUM



The ApiHealth Curriculum aims to be a model for educational processes on the subject of Apitherapy that refers not only to the content, amount of information and its distribution according to the time schedule, but it also contains guidelines that will try to cover the rest of educational and methodological aspects.



ApiHealth Curriculum

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štátny podnik





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Introduction

Main aims

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The curriculum is one of the main results of ApiHealth project (www.apihealth.eu). The project “ApiHealth: Improving the professional development opportunities in the Apitherapy sector in terms of health” is implemented under the European Union programme ERASMUS+. The project aims to design apitherapy and bee-based educational curriculum and to develop fully up-to-date educational materials aimed at the use of bee products in alternative medicine, and subsequently to increase beekeepers' income by using bee products in alternative medicine. Through the ApiHealth Curriculum we try to address the most important aspects of utilisation of bee products for improving human health.

Although a very large number of resources on the use of multi-plants in alternative medicine exists, unfortunately there is no comprehensive curriculum or scientific book on the use of bee products in alternative medicine even in the agricultural, veterinary and medicine faculties in Europe. Every user or person who will look for the apitherapy topic, everyone who will be just interested in the topic or will need it for his/her work or utilisation for improving one's own skills and knowledge, will get comprehensive and easy to understand product.

The ApiHealth Curriculum aims to be a model for educational processes on the subject of Apitherapy that refers not only to the content, amount of information and its distribution according to the time schedule, but it also contains guidelines that will try to cover the rest of educational and methodological aspects.

The ApiHealth Curriculum has the following general objectives:

- Provide teachers and trainers in adult education with support for methodological work in the field of Apitherapy;



- Update and improve instructors' knowledge and support related professional groups and environmental institutions and training centres' needs for the training related to bee products and the use of alternative medicine;
- Define the whole structure of the training, its length in time, and the range of information that will be presented to the trainees;
- Contribute with suggestions of content, themes and activities as common basis, allowing the adaptation of the curricular proposal to the specific conditions of a training centre.

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Target Groups

- **Primary target groups**
 - Adult professionals: beekeepers, trainers in adult education, people from rural areas who are interested in beekeeping and apitherapy
- **Other**
 - Medical sector staff;
 - Adult education centres' instructors on beekeeping;
 - Vocational education institutions (public, private);
 - Alternative medicine and food sector-related vocational high school instructors (Agriculture, Veterinary, Food-processing);
 - Environmental foundations and training centres.



Background of the proposed Curriculum

Today Europe' numbers say 650.000 beekeepers and 17.5 million beehives are present on this continent, so those figures prove this is a great industry with big potential.

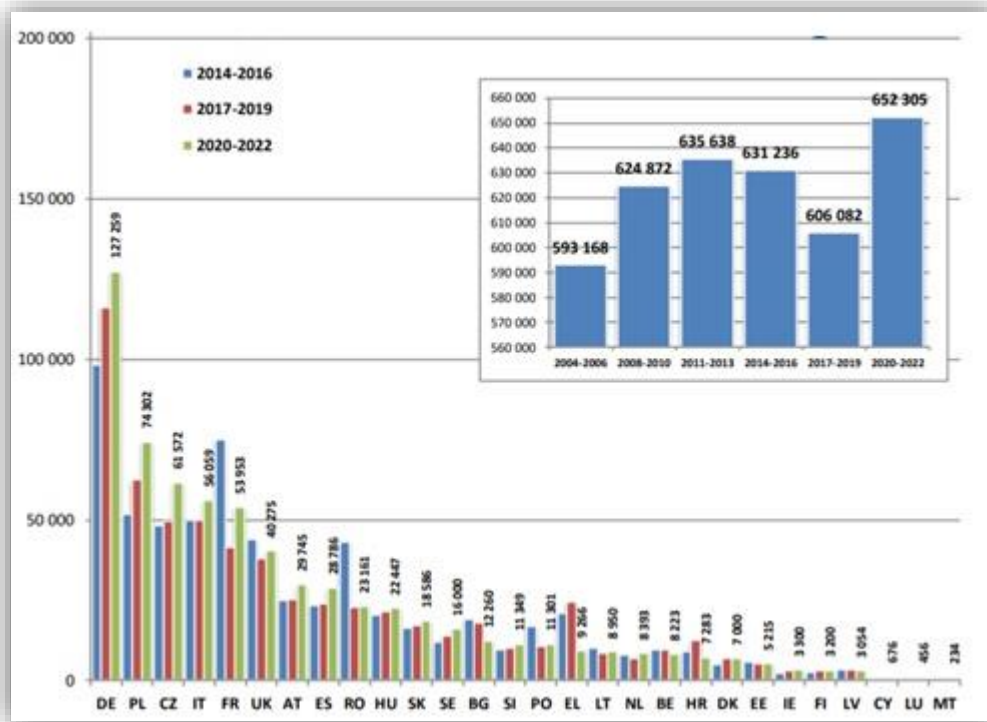


Fig. 1 Evolution of the number of beekeepers in the EU. Source: European Commission, 2020

Honey is important for beekeepers, but beekeeping is not limited only to honey production. Today, bee products including propolis, royal jelly, and bee pollen are popular, traditional healthy food products. Based on scientific assays, propolis is the most powerful antioxidant of all the bee products examined, and pollen too, exhibiting strong antioxidant effects. Nowadays, the use of bee products in the health sector is called apitherapy.

Apitherapy is a growing sector and a fascinating one as well. The project will increase the participation of young people in learning new methods for better employability. Bee products and apitherapy can create new jobs for young people. Beekeeping for young



people should be made attractive and profitable, unfortunately, today, most of European beekeepers are older people (50 years+ years). Production and marketing of high-quality bee products and encouraging the use of these products in alternative medicine can be a bit more attractive in this profession in Europe.

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Apitherapy is the use of various elements of the hive products, as well as bee venom therapy to treat numerous health ailments that include a vast array of conditions from burns and wounds, to arthritis, allergies, MS, and rheumatic diseases. Specific bee products for health care have been used for centuries in different cultures. For instance, Hippocrates, in the 4th century BC, used bee venom to treat joint pain and arthritis; ancient Greek athletes used honey to boost their energy. Bee pollen is said to aid in weight loss; cosmetic companies routinely use the revitalizing and moisturizing qualities of honey in hand creams, lotions, balms and salves. In Europe, bandages are now impregnated with honey, and the use of royal jelly has been associated with controlling abnormal cholesterol.

Research provides information that over 140 plants have multiple uses: as food and medicinal sources for bees (nectar, pollen, resins and balsams), as food sources and natural drugs potentially for every living being including humans.

ApiHealth project aims to provide training tools for agriculture and food engineers, medical staff, beekeepers, and the relevant professional groups about the use of the products of the hive for health and promote and demonstrate scientifically the effects of these products via the e-learning training materials developed within this project. Apitherapy is not only about bee venom; many people have knowledge about the use of pollen, propolis, and honey to help address specific health conditions.

This Curriculum and associated training materials aims to update and improve knowledge of target groups and related professional groups and meet the environmental institutions and training centres needs for training within the area of bee products and use of alternative medicine. In this context, this project will solve a major deficiency in that area.



Beyond the contribution of bee products in alternative medicine, beekeeping has a potential for regional economy. In remote and rural areas, beekeepers can make a considerable contribution to sustainable agricultural production.

Bees have played a great role in biodiversity, nature conservation, in regional economies and in rural culture in almost all European countries. Europe has been recently struggling with the retreat of beekeeping, despite this, the number of bee colonies and beekeepers in the European Union has increased in recent years. In view of the urgent need for generational renewal in the beekeeping sector, it is necessary to develop training programs in the professional field in order to motivate young people to enter the beekeeping profession.

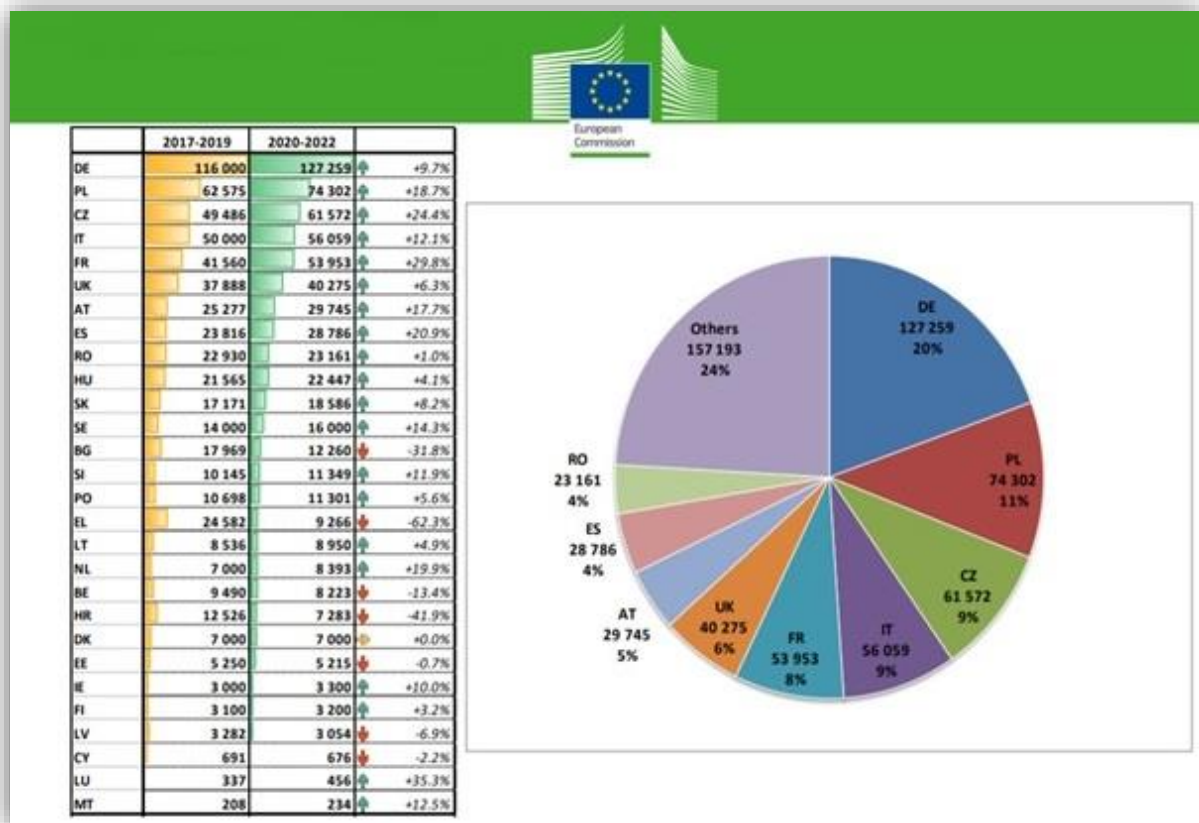


Fig. 2 Number of beekeepers in the EU. Source: European Commission, 2020

Apitherapy in the partner countries

Slovakia

Although in Slovakia, according to our current legislation, there is no open talk about „medical treatment“, in some countries of the world (eg. Russia, Ukraine, Romania, and Israel) apitherapy is a recognized medical profession. In Slovakia, there is still a shortage of apitherapy use in practice. Apitherapy treatment is implemented at the level of the beekeepers themselves.

Honey therapy is the most widespread method in the country because honey was the basic product that beekeepers prepared. Scientific studies have led to the selection of honey in Slovakia, which has the potential to meet the attributes of medicinal honey. It is a honeydew from the Cergov mountain range (the Medar beehive), which has comparable antibacterial effects under laboratory conditions such as medical mānuka honey. This honey is also characterized by being rich in polyphenols, including flavonoids, which have a significant anti-inflammatory effect and are also involved in the production of hydrogen peroxide which acts antibacterially.

Although bee treatment in the country is in its infancy, more and more beekeepers are starting to diversify their production and offer services in the field of apitherapy - production of nutritional supplements and cosmetics from bee products, inhalation of bee air, apitourism etc.

Bulgaria

In Bulgaria, apitherapy is seen as the treatment which uses all kinds of bee products and is quite popular today. There are a number of national organizations of bee keepers, including a National Association of Women Beekeepers. Bee keeping has been known and widely practiced back in 681 when the Bulgarian state was founded. Nowadays there are a number of certified companies which have their own apiaries and produce honey and other bee products, both conventional and bio. The smaller ones usually sell locally but there are big companies which export their products. According to data provided by the Ministry of Agriculture, Food and Forestry currently Bulgaria exports about 10 thousand tons conventional and bio honey, along with other bee products.

Romania

Apitherapy is seen, in Romania, as “the science and art of using beehive products to prevent and/or heal hundreds of human and animal diseases.” Romania, the land of Apitherapy,

green nature, castles and a home land of famous Dracula, is the country where apitherapy is practiced by doctors. It is an old tradition with many benefits for our health without side effects. The country with the richest range of bee products in Europe, with a spontaneous flora that ensures clean bee products with high value, perfect for apitherapy.

Turkey

Some sources indicate that 9 thousand years ago apitherapy was practised in Anatolia. Especially propolis and honey has been used safely for many years in folk medicine in Turkey. However, the extension of its use began in 2014 with a regulation issued by the Ministry of Health. Lack of scientific researches on apitherapy is an important gap and, there are not enough training centres yet in our country. After accepting Traditional and Complementary Medical Applications Regulation in 2014, interest in apitherapy practice has increased and initiatives have begun. The purpose of this Regulation is to determine the traditional and complementary medicine application methods for human health, to educate and authorize the persons who will implement these methods and to regulate the working procedures and principles of the health institutions to be applied to these methods.

Poland

The topic of apitherapy is not new in Poland. Usage of honey and product from hives is well known from centuries. Nevertheless current development of medicine pushed apitherapy a bit into the hidden place. However topic of apitherapy started to be recovered since few recent years. Twenty years ago, the sanatorium in Świnoujście started to support the treatment of patients with bee products. Various studies have also been carried out on the use of bee products for medical purposes.

Spain

Nowadays, the apitherapy in Spain is only little developed. Apitherapy is practised at the level of folk medicine, the therapeutic use is considered mainly the application of the bee venom. Other substances produced by bees may have uses related to the maintenance of health as dietary supplements, antiseptics, but these uses are not considered as apitherapy in Spain.

However, there are many entities: associations of beekeepers, agricultural organizations, etc. which work in the production sector.

Methodology

The introduction of information and communication technologies (ICT) into the learning process brings many benefits. Changing perceptions of learning from a conventional teacher-student relationship to a relationship where a teacher is a supportive element for the full understanding of specific subject encourages the advancement and development of many e-learning platforms.

The main training method recommended within ApiHealth training activities is **Blended Learning: Hybrid e-Learning course**, in which **most course activity is done online, but some face-to-face instructional activities are required** (intensive face-to-face sessions or short-term face-to-face residencies), **such as lectures, discussions, or other in-person learning activities**. In other words, blended learning means meaningful didactic interconnection of traditional pedagogical methods with the use of e-learning, which in principle means combining the following three phases of the learning process into an optimally functioning unit:

1. Live lectures;
2. Workshops and exercises, computer-aided tests;
3. Self-study, also with computer support;

Blended learning offers immense advantages to students – they stand to benefit from the structured practices of the classroom while learning at their own pace, owing to the adaptive and personalized nature of online learning. Each student has a range of different strengths and requirements and a blended learning approach allows tutors to acknowledge this. When they are given the ability to use tools from both traditional and digital spheres, tutors are able to present necessary information in a range of different ways designed to suit the varying learning styles of their students.

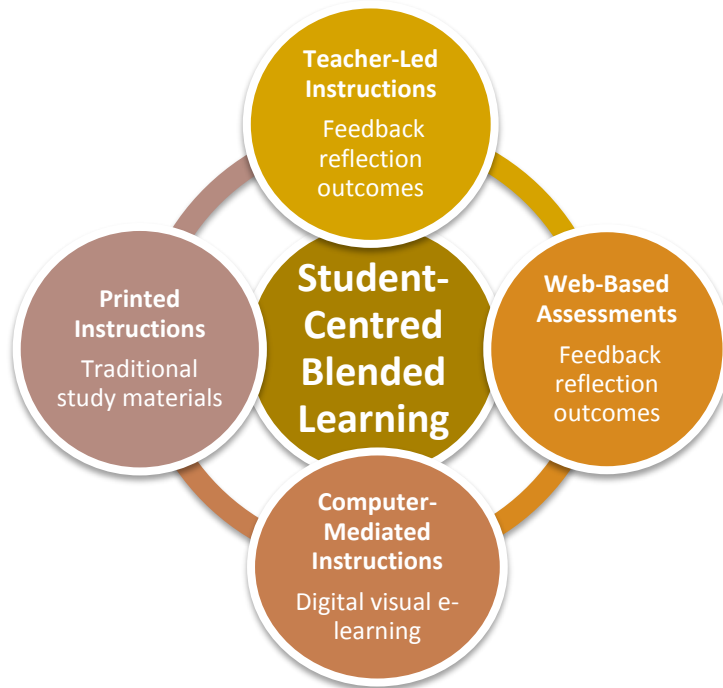


Fig. 3 Elements of blended learning. Source: <http://lifeisapieceofpi.blogspot.com/2014/11/blending-my-classroom.html>

In this way, opportunities are created for introducing distance learning, thus wiping out the time and space boundaries of access to the study materials. At the same time, it can be as effective as traditional training but at a lower cost. Developing e-learning is more expensive than preparing classroom materials and training the trainers, especially if multimedia or highly interactive methods are used. However, delivery costs for e-learning (including costs of web servers and technical support) are considerably lower than those for classroom facilities, instructor time, participants' travel and job-time lost to attend classroom sessions. Moreover, e-learning reaches a wider target audience by engaging learners who have difficulties attending conventional classroom training.

Blended learning provides wide opportunities for enhancing lectures with a certain degree of transformation in learning and teaching approaches. It represents a new design of learning experiences and educational environment.

Blended learning involves the following key aspects:

- Rethinking the course design to optimize student engagement;
- Integrating face-to-face and online learning;
- Replacing traditional class contact hours. (Garrison & Vaughan 2008)

Some online activities can be implemented before the face-to-face activities – the aim is to get students to the same level of knowledge before face-to-face activities, or to try to find out differences in their knowledge level. The student can prepare himself / herself for a lecture in this way and the lecturer can adapt the material according to the students' needs.

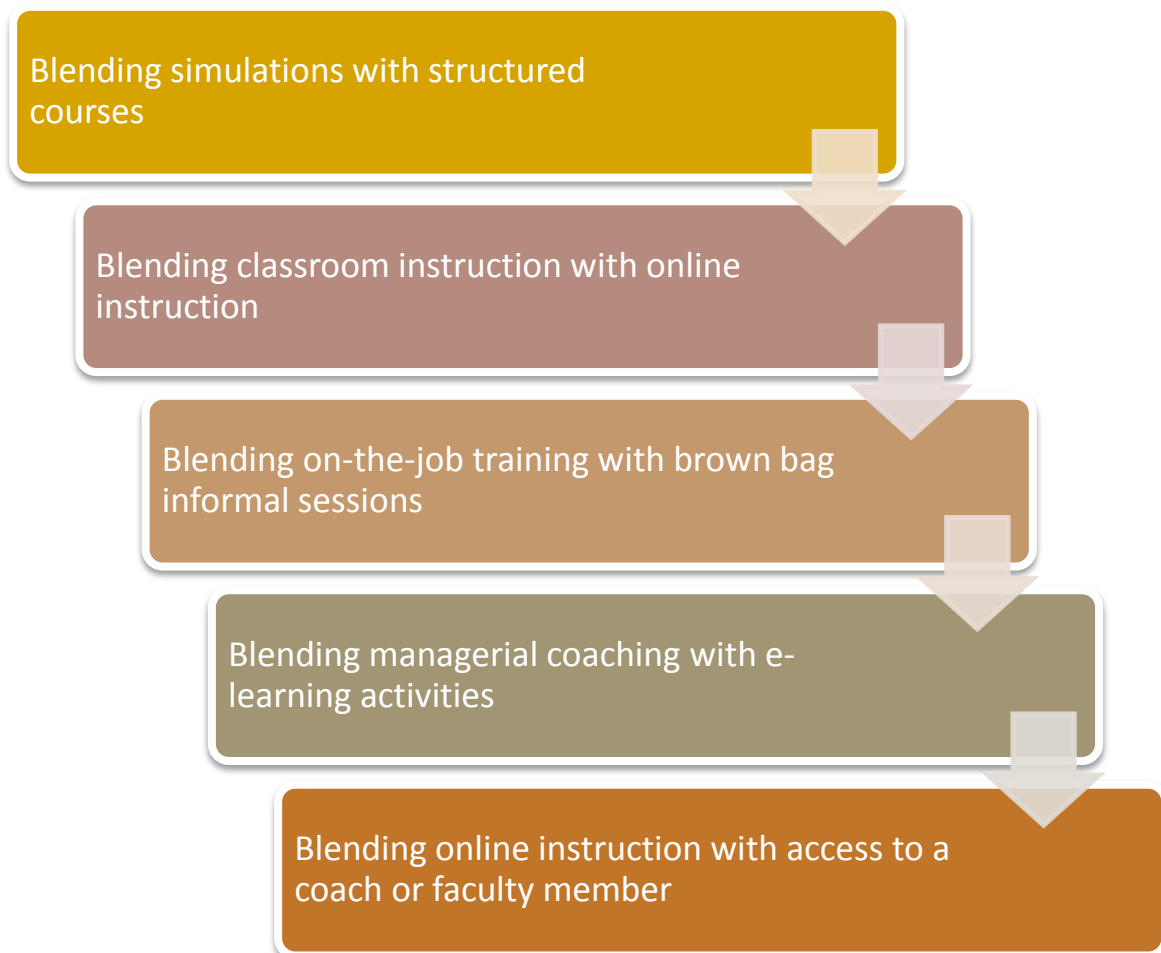


Fig. 4 Examples of use of two or more distinct methods of training. Source: Elliot Masie 2002



E-learning materials combined with classroom lectures help students practice newly acquired knowledge and subsequently validate it. According to Malá (2011), the e-learning supports teaching process in the following aspects:

- Presenting study materials;
- Controlling the mastery of new study materials;
- Analysing and correcting mistakes;
- Doing exercises.

A training program may aim at developing different types of skills:

- Cognitive skills, which can involve knowledge and comprehension (e.g. understanding scientific concepts), following instructions (procedural skills), as well as applying methods in new situations to solve problems (thinking or mental skills);
- Interpersonal skills (e.g. skills involved in active listening, presenting, negotiating, etc.);
- Psychomotor skills, involving the acquisition of physical perceptions and movements (e.g. making sports or driving a car).

Most e-learning courses are developed to build cognitive skills; the cognitive domain is the most suitable for e-learning. Within the cognitive domain, thinking skills may require more interactive e-learning activities because those skills are learned better “by doing”.

Learning in the interpersonal domain can also be addressed in e-learning by using specific methods. For example, interactive role playing with appropriate feedback can be used to change attitudes and behaviours.

Some questions to ask when choosing among e-learning, face-to-face instruction or other types of informal or on-the-job learning include:

- What is the relative cost of each type of training?
- Is learning best delivered in one unit or spread out over time?
- Does it address a short-term or a long-term learning need?
- Do participants have access to needed computer and communications equipment?



- Are participants sufficiently self-motivated for e-learning or self-study modes of learning?
- Do target participants' time schedules and geographic locations enable classroom-based learning or other types of synchronous learning?

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The most important advantages of e-learning include:

- Multimedia content - visual processing makes it possible to present knowledge in a more attractive way, in some cases it would not be even possible to present it otherwise;
- Pace of study - the students can choose their own pace of learning and acquiring the study materials;
- Interactivity – by using modern technologies, the student can be actively involved in the learning process and get immediate feedback (tests, forum, chat, video conferencing). Storyline simulation is one of the other benefits of multimedia content;
- Technology - Nowadays, students commonly have access to new technologies that facilitate and accelerate the learning process. (smartphone, tablet, PC, etc.).

Other benefits of e-learning:

- It can satisfy students with different learning styles;
- Students can study in their free time (i.e., in-service study);
- No rental of training premises is required;
- The delivery of educational materials is very flexible;
- Adaptation of study materials can be realized relatively quickly and easily;
- It supports the development of computer skills and the ability to search and organize information.

E-learning can be implemented basically in two ways:

a) In a synchronous way - Synchronous events take place in real time through digital platforms. It is characterized by the fact that all participants can communicate from different





places, but only at a specific time by means of computer conferences, interactive video-communication, but also by chatting, or through webinars;

b) In asynchronous way - Asynchronous events are time-independent. The students do not have to be in the same place at the same time, they do not study at the same time, they choose the time of access to educational materials themselves. In this way, asynchronous learning is more flexible, one of the best benefits of asynchronous learning being that the learner has more time to generate content-related responses to the instructor and peer postings.

Synchronous e-Learning	Asynchronous e-Learning
<ul style="list-style-type: none"> • Live e-Learning (Virtual Classroom, Webinar, Instructional videos, Teleconference) • Real-time distance learning • Mobile learning 	<ul style="list-style-type: none"> • Online Educational Materials • Offline Educational Materials (CD-ROM, Digital Storage Media, e-books) • Computer-Based Instruction • On-line Collaborative Tools (Chat, Blogs, Wikis, On-line discussion, Social Media)



Model for training activities

In the training of the ApiHealth project, the consortium decided to go with both printed materials (*Handbook*) and online asynchronous learning to ensure easy and extended access to training materials (people living in rural areas do not always have access to the Internet).

The following teaching and learning strategies, methods and techniques shall be applied in the **face-to-face part of the training program**:

- Verbal lecture;
- Small group discussion;
- Peer-to-peer learning;
- Demonstrative teaching;
- Study visits- good practice examples;
- Questions and answers.

The proposed **e-Learning platform** is based on free and open-source learning management system (LMS) Moodle, with customizable management features, which is widely used to create online courses for educators and trainers to achieve learning goals. This is a web-based learning system where study materials are accessible to students through the Internet. LMS is a web-based software application or technology that serves to plan, implement, and evaluate specific lessons.

The e-Learning platform will contain:

- Interactive materials:
 - It may consist of several interactive lessons / books;
 - Each lesson / book consists of screens on which the content elements can be displayed: text, animation, video, audio, questions, or tests.
- Simple study materials:
 - Materials without interactive elements, e.g. PowerPoint presentations, audio or video materials. Materials without interactive elements allow students to only view, read or listen to the content of the lesson.

- Other tools:
 - Answers to specific questions about practice;
 - Complex solutions;
 - A glossary with the terms and definitions linked to the training content;
 - An online evaluation questionnaire that is used to obtain feedback from course participants on the form and content of the course.



Fig. 5 E-learning concept. Source: <https://fahiezan.wordpress.com/week-3/>

Training Content Development

The training content is designed for a wide spectrum of audience involving educational centres, institutions or lecturers in the field of adult education. In addition, it could be used by beekeeping associations organising trainings and lectures for beekeepers in order to broaden their knowledge in the field of Apitherapy and bee products marketing. In general, the training content can be modified and adjusted according to the type of audience, educational goals, actual needs, or other factors (learning environment, equipment used in learning process or lecturer’s skills and experiences).

It is proposed to organize the training content in several modules with the following structure:

M 1	DEFINITION AND DESCRIPTION OF APITHERAPY
M 2	ADVANTAGES OF APITHERAPY FOR HUMANS AND ANIMALS
M 3	PRODUCTS FROM HIVE
M 3.1	BEE VENOM AND ITS FEATURES/PROPERTIES
M 3.2	BEESWAX AND ITS FEATURES/PROPERTIES
M 3.3	POLLEN AND ITS FEATURES/PROPERTIES
M 3.4	PROPOLIS AND ITS FEATURES/PROPERTIES
M 3.5	ROYAL JELLY AND ITS FEATURES/PROPERTIES
M 4	HOW TO BECOME A FARMER ENTREPRENEUR

General Qualification Standard

<p>Knowledge</p>	<ul style="list-style-type: none"> • Define the term "apitherapy"; • Define the historical development of apitherapy; • Describe the state of the art of apitherapy in Europe; • Describe the properties of raw and processed bee products; • Define the importance of individual products and procedures within apitherapy for human health; • Describe the importance of bee products for humans and animals; • Define laws, policies, and other administrative regulations concerning the production, use and sale of bee products for medical purposes; • Characterize the different methods of obtaining, producing and processing bee products; • Define the basics of marketing and management in the production, use and sale of bee products; • Define OSH principles.
<p>Skills</p>	<ul style="list-style-type: none"> • Obtain and process bee products; • Provide apitherapy consultancy services; • Doing business in apitherapy; • Comply with the OSH and fire protection principles.
<p>Competences</p>	<ul style="list-style-type: none"> • Autonomy in decision-making; • Accessing and analysing information; • Independence in the organizing and planning of work; • Self-activity in product development and processing; • Independence in solving and analysing problems; • Responsibility for the quality of one's own work; • Responsibility for fulfilling one's own roles and responsibilities; • Teamwork competences.

ApiHealth Modules

MODULE 1: DEFINITION AND DESCRIPTION OF APITHERAPY

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Learning outcomes

LEARNING OBJECTIVE:

The graduate can theoretically define the term apitherapy, the basic aims, the historical development of apitherapy, the state of the art of the use of therapeutic methods with application of bee products at regional and European levels, the general legislative framework of the individual countries in the field of apitherapy.

The student has knowledge on the general level (EQF 2) about:

- What is apitherapy;
- Working methods;
- Implementation methods;
- Benefits resulting from the use of bee products used in apitherapy;
- Characteristics of bee products such as honey, propolis, bee pollen, beeswax, royal jelly and bee venom.

Module Summary

Apitherapy (from the Latin word *apis* meaning “bee”) is the medicinal use of bee products. Bee products include honey, pollen, beeswax, propolis, royal jelly and bee venom. Bees and beekeeping improve human existence in almost every country on earth. Honey and other products obtained from bees have long been known to every society.

Proposed Content:

1. What is Apitherapy?
2. Why do we need apitherapy?
3. The general importance of bees and bee products for animals and humans.
4. Historical development of apitherapy



5. The use of apitherapy in Europe

6. Relevant legislation

Duration of the module (hours)

On-line training	Face-to-face training	
e-Learning	classroom training	practical training
6	2	0

Evaluation Standard

The requirement for passing the exam is to fulfil the criteria at least to 70%.

Evaluation criterion	Evaluation method	Evaluation tool
Define Apitherapy	Written / oral method	Online test / Oral response with explanation
Describe the historical development of Apitherapy in the world	Written / oral method	Online test / Oral response with explanation
Describe the state of the art of the use of apitherapy in your region/country/ in Europe	Written / oral method	Online test / Oral response with explanation
Provide a basic legislative framework for apitherapy in a given country	Written method	Online test





MODULE 2: ADVANTAGES OF APITHERAPY FOR HUMANS AND ANIMALS

Learning

outcomes

LEARNING OBJECTIVE:

The objective of the module is that students know the advantages of apitherapy and the different products from the hive for human health and animals, compared to other therapies (EQF 2/3).

Knowledge:

- Describe the advantages of apitherapy for human health and for animals;
- Describe the characteristics and application of products from the hive in different areas: sanitary, cosmetic and nutritional use.

Skills:

- Identify the different uses specific for individual bee products;
- Access and analyse information on the different products from the hive for human health and animals;
- Analyse the therapeutic, cosmetic, nutritional and culinary benefits of apitherapy for humans;
- Analyse the benefits of apitherapy for animals.

Module Summary

Modern apitherapy refers to the use and consumption of bee products including venom. The benefits of bee products used in apitherapy (honey, pollen, royal jelly, propolis and venom) are multiple for the organism due to their nutritional, therapeutic and cosmetic properties. Just as honey is good for humans, it can also be very beneficial for animals. Dietary use and animal therapies are rapidly becoming popular among pet owners because of their benefits and healing effects. It has also grown in use in veterinary medicine given its successful benefits specifically in the treatment of wounds, burns or cataracts.

Proposed Content:

1. Definition of Apitherapy revised.



2. Advantages of Apitherapy:
 - 2.1. Treating diseases (allergies, Alzheimer's disease, hyperthyroidism, lupus, Parkinson's disease)
 - 2.2. Treating illnesses (infections, multiple sclerosis, rheumatoid arthritis, shingles)
 - 2.3. Treating injuries (burns, open cuts, pain, tendonitis)
3. General benefits of honeybee products applications (applied topically, injected directly into the blood, taken orally)
4. General benefits of honeybee products used in Apitherapy (bee venom, beeswax, honey, pollen, propolis, royal jelly)
5. Benefits of apitherapy for animals
6. Potential risks or side effects of using Apitherapy (cough, discoloration of the white of the eye, headache, muscular weakness, severe pain in the body, uterine contractions, yellowing of the skin)

Duration of the module (hours)

On-line training	Face-to-face training	
e-Learning	classroom training	practical training
6	4	0

Evaluation Standard

The requirement for passing the exam is to fulfil the criteria at least to 70%.

Evaluation criterion	Evaluation method	Evaluation tool
Knowing the diseases, illnesses, and injuries one can treat using Apitherapy	Oral method	Oral response with explanation
Knowing the advantages of honeybee products applications	Oral method	Oral response with explanation
Knowing the advantages of honeybee products used in Apitherapy	Oral method	Oral response with explanation
Knowing the potential risks or side effects of using Apitherapy	Written method	Online test



MODULE 3: PRODUCTS FROM HIVE

Learning outcomes

LEARNING OBJECTIVE:

The graduate can theoretically characterize bee products such as bee honey, pollen, wax, propolis, royal jelly, bee venom, bee bread (EQF 2/3).

Module Summary

Products from the hive can be classified as direct and indirect products. Direct hive products represent those products which are directly produced by honeybee from their bodies (bee venom, royal jelly, beeswax) while indirect bee products are gathered from external environment (honey, pollen, propolis).

Proposed Content:

1. Bee products- general description
2. Direct bee products
3. Indirect bee products
4. Main bee hive product - honey

Duration of the module (hours)

On-line training	Face-to-face training	
e-Learning	classroom training	practical training
6	2	0

Evaluation Standard

The requirement for passing the exam is to fulfil the criteria at least to 70%.

Evaluation criterion	Evaluation method	Evaluation tool
Characterize direct bee products	Written / oral method	Online test / Oral response with explanation
Characterize indirect bee products	Written / oral method	Online test / Oral response with explanation
Characterize the main bee product - honey	Written / oral method	Online test / Oral response with explanation

MODULE 3.1: BEE VENOM AND ITS FEATURES / PROPERTIES

Learning outcomes

LEARNING OBJECTIVE:

The graduate can define bee venom characteristics, its physical properties, and composition of bee venom. The student can describe the use of bee venom in apitherapy, application methods, side effects and contraindications.

The student has knowledge on the higher level (EQF 3-4) about:

- What is bee venom;
- Working methods;
- Implementation methods;
- Characteristics of bee venom;
- Benefits resulting from the use of bee venom in apitherapy.

The student has the following skills:

- Selection and application of basic methods, tools, materials and information in the topic of bee venom.

The student has the competence:

- Ability to understand the healing properties of bee venom and implement recommendations regarding the correct use of bee venom in the treatment of diseases; adapt his/her behaviour to circumstances in solving problems.

Module Summary

Among many species of insects, only a few have the ability to defend themselves with stings and venom injected at the time of the sting. In low doses, bee venom can be useful in treating many ailments. This healing effect was already known to many ancient civilizations. Today, bee venom is used only in medicine and veterinary medicine.

Proposed Content:

- 1) Bee Venom Characteristics
- 2) Physical properties of bee venom



- 3) Venom composition
- 4) Physiological effects of venom
- 5) Contemporary use of bee venom
- 6) Bee venom products
- 7) Potential Risks and Side Effects

Duration of the module (hours)

On-line training	Face-to-face training	
e-Learning	classroom training	practical training
6	2	0

Evaluation Standard

The requirement for passing the exam is to fulfil the criteria at least to 70%.

Evaluation criterion	Evaluation method	Evaluation tool
Basic characteristics of bee venom	Written assessment	Online test
Application methods	Written assessment	Online test
Bee venom in the treatment of diseases	Oral and written assessment	Oral response with explanation / Online test



MODULE 3.2: BEESWAX AND ITS FEATURES / PROPERTIES

Learning outcomes

LEARNING OBJECTIVE:

- The objective of the module is that students know the features / properties of Beeswax.

KNOWLEDGE:

- Students will acquire more knowledge about the features / properties of Beeswax.

SKILLS:

- Students will acquire/consolidate such learning skills as: Accessing and analysing information, Critical thinking, Curiosity and imagination, Effective oral and written communication.

Module Summary

Specialists claim hundreds uses of beeswax. These beeswax uses can help beekeepers to better market their beeswax. Around 40% of the world trade in beeswax is used for the cosmetics industry (first class beeswax that has not been overheated, is pure, and is free from propolis), around 30% of world trade in beeswax is used by the pharmaceutical industry (good quality wax), around 20% of the world trade in beeswax is used for candle making, and the remaining 10% has other uses.

Proposed Content:

1. Beeswax characteristics
2. Features of Beeswax: breaking test, chewing test, colour, consistency, cutting test, kneading test, odour, splinters test.
3. Uses of Beeswax: batiking, conditioning wooden utensils, controlling corrosion, decorating eggs, greasing cookie sheets, hairstyling, making candles & luminaries, making crayons, making envelope seals, making modelling clay, making pastry, making reusable food wraps, polishing furniture, polishing granite counter-top, preventing rust, restoring leather boots, pocketbooks and shoes, waterproofing



boots and shoes, waxing cheese, waxing drawers, furniture joints, glass doors and windows, waxing nails & screws, waxing thread.

4. Potential Risks of Using Beeswax
5. Cosmetics production (recipes for creams, balsam and ointments)

Duration of the module (hours)

On-line training	Face-to-face training	
e-Learning	classroom training	practical training
4	2	2

Evaluation Standard

The requirement for passing the exam is to fulfil the criteria at least to 70%.

Evaluation criterion	Evaluation method	Evaluation tool
Knowing beeswax features	Written	Online test
Knowing the uses of beeswax	Oral method	Oral response with explanation
Preparing beeswax for a certain use	Practical	Product evaluation



MODULE 3.3: POLLEN AND ITS FEATURES / PROPERTIES

Learning outcomes

On successful completion of this module the learners will be able to:

Knowledge:

- Demonstrate basic understanding of how pollen is harvested and stored;
- Demonstrate competent knowledge and understanding of the basic characteristics of pollen;
- Compare and contrast different applications of pollen;
- Compare and contrast pollen and the other beehive products.

Skills:

- Examine the challenges in harvesting and preserving pollen of good quality;
- Explore and examine the basic characteristics of pollen (medical and nutritional);
- Analyse examples of pollen application in health promotion and prevention and as a form of apitherapeutic treatment;
- Analyse examples of pollen application in combination with other beehive products.

Competence:

- Appreciate the importance of using bee pollen for human health.

Module Summary

Pollen is often regarded as “the world's best food product”. Global production of pollen is around 1,500 tons per year. Bee bread and pollen, due to their nutritional and medicinal properties, are used for apitherapeutic purposes.

This part of the module will complement Module 3. It will give learners a pragmatic insight into the benefits of bee pollen for human health. At the end of this part learners will be able to apply pollen for prevention and treatment of different diseases in combination with



other bee products.

Proposed Content:

1. Pollen characteristics
2. Production and Storage
3. How pollen is harvested and stored
4. Application of pollen:
 - In health promotion and prevention
 - As a form of apitherapeutic treatment
4. Dosing considerations for pollen
4. Side effects and contraindications
5. Pollen application in combination with other bee hive products

Duration of the module (hours)

On-line training	Face-to-face training	
e-Learning	classroom training	practical training
5	2	1

Evaluation Standard

The requirement for passing the exam is to fulfil the criteria at least to 70%.

Evaluation criterion	Evaluation method	Evaluation tool
Harvesting and storage of pollen of good quality.	Oral assessment	Presenting the challenges in harvesting and storage of bee pollen
Basic characteristics of bee pollen (medical and nutritional) in health prevention and treatment.	Oral and written assessment/s, peer assessment	<p><i>Oral:</i> discuss at least three characteristics of pollen and provide examples</p> <p><i>Written:</i> multiple-choice test for peer assessment</p>
Pollen application for human health, including in combination with other bee hive and other products	Oral and written assessment/self-reflection/project	<i>Oral:</i> provide examples of at least three applications of pollen and analyze the benefits.





<p>work/ practical</p>	<p><i>Written:</i> multiple choice test for peer assessment</p> <p><i>Self-reflection:</i> learners self-reflect on the use of pollen in their own families</p> <p><i>Project work:</i> create a leaflet to promote the benefits of pollen for human health.</p>
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MODULE 3.4: PROPOLIS AND ITS FEATURES / PROPERTIES

Learning outcomes

LEARNING OBJECTIVE:

The learners can theoretically characterize propolis, its composition, production, method of obtaining, processing, storage. The student can describe the use of propolis in apitherapy, application methods, side effects and contraindications.

Module Summary

Propolis; a honey-bee product, possesses a wide range of pharmacological potentials including anti-bacterial, anti-fungal, anti-protozoal, hepato-protective, anti-oxidant, anti-inflammatory, anti-viral, anti-cancer and antitumor properties. Besides, the addition of ethanolic extract of propolis in the composition of mouth-washes and toothpastes enhances the prevention of microbial infection making it effective in the treatment of gum inflammation. Moreover, the presence of bioflavonoids, arginine, vitamin C, provitamin A, B complex along with some minerals possesses wound healing property and therefore enhances injury cure. Instead of individual component, there may be combined action, which leads propolis to diverse biological performance. Like all bee products, propolis offers a variety of health benefits to humans. It exhibits natural antibacterial properties and antimicrobial activity, making it a great first line of defence against any mild illnesses or sore throats that creep up. But this humble substance has also been studied for its biological activity against more serious matters like cancer cells in lab tests. Researchers looked closely at the chemical composition and found hundreds of beneficial natural compounds including polyphenols like caffeic acid phenethyl ester, amino acids, coumarins, and even natural steroids. Due to the botanical compounds propolis also contains up to 10% essential oils and 5% bee pollen which have immune-boosting benefits of their own. These compounds help explain its anti-inflammatory, immune-boosting, and cancer-fighting properties.

Consequently, the development of new propolis compounds from propolis coming from diverse geographical origins is vital in controlling various pathogenic diseases. Current





literature review suggests that propolis may be further explored for its potential properties against human pathogens.

Proposed Content:

- 1) Propolis characteristics
 - What is Bee Propolis?
 - What Does Bee Propolis Look and Taste Like?
 - How Do Bees Use Propolis?
- 2) Outstanding Properties of Propolis
- 3) Application of Propolis
 - How to Find and Use Propolis
 - How to Take Propolis
- 4) Potential risks or side effects

Duration of the module (hours)

On-line training	Face-to-face training	
e-Learning	classroom training	practical training
4	2	2

Evaluation Standard

The requirement for passing the exam is to fulfil the criteria at least to 70%.

Evaluation criterion	Evaluation method	Evaluation tool
Basic characteristics of propolis (medical and nutritional) in health prevention and treatment	Oral and written assessment	Oral response with explanation / Online test
Harvesting, manipulation, storage of propolis	Written assessment / project work	Online test / Oral response with explanation
Propolis application for human health.	Oral and written assessment	Oral response with explanation / Online test
Preparing various propolis extracts	Practical	Product evaluation

MODULE 3.5: ROYAL JELLY AND ITS FEATURES / PROPERTIES

Learning outcomes

LEARNING OBJECTIVE:

The learners can theoretically characterize the bee product – Royal jelly composition, production, method of obtaining, manipulation, storage, lyophilization of the royal jelly. Furthermore, the learners will be familiar with the use in history, the way of usage, the use of the royal jelly for medical purposes and as a food supplement.

On successful completion of Module 3, part 5 learners will be able to:

Knowledge:

- Demonstrate basic understanding of how royal jelly is produced, harvested and stored;
- Demonstrate competent knowledge and understanding of the basic characteristics of royal jelly;
- Understand different applications of royal jelly;
- Compare and contrast royal jelly and the other beehive products.

Skills:

- Examine the challenges in harvesting and preserving high quality royal jelly;
- Explore and examine the basic characteristics of royal jelly (medical and nutritional);
- Analyse examples of royal jelly application in health promotion and prevention and as a form of apitherapeutic treatment;
- Analyse examples of royal jelly application in combination with other beehive products.

Competence:

- Appreciate the importance of using royal jelly for human health and nutrition.

Module Summary

Royal jelly has been known since ancient Egypt and Rome. The greatest interest in royal jelly occurred in the 1960s, when Belfer patented the production of royal jelly under the name Apiserum and became famous all over the world. Royal jelly can be described as superfood, due to its rich nutritional value and many functional properties. Besides rich nutrition content, royal jelly possesses various biological activities, effects and healing properties.

Proposed Content:

- 1) Royal jelly characteristics
 - Royal jelly and its features
 - Chemical composition
 - How Do Bees Use Royal jelly?
- 2) Production and storage
- 3) Therapeutic effects
- 4) Royal jelly in diet, nutritional products and cosmetics
 - Consumption and dosage
- 5) Potential risks or side effects

Duration of the module (hours)

On-line training	Face-to-face training	
e-Learning	classroom training	practical training
6	2	0

Evaluation Standard

The requirement for passing the exam is to fulfil the criteria at least to 70%.

Evaluation criterion	Evaluation method	Evaluation tool
Description of royal jelly (composition, production and its use in history)	Oral assessment	<i>Oral:</i> present characteristics of royal jelly and its production methods
Harvesting, manipulation, storage and lyophilisation of the royal jelly in high quality	Oral and written assessment/s, peer assessment	<i>Oral:</i> discuss harvesting methods, manipulation and storage conditions including the



Application of royal jelly as food supplements as well as for human health

Oral and written assessment/self-reflection/project work

lyophilisation of the royal jelly

Written: multiple-choice test for peer assessment

Oral: discuss at least five benefits of royal jelly as food supplements as well as in medicine.

Written: multiple choice test for peer assessment

Self-reflection: learners self-reflect on the use of royal jelly in their own families and list at least three contraindications.

Project work: create a brochure to promote the benefits of royal jelly for human health.





MODULE 4: HOW TO BECOME A FARMER ENTREPRENEUR

Learning outcomes

LEARNING OBJECTIVE:

The objective of the module is that students know what they need to become entrepreneurs.

LEARNING KNOWLEDGE:

- Students will acquire more knowledge about entrepreneurship.

LEARNING SKILLS:

- Accessing and analysing information;
- Agility and adaptability;
- Collaboration across networks;
- Critical thinking and problem-solving;
- Curiosity and imagination;
- Effective oral and written communication;
- Initiative and entrepreneurialism.

Module Summary

Proposed Content:

1. Type of business to establish (individual/single, organised farmer organisation)
2. Amount of money involved in starting the business
3. Costs of getting into the business (identifying resources, analysing the costs of resources, valuating the identified resources, identifying risks)
4. Time for first income and time to break even
5. Potential profit of the business
6. Location of the business
7. Number of employees that may be needed
8. Market where the products will be sold

Duration of the module (hours)



On-line training	Face-to-face training	
e-Learning	classroom training	practical training
6	4	0
Evaluation Standard		
<i>The requirement for passing the exam is to fulfil the criteria at least to 70%.</i>		
Evaluation criterion	Evaluation method	Evaluation tool
Knowing the type of business to establish	Oral method	Oral response with explanation
Knowing the amount of money involved in starting the business	Written	Online Test
Knowing the costs of getting into the business	Oral method	Oral response with explanation
Knowing the time for first income and time to break even	Written	Online Test
Knowing the potential profit of the business	Oral method	Oral response with explanation
Knowing the location of the business	Written	Online Test
Knowing the number of employees that may be needed	Oral method	Oral response with explanation
Knowing the market where the products will be sold	Written	Online test



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