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MEDICINAL BEEKEEPING FOR BEEKEEPERS MODULE 9

Standardization and certification of bee-derived products



2021-1-TR01-KA220-VET-000034632

Standardization and certification of bee-derived products

In this module you will learn about specific criteria, guidelines, and regulations to ensure the quality, safety, and consistency of bee products, such as honey, beeswax, royal jelly, and propolis, as key factors for the standardization of bee-derived products what is essential for the protection of consumers, the promotion of fair trade, and the quality control.



Standardization and certification of bee-derived products

TRAINING CONTENT:

1. Standardization of bee-derived products
 - International standards
2. Facets of standardization of bee-derived products
3. Certification of bee-derived products



Standardization and its aspects for bee-derived products

STANDARDIZATION OF BEE-DERIVED PRODUCTS – a set of specific criteria, guidelines, and regulations to ensure the quality, safety, and consistency of these products. Standardization is essential for the protection of consumers, the promotion of fair trade, and the quality control of bee-derived products. The specific standards and regulations for bee-derived products can vary by country and region, but they are generally intended to protect both consumers and producers while promoting the integrity of these valuable natural products. Compliance with established standards can help consumers make informed choices and build trust in the market for bee-derived products.



Facets of standardization of bee-derived products

1. Quality (composition criteria) standards
2. Labeling requirements
3. Traceability
4. Bee-derived products certification



Facets of standardization of bee-derived products

The specific standards, and regulations for bee-derived products are described in various international standards, and international and national legal acts.

CODEX STAN 12-1981

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CODEX STANDARD FOR HONEY
CODEX STAN 12-1981¹

CODEX ALIMENTARIUS
INTERNATIONAL FOOD STANDARDS



E-mail: codex@fao.org - www.codexalimentarius.org

12.1.2002

EN

Official Journal of the European Communities

COUNCIL DIRECTIVE 2001/110/EC
of 20 December 2001
relating to honey

CAC/GL 32

GUIDELINES FOR THE PRODUCTION, PROCESSING, LABELLING AND MARKETING OF
ORGANICALLY PRODUCED FOODS

(GL 32 – 1999, Rev. 1 – 2001)

L 304/18

EN

Official Journal of the European Union

22.11.2011

REGULATION (EU) No 1169/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 25 October 2011

on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004

(Text with EEA relevance)

3.6.2014

EN

Official Journal of the European Union

L 164/1

I
(Legislative acts)

DIRECTIVES

DIRECTIVE 2014/63/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 15 May 2014
amending Council Directive 2001/110/EC relating to honey

20.1.2010

EN

Official Journal of the European Union

L 15/1

II
(Non-legislative acts)

REGULATIONS

COMMISSION REGULATION (EU) No 37/2010
of 22 December 2009
on pharmacologically active substances and their classification regarding maximum residue limits in feedstuffs of animal origin
(Text with EEA relevance)

L 10/47

29 Aralık 2011 PERŞEMBE

Resmî Gazete

Sayı : 28157 (3. Mükerrer)

YÖNETMELİK

Gıda, Tarım ve Hayvancılık Bakanlığından:

TÜRK GIDA KODEKSİ YÖNETMELİĞİ

BİRİNCİ BÖLÜM

Amaç, Kapsam, Dayanak ve Tanımlar

Quality standards of bee-derived products

QUALITY STANDARDS - the quality parameters that bee-derived products must meet. The quality criteria depends on type of bee-derived product. These criteria help maintain a consistent and high-quality product. Quality standards for bee-derived products, such as honey, beeswax, royal jelly, and propolis, are established to ensure the safety, authenticity, and quality of these products. These standards can vary by country or region, but there are some common quality criteria that are typically applied to bee products.



Quality standards of bee-derived products

Composition and quality requirements are clearly defined in international standards such as the Codex Alimentarius, The European Directive, the International Organization for Standardization (ISO), the USP Identity Standard for Honey, Turkish Food Codex notification on honey and guidelines of different trade and beekeeping associations.



Quality standards of bee-derived products

CODEX STAN 12-1981

CODEX STANDARD FOR HONEY
CODEX STAN 12-1981¹

HONEY QUALITY STANDARDS

The **Codex Alimentarius Commission** has established a specific standards for honey – **revised CODEX STAN 12-1981 (2001)** that provides guidelines for the quality, labeling, and packaging of honey. It covers aspects like moisture content, flavor, color, contaminants, labeling requirements, and more. CODEX STAN 12-1981 provides standards for all honeys produced by honey bees intended both for direct consumption and for industrial uses or as an ingredient in other foods.



PDF



Quality standards of bee-derived products

STANDARDS – revised CODEX STAN 12-1981 (2001) vs. European directive

2001/110/EC relating to honey

HONEY QUALITY (COMPOSITION CRITERIA) STANDARDS – revised CODEX

STAN 12-1981 (2001) vs. European directive 2001/110/EC relating to honey

Differences exist only in the provision regarding honey with a natural low content of enzymes and baker's honey.

Honey definition and types – blossom or nectare honey is the honey which comes from nectars of plants, while honeydew honey is the honey which comes mainly from excretions of plant sucking insects (*Hemiptera*) on the living parts of plants or secretions of living parts of plants.

Moisture content - to prevent fermentation a maximum moisture content, **not more than 20%**. Heather honey (*Calluna*) not more than 23%.



Quality standards of bee-derived products

STANDARDS – revised CODEX STAN 12-1981 (2001) vs. European directive

2001/110/EC relating to honey

HONEY QUALITY (COMPOSITION CRITERIA) STANDARDS – revised CODEX STAN 12-1981 (2001) vs. European directive 2001/110/EC relating to honey

Sugars content –

fructose and glucose content - not less than 60%, while honeydew honey, and its blends with blossom honey – not less than 45%.

sucrose content – for most of honey types not more than 5%, for some types of honey such as alfalfa (*Medicago sativa*), false acacia (*Robinia pseudoacacia*) 10%, and for lavender (*Lavandula spp*), borage (*Borago officinalis*) – not more than 15%.



Quality standards of bee-derived products

STANDARDS – revised CODEX STAN 12-1981 (2001) vs. European directive

2001/110/EC relating to honey

Color and appearance - depending on the type of honey should meet specific color and clarity criteria. Colour ranges from from nearly colourless to dark browns. The consistency can be fluid, viscous or partly to entirely crystallised.

Flavor and aroma - flavor and aroma of honey should be associated with its botanical and/or geographical origin. Honey shall not have any objectionable matter, flavour, aroma, or taint absorbed from foreign matter during its processing and storage.



Quality standards of bee-derived products

STANDARDS – revised CODEX STAN 12-1981 (2001) vs. European directive

2001/110/EC relating to honey

Free from contamination – presence of contaminants, such as antibiotics, pesticides, and heavy metals in honey is not allowed.

Pollen analysis - to confirm its botanical origin some standards require the identification and quantification of pollen in honey.



Quality standards (composition criteria) of honey

(source: Thrasyvoulou A. et al. 2018)

Directive 2001/110 EU

Composition criteria	Blossom honey		Honeydew honey* general	Revised CODEX 2011
	General	Exceptions		
Moisture; %	<20	<i>Calluna</i> and baker's honey <23; baker's honey from <i>Calluna</i> <25	<20	The same. No indication for baker's honey.
Fructose+glucose; %	>60	-	>45	The same.
Sucrose; %	<5	robinia, medicago, banksia, hedysarum, eucalyptus, <i>Eucryphia spp</i> , and citrus <10; lavandula, borago <15	<5	The same.
Water-insoluble; %	<0,1		<0,1	The same.
Electrical conductivity; mS/cm	<0,8	chestnut, arbutus, erica, eucalyptus, tilia, calluna, manuka, melaleuca	<0,8	The same.
Free acid; meq/kg	<50	baker's honey <80	<50	The same.
Diastase activity; DN**	>8	baker's honey and honey with low natural enzyme content: >3 when HMF is less than 15 mg/kg	>8	Honeys with low natural enzyme content: > 3 DN.
HMF; mg/kg**	<40	baker's honey honeys of tropical climate and blends of these honey <80	<40	Honeys of tropical climate and blends: < 80.

Quality standards of bee-derived products

DISPARITIES BETWEEN EUROPEAN DIRECTIVES, CODEX,
AND NATIONAL LAWS

Countries with fully
harmonized national
quality standards
(composition criteria) with
EU legislation.



Bulgaria



Slovenia



England



Switzerland



France



Cyprus



Spain



Malta



Quality standards of bee-derived products

DISPARITIES BETWEEN EUROPEAN DIRECTIVES, CODEX, AND NATIONAL LAWS AND GUIDELINES OF PROJECT PARTNER COUNTRIES* (source: Thrasyvoulou A. et al. 2018)



Poland

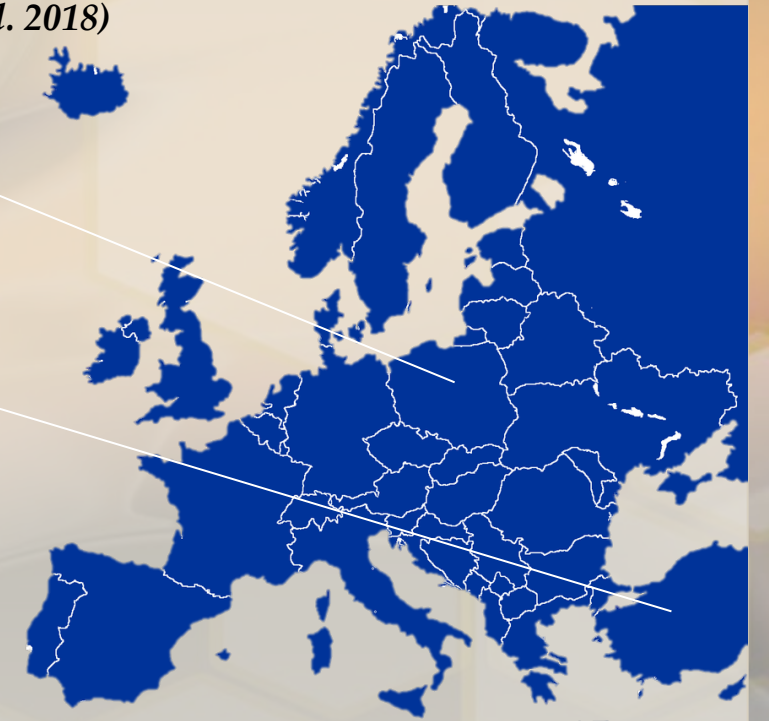
provisions: electrical conductivity mS/cm – 1 0.2–0.6 fl, 0.6–0.8 fl+hd (natural mixed), >0.8 hd deciduous trees, >0.95 hd coniferous; proline >250 mg/kg; HMF <30 mg/kg; acidity >10–50 meq/kg



Türkiye

provisions: fru/glu ratio 0.9 – 1.4 fl, 1.0–1.85 castanea, 1.2–1.85 acacia, 1.0–1.65 thyme, 1.0–1.4 hd; difference between protein and honey delta C13 –1.0 or more positive; C4 sugars ratio calculated from difference between protein and honey delta C13 (max) <7%; prolin>300 mg/kg, >180 mg/kg canola, lime, citrus, lavender, eucalyptus honeys, >120 mg/kg rosemary, acacia honeys, >180 mg/kg bakery honey; sucrose <5%, <10% hd P. brutia and P. pinea; fru/glu 1.0–1.4; water-insoluble solids <0.1%; free acidity <50 meq/kg ; electrical conductivity <0.8 mS/cm, >0.8 mS/cm mixture of chestnut and hd; naphthalene <10 µg/kg

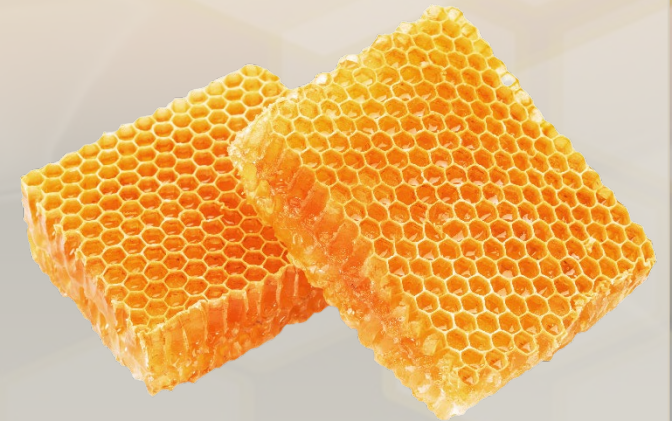
* fl – floral honey, hd – honeydew honey



Quality standards of bee-derived products

BEESWAX QUALITY STANDARDS

The process of creating and upholding particular quality standards and requirements for beeswax goods in order to guarantee consistency, quality, and safety is known as "**beeswax standardization.**" For a number of businesses that use beeswax, including food, medicine, cosmetics, and candle manufacturing, standardization is crucial.



Quality standards of bee-derived products

BEESWAX QUALITY STANDARDS

The quality standards for beeswax are provided by FAO (2005) as set of guidelines and Commission Regulation (EU) No 231/2012 of 9 March 2012 laying down specifications for food additives listed in Annexes II and III to Regulation (EC) No 1333/2008 of the European Parliament and of the Council Text with EEA relevance – (click on the below icons to make you familiar with the detailed information in English about quality parameters of beeswax).



Food and Agriculture
Organization of the
United Nations



World Health
Organization

**Joint FAO/WHO Expert Committee
on Food Additives (JECFA)**



EUR-Lex

COMMISSION REGULATION (EU) No 231/2012

of 9 March 2012

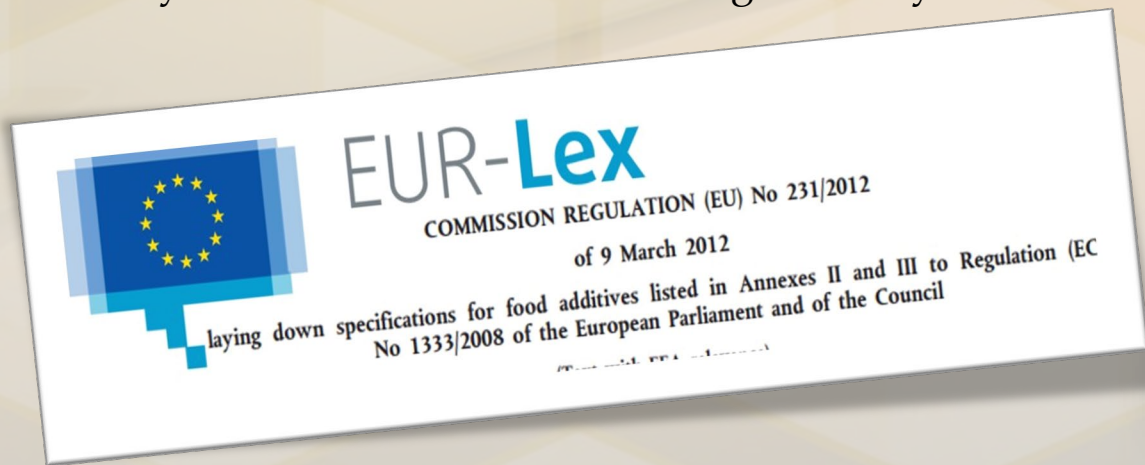
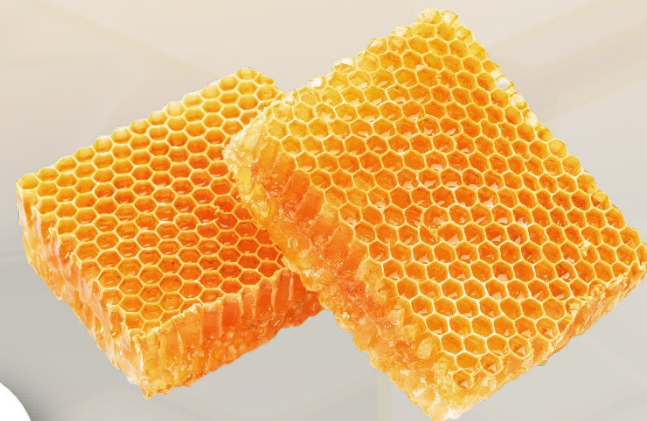
laying down specifications for food additives listed in Annexes II and III to Regulation (EC) No 1333/2008 of the European Parliament and of the Council

(Text with EEA relevance)

Quality standards of bee-derived products

BEESWAX QUALITY STANDARDS

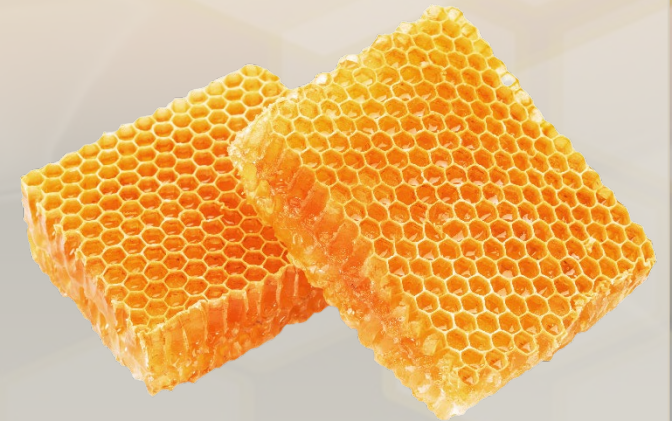
Commission Regulation (EU) No 231/2012 of 9 March 2012 laying down specifications for food additives listed in Annexes II and III to Regulation (EC) No 1333/2008 of the European Parliament and of the Council Text with EEA relevance is available in project partner languages, except in Turkish (click on the below icons to make you familiar with the text of legal act in your mother language)



Quality standards of bee-derived products

BEESWAX QUALITY STANDARDS

The age of the wax, the type of bees, and the climate where it is produced all have an impact on the composition of beeswax. Physical-chemical characteristics like **melting point, density, acid value, saponification value, ester value, iodine adsorption number, and peroxide value** can be used to assess the validity of **beeswax**. European Food Safety Authority (EFSA, 2020) recommended **at least two physico-chemical parameters** accompanied with advanced analytical methods to test beeswax purity and quantification of beeswax adulterants (to see the technical report click the below icon).



Quality standards of bee-derived products

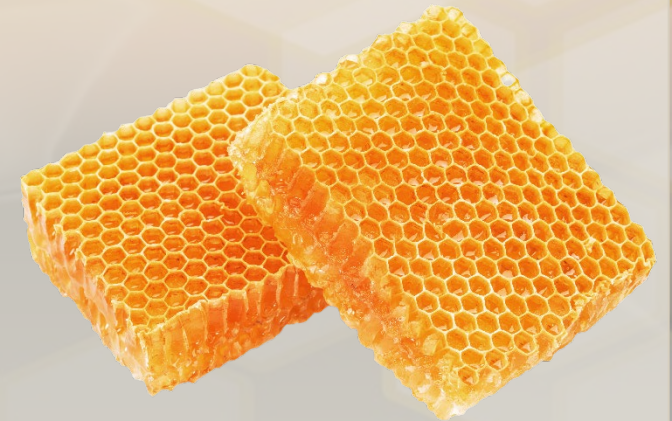
BEESWAX QUALITY STANDARDS

Texture - smooth and uniform, free from graininess

Impurities - free from foreign materials, e.g. synthetic additives, pesticides, molds, fungal or bacterial contamination.

Crude ash content - low

Acidity - neutral pH, typically around 7.0.



Quality standards (composition criteria) of beeswax

(source: Bogdanov, 2016)

Parameter	FAO (2005)	231/2012/EC (2012)	IHC (2016)
Moisture; %	-	-	Not more than 1%
Melting range; °C	62 - 65	62 - 65	61 - 65
Specific gravity; $D_{20/20}$	-	~0,96	-
Refractive index; 75 °C	-	-	1,4398 - 1,4451
Solubility	insoluble in water, sparingly soluble in alcohol, very soluble in ether	insoluble in water, sparingly soluble in alcohol, very soluble in chloroform and ether	
Acid value; mg KOH/g	17 - 24	17 - 24	17 - 22
Saponification value; mg KOH/g	87 - 104	87 - 104	87 - 102
Ester value; mg KOH/g	-	-	70 - 90
Ester/acid ratio	-	-	3,3 - 4,3
Peroxide value (mM H ₂ O ₂ /kg)	Not more than 5	Not more than 5	

Quality standards (composition criteria) of beeswax

(source: Bogdanov, 2016)

Parameter	FAO (2005)	231/2012/EC (2012)	IHC (2016)
Glycerol and other polyols	Not more than 0,5 % (as glycerol)	Not more than 0,5 % (as glycerol)	Absent
Carnuba wax	Test*	No information	Absent
Ceresin, paraffins and other waxes	Test*	Test*	Absent
Fats, Japan wax, resin and soaps	Test*	Test*	Absent
Arsenic	-	Not more than 3 mg/kg	-
Lead	Not more than 2 mg/kg	Not more than 2 mg/kg	-
Mercury	-	Not more than 1 mg/kg	-

* To learn more about the chemical tests for the presence of individual undesirable compounds click below icons

(FAO, 2005 pp.12-13; 231/2012/EC, 2012 pp. 251)



Food and Agriculture
Organization of the
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World Health
Organization

Joint FAO/WHO Expert Committee
on Food Additives (JECFA)



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(Text with EEA relevance)

Quality standards of bee-derived products

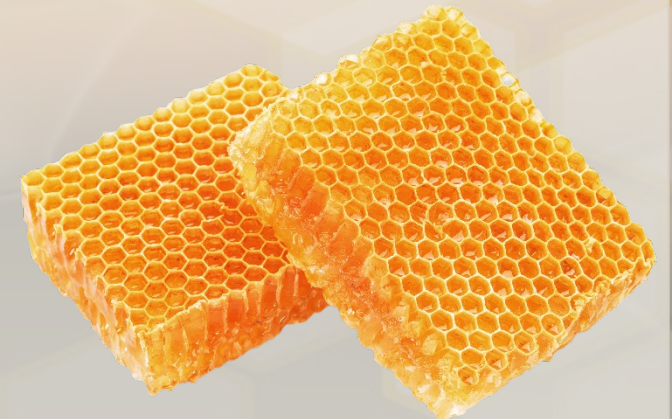
BEESWAX QUALITY STANDARDS - ADULTERANTS

PARAFFIN - most widely used due to its low price, availability, and physico-chemical properties - chemically inert, colourless and odourless.

STEARIN/STEARIC ACID

PALMITIN

TALLOW



Pesticides and veterinary drug residues – recommended limits in beeswax

(source: FAFSC (2018))

CONTAMINANTS	LIMITS	CONTAMINANTS	LIMITS
Acrinathrin	< 0.6 mg/kg	Deltamethrin	< 0.1 mg/kg
Amitraz	< 400 mg/kg	Flumethrin	< 1.5 mg/kg
Carbofuran	< 0.4 mg/kg	Imidacloprid	< 0.03 mg/kg
Chlorpyrifos(-ethyl)	< 2 mg/kg	Lindane	< 0.09 mg/kg
Coumaphos	< 40 mg/kg	Mevinphos	< 0.2 mg/kg
Cyfluthrin	< 0.06 mg/kg	Pyridaben	< 1.5 mg/kg
Cypermethrin	0.3 mg/kg	Tau-fluvalinate	< 20 mg/kg
DDE	< 40 mg/kg	Thiamethoxam	< 0.04 mg/kg
DDT	< 40 mg/kg	Thymol	< 2 mg/kg



Quality standards of bee-derived products

BEE VENOM QUALITY STANDARDS

Since bee venom is not recognized as an official drug or food, there are no official quality standards for it.

Bee venom as fresh basis should be a clear, odourless, watery liquid (~ 88% of moisture) when dried – light yellow powder.

The **chemical purity** may be assessed as a quantitative analysis of more stable or easily measurable components of bee venom, primarily two proteins: melittin (~50% of DM), and phospholipase A2 (10-12%).



Quality standards of bee-derived products

BEE VENOM QUALITY STANDARDS

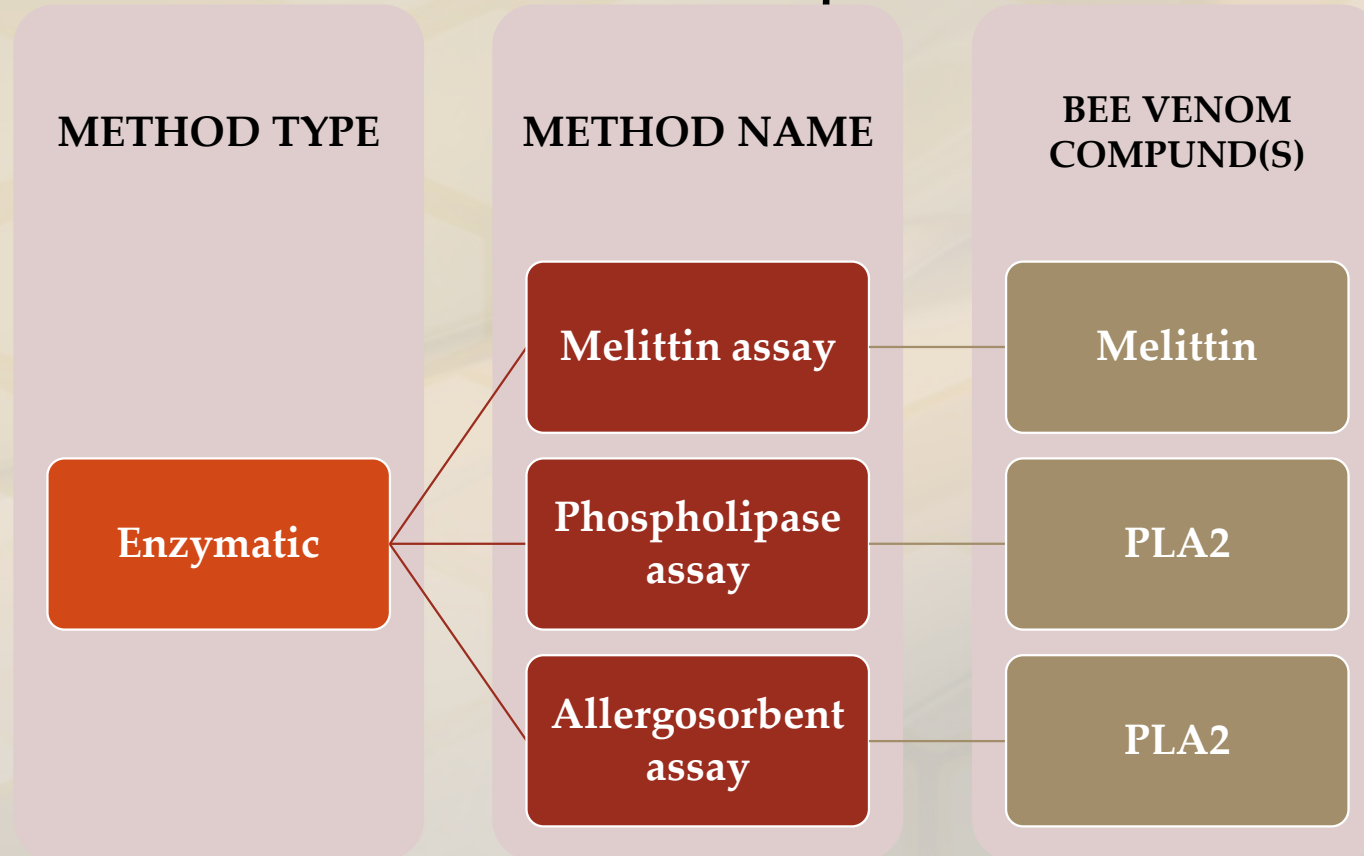
The Food and Drug Administration (FDA) of the United States states that venom preparation makers must provide evidence of enzymatic activity:

- **the hyaluronidase enzyme** must be present and exhibit enzymatic activity expressed in units per milliliter of solution (usually, the range is between 50 and 130 U/mL);
- **phospholipase** activity must be present, however it is determined with a straightforward plus/minus test.



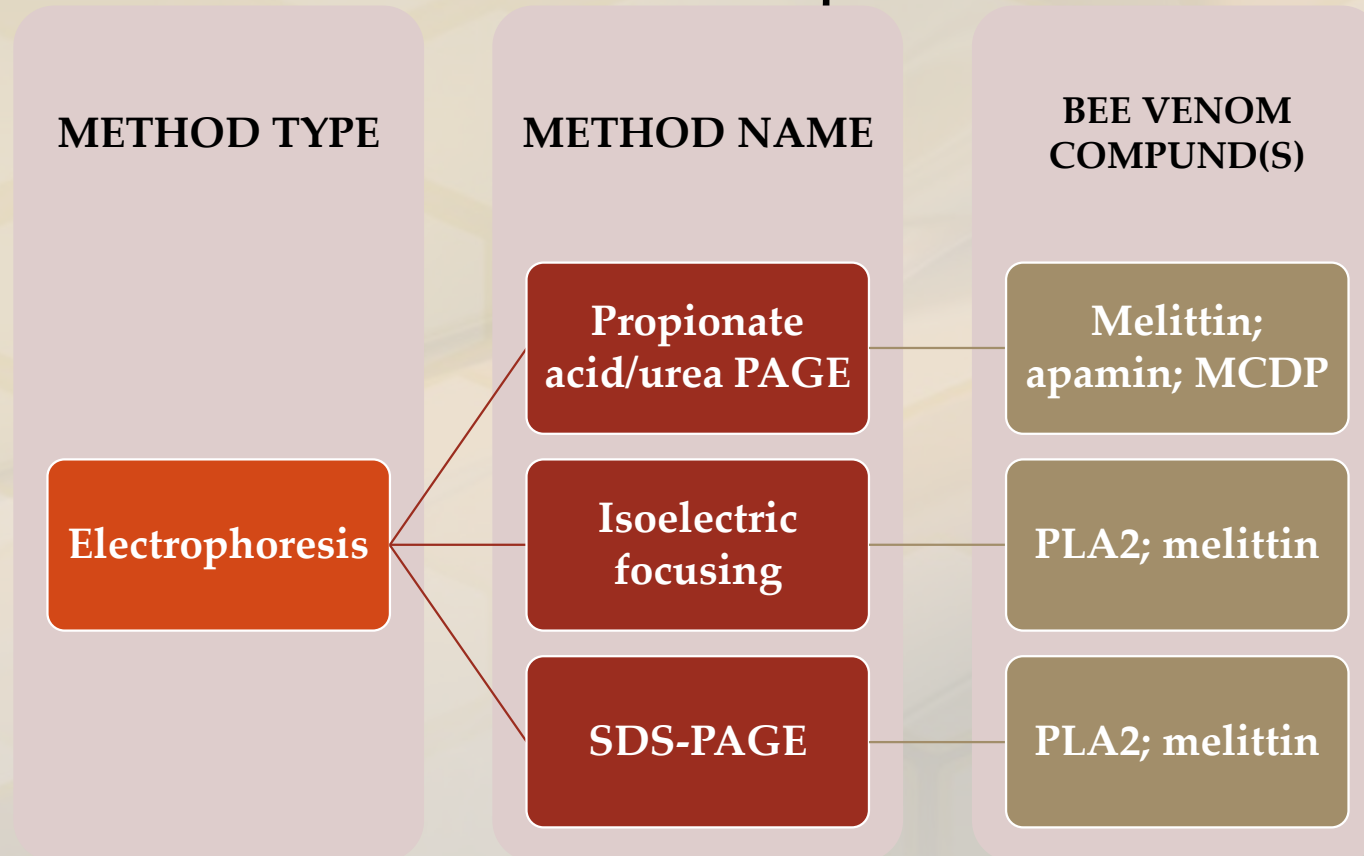
Quality standards of bee-derived products

Analytical procedures to determine bee venom components



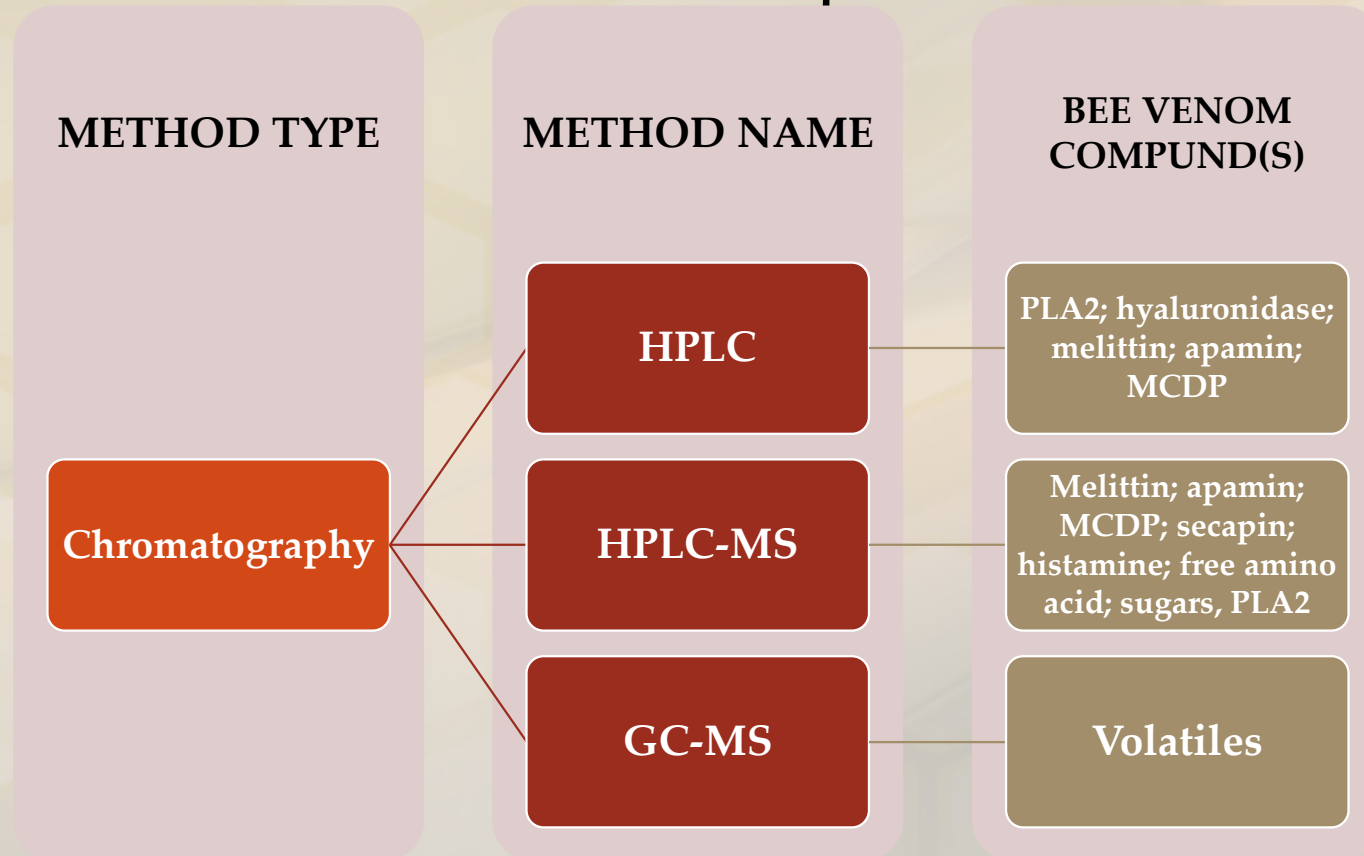
Quality standards of bee-derived products

Analytical procedures to determine bee venom components



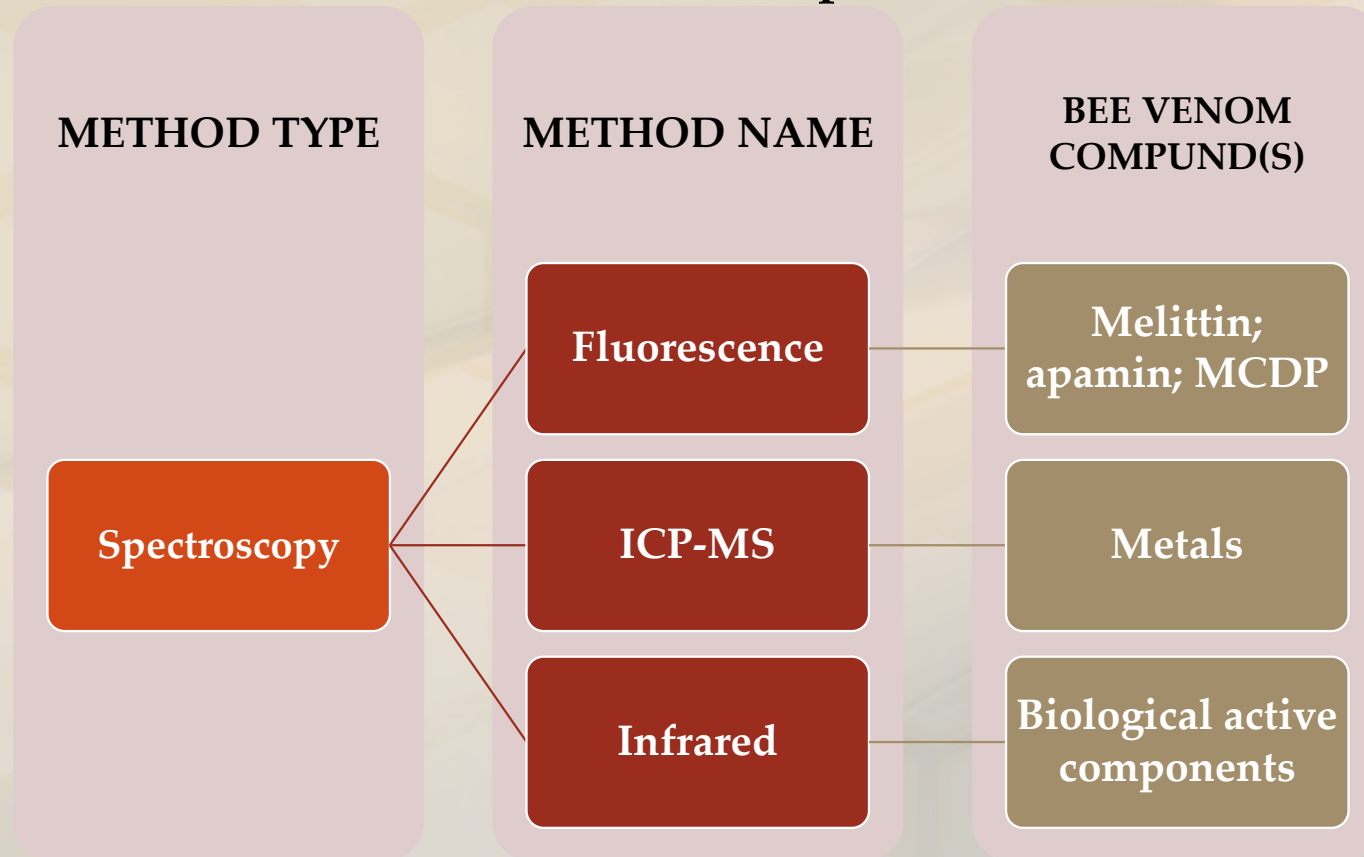
Quality standards of bee-derived products

Analytical procedures to determine bee venom components



Quality standards of bee-derived products

Analytical procedures to determine bee venom components



Quality standards of bee-derived products

POLLEN QUALITY STANDARDS

Official international pollen standards do not exist.

A standard for pollen quality has been proposed by the Swiss Food Manual (2003), which includes composition criteria of quality standards for:

- protein
- fat
- carbohydrates
- crude fiber
- minerals, and vitamins.



Quality standards of bee-derived products

POLLEN QUALITY STANDARDS

The best method to preserve nutritional value and the optimal biological value of pollen, is freezing of fresh pollen under nitrogen.

Most often pollen is dried. This process should be carried out at the temperature not higher than 40 °C (to avoid losses of volatile compounds) until the moisture content will be lower than 6%.



Quality standards of pollen

(source: Swiss Food Manual, 2003)

Analysis	Quality criteria
Sensory parameters	No visible contaminants, typical flavour and taste
Microscopic examination	Origin test (geographical, botanical)
Microbial examination	Bacterial load should be within legal hygienic limits
Chemical examination	Moisture content not more than 6% of DM
Contamination	Heavy metals, pesticides*



*Pollen should be harvested in areas located at least 3 km from contamination source e.g. pesticide-treated agricultural areas.

Pollen quality criteria

(source: Swiss Food Manual, 2003)

COMPONENT	CONTENT (% of DM)	
	minimum	maximum
Carbohydrates	13	55
Protein	10	40
Ether extract	1	10
Dietary fibre	0,3	20
Minerals	0,05 0,3	0,3
Vitamins	0,002	0,01
Flavonoid glycosides	0,004	0,3



Quality standards of bee-derived products

ROYAL JELLY QUALITY STANDARDS

Royal jelly specification is described in ISO 12824:2016 standard.

Physical parameters	Quality criteria
Consistency	semi-fluid, homogeneous, gelatinous substance
Colour	whitish or beige
Taste	acidic
Flavour	pungent, phenolic
Density	1,1 g/cm ³



Quality standards of bee-derived products

ROYAL JELLY QUALITY (COMPONENT CRITERIA) STANDARDS (source: ISO 12824:2016 standard)

COMPONENT	Unit	CONTENT	
		minimum	maximum
Moisture		62,0	63,5
0-hydroxy-2-decenoic acid (10-HDA)		1,4	
Protein		11	18
Total sugar		7	18
Fructose		2	9
Glucose	% of fresh material	2	9
Sucrose			<3,0
Erlose			<0,5
Maltose			<1,5
Maltotriose			<0,5
Total lipid		2	8
Total acidity [1mol/l NaOH]	ml/100g	30	53



Quality standards of bee-derived products

ROYAL JELLY QUALITY STANDARDS – MICROBIAL STANDARDS

(source: ISO 12824:2016 standard)

Microorganism	Unit	Limits	Analytical reference method
Colony count Pathogenic bacteria	CFU*/g	< 500	ISO 4833-1
Enterobacteriaceae	CFU/g	0/10g	ISO 21528-2
Salmonella	CFU/g	0/25g	ISO 6579

*CFU – colony-forming unit



Quality standards of bee-derived products

ROYAL JELLY QUALITY STANDARDS

One of the most relevant quality indicator for routine testing of royal jelly authenticity is **content of 10-hydroxy-2-decenoic acid (10-HDA) called queen bee acid.**

The optional quality parameter determining the freshness of royal jelly is **furosine** – an indicator of chemical alteration referred to exposure to high temperatures and time.

Very important indicators of royal jelly quality testing are **the stable isotopes** of the elements carbon and nitrogen in order to detect adulteration with sugary syrups.



Quality standards of bee-derived products

PROPOLIS QUALITY STANDARDS

Depending on geographical region, season, forage, and method of extraction, more than 800 different phytoconstituents in various concentrations have been recognized in propolis and propolis extract samples. Unfortunately, there is no available literature reports demonstrating whether the specific therapeutic potential of propolis is associated with a certain chemical entity. Therefore, still there is a need to adapt more detailed quality control strategy for propolis standardization.



Quality standards of bee-derived products

PROPOLIS QUALITY STANDARDS

There are two main types of propolis traded internationally – brown (Populus), green (Baccharis), In scientific literature, the most widely reported types of propolis, besides two mentioned above, is also red propolis. This standard considers the complex chemical composition of propolis, and the influences geographical and plant species variation, and honey bee sub-species have on the proximate, flavonoid, and phenolic composition of propolis.



Quality standards of bee-derived products

PROPOLIS QUALITY STANDARDS

Since propolis is a plant-derived product of bees, standardizing it requires a similar approach to that of medicinal plants: determining the concentration of physiologically active ingredients. Since each variety of propolis has a unique chemical profile, it is evident that there can be no common chemical criteria for standardization and quality control in this area.

The standard for propolis/propolis extracts shall include the complex chemical composition of propolis, and the influences geographical and plant species variation, and honey bee sub-species have on the proximate, flavonoid, and phenolic composition of propolis.



Quality standards of bee-derived products

PROPOLIS QUALITY STANDARDS – MAIN TYPES

South American red type propolis – rich in isoflavans, isoflavons and pterocarpan (vestitol medicarpin, neovestitol, 7-O-methylvestitol)

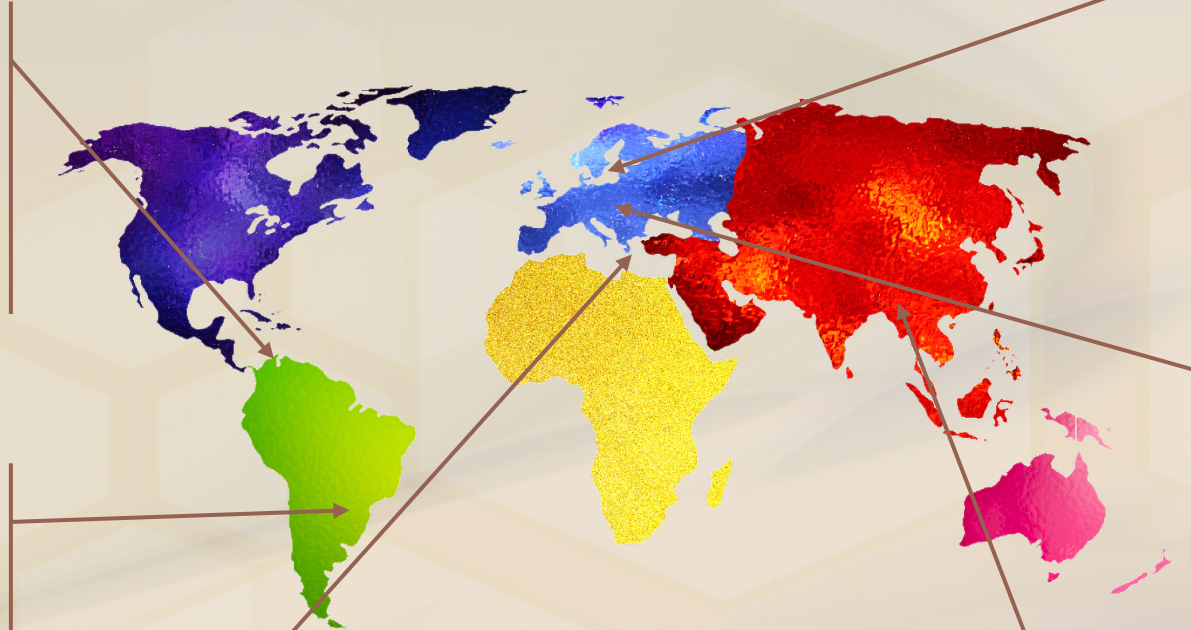
Brazilian green type propolis – rich in phenolic acids, prenylated phenolic acids and flavonoids (artepillin C, drupanin, p-coumaric acid and dihydrocinnamic acid)

Mediterranean type propolis – rich in diterpenes (isocupressic acid, pimaric acid, agathadiol, isoagatholal and totarol) – usually does not contain flavonoids and phenolic acids.

Aspen type propolis – rich in p-coumaric, ferulic, and benzoic acids, benzyl p-coumarate and benzyl ferulate.

Poplar type propolis – rich in flavonoids, phenolic acids and their esters (pinocembrin, chrysin, galangin, pinobanksin, and pinobanksin 3-acetate)

Mangifera indica type propolis – rich in phenolic lipids: cardanols, cardols and anacardic acid derivatives, (heptadecenyl-recorcinol, nonadecenyl-recorcinol, nonadecyl-anacardic acid and heptadecenyl-anacardic acid.



Quality standards of bee-derived products

PROPOLIS TYPES - BOTANICAL SOURCES

South American red type propolis
Dalbergia ecastophyllum



Aspen type propolis
Populus tremula



Brazilian green type propolis
Baccharis dracunculifolia



Poplar type propolis
Populus nigra



Mediterranean type propolis
Cupressus sempervirens



Mangifera indica type propolis
Mangifera indica



Quality standards of bee-derived products

PROPOLIS QUALITY STANDARDS FOR ALL TYPES OF PROPOLIS*

(source: IHS)

Parameter	Value
Content of matter soluble in 70% ethanol (balsam content)	Not less than 45%
Wax content	Not more than 40% (<i>Stan et al., 2011</i>)
Water content	Not more than 8%
Mechanical impurities	Not more than 6%
Ash content	Not more than 5%

*Brazilian legislation for Brazilian green propolis recommends a minimum of 35% ethanol extractable substances and a maximum of 25% wax.



Quality standards of bee-derived products

PROPOLIS QUALITY STANDARDS

The International Honey Commission (IHC) recommends the values for the concentration of biologically active constituents for the two most wide-spread propolis types i.e. **European poplar type propolis** - Poplar type, and **Brazilian green propolis** - Baccharis type (source: Bankova et al., 2016).



Propolis type	Bioactive component	Minimum % of raw propolis	Reference
Poplar propolis	Total phenolics	21	(Popova et al., 2004)
	Total flavones and flavonols	4	(Popova et al., 2004)
	Total flavanones and dihydroflavonols	4	(Popova et al., 2004)
Brazilian green propolis	Total phenolics	5	(Sawaya et al., 2011)
	Total flavonoids	0,5	(Sawaya et al., 2011)

Bee-derived product certifications

TYPES OF CERTIFICATIONS

1. ORGANIC CERTIFICATION
2. PROTECTED DESIGNATION OF ORIGIN (PDO)
3. PROTECTED GEOGRAPHICAL INDICATION (PGI)
4. TRADITIONAL SPECIALITY GUARANTEED (TSG)
5. QUALITY/SAFETY STANDARDS CERTIFICATION
6. NON-GMO CERTIFICATION ?



Bee-derived product certifications

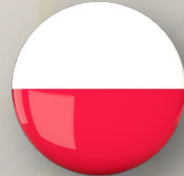
ORGANIC CERTIFICATION

Organic certification of bee-derived products, such as honey, beeswax, and propolis, involves ensuring that these products are produced in accordance with organic farming and processing standards. Organic beekeeping practices aim to minimize the use of synthetic chemicals and promote sustainable and environmentally friendly methods. To achieve organic certification for bee-derived products, producers and beekeepers must adhere to specific guidelines and standards, which may vary by country or certifying body. In EU the standards of organic beekeeping are described in Regulation 848/2018 on organic production and labelling of organic products (click the icon below).



Bee-derived product certifications

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Bee-derived product certifications

ORGANIC CERTIFICATION - STANDARDS

APIARY LOCATION AND MANAGEMENT - organic beekeeping often requires that the apiary is located in an area where bees can forage on organic flowering plants and crops. Bees should not be exposed to synthetic pesticides or genetically modified crops. For organic beekeeping, preference shall be given to the use of *Apis mellifera* and their local ecotypes.

HIVE MATERIALS - the materials used in beehives, such as wooden frames and foundation, should meet organic standards and not be treated with synthetic chemicals.



Bee-derived product certifications

ORGANIC CERTIFICATION - STANDARDS

BEE FEEDING - organic beekeeping emphasizes the use of organic feed for bees when necessary. This feed should be free from synthetic chemicals and genetically modified organisms (GMOs). At the end of the production season hives shall be left with sufficient reserves of honey and pollen for the bees to survive the winter; bee colonies may only be fed where the survival of the colony is endangered due to climatic conditions. In such case, bee colonies shall be fed with organic honey, organic sugar syrups, or organic sugar.



Bee-derived product certifications

ORGANIC CERTIFICATION - STANDARDS

BEE HEALTH AND WELFARE - for the purposes of protecting frames, hives and combs, in particular from pests, only rodenticides used in traps, and appropriate products and substances authorised for use in organic production shall be permitted. Beehives may be disinfected with physical treatments such as steam or direct flame. The male brood may be destroyed only for the purpose of isolating the infestation of Varroa destructor. In cases of infestation with Varroa destructor formic acid, lactic acid, acetic acid and oxalic acid, as well as menthol, thymol, eucalyptol or camphor, may be used.



Bee-derived product certifications

ORGANIC CERTIFICATION - STANDARDS

PROCESSING AND HANDLING - the processing and handling of bee-derived products should also follow organic guidelines. This includes using organic-approved equipment and avoiding the use of synthetic additives in processing.

CERTIFYING BODIES - organic bee products are typically certified by accredited organic certification bodies or agencies. These organizations inspect and verify that the beekeeping and processing operations comply with organic standards.



Bee-derived product certifications

PROTECTED DESIGNATIONS OF ORIGIN (PDO)

Product names registered as PDO are those that have the strongest links to the place in which they are made.

Products: food, agricultural products and wines.

Specifications: The entire process of production, processing, and preparation needs to happen in that particular area. This implies that for wines, the grapes must only be sourced from the region in which the wine is produced.

Example: The first cross-border Polish product is honey from the Sejny region/Lazdijų/Lazdijų krašto medus; producers from both Poland and Lithuania jointly submitted for registration!

Labeling is required food and agricultural products, optional for wine.



Bee-derived product certifications

PROTECTED GEOGRAPHICAL INDICATION (PGI)

PGI highlights the connection between the product's name and its particular geographic location, where a product's reputation, quality, or other attribute can be primarily traced back to its place of origin.

Products: food, agricultural products and wines.

Specifications: The majority of items go through at least one stage of preparation, processing, or manufacture locally.

Example: Polish types of honey protected under this scheme include Drahim honey, Kurpie honey and heather honey from the Lower Silesian Forest.

Labeling is required food and agricultural products, optional for wine.



Bee-derived product certifications

TRADITIONAL SPECIALITY GUARANTEED (TSG)

Traditional speciality guaranteed (TSG) is a European quality seal given to goods with historic names that highlight the goods' distinctive qualities. Goods bearing the TSG mark must be produced using conventional raw materials or according to a customary recipe that has been passed down through the generations. A product's name that has been registered as a TSG guards against abuse and misrepresentation.

Products: food and agricultural products.

Examples: Polish items with the TSG mark include półtorak, dwójniak, trójniak, and czwórniak, which are variations of mead.

Labeling is required for every product.



Bee-derived product certifications



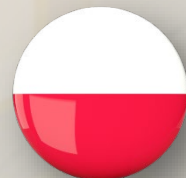
QUALITY/SAFETY STANDARDS - CERTIFICATION

FDA

IFS

ISO 9001EN - 2015 Quality management systems – Requirements

ISO 2005, Halal i Kosher



Bee-derived product certifications



NON-GMO CERTIFICATION - STANDARDS

Given that all food products may include traces of genetically modified organisms, the FDA discourages the use of the label "GMO Free." There are GMO labeling thresholds set by the European Union, Australia, and other nations. **According to the EU legislation, every food product with a GMO composition of more than 0.9% must list the GMO ingredient on the label** (to see the text of the regulation click pls below icon – there is no Turkish translation).



Bee-derived product certifications

NON-GMO CERTIFICATION - STANDARDS

The amount of pollen in honey ranges from about 0.1% to 0.4%. GMO markers may only be found in protein and its average content in pollen is 0,2%. Therefore, any evidence of GMOs in honey will be much below the 0.9% threshold that has been set by nations all around the world to require GMO labeling.

Because the amount of GMOs in honey never goes beyond this limit, honey does not need to be designated or labeled as a non-GMO food. While honey, like most other foods, **may not be totally free of genetically modified organisms**, it nevertheless **meets the criteria for non-GMO food set by the European Union, Australia, and other nations**. That case non-GMO certificate in case of honey is only a marketing trick!



Bee-derived product certifications

OTHER CERTIFICATIONS

Halal certified - the food, cosmetic, and pharmaceutical industries can all benefit from halal certification, which verifies that a product is made entirely in accordance with Islamic law, contains no "forbidden" ingredients, and has never come into contact with any materials or items deemed "impure."

Kosher certified - a rabbinic agency's seal of kosher approval, known as a Kosher Certification, attests to their having examined the product's ingredients, manufacturing site, and actual production to make sure that no traces of non-kosher materials are present in any of the ingredients, derivatives, equipment, or instruments. Customers are reassured by the Kosher Certified sign that the product itself and its manufacturing process meet all Kosher Law regulations.



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To know more about the project, please visit our website
<https://www.medibeeb.eu/>



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FROM THE MINISTRY OF FOOD, AGRICULTURE AND
LIVESTOCK:

BEEKEEPING REGULATION



2021-1-TR01-KA220-VET-000034632

FIRST SECTION

Purpose, Scope, Basis and Definitions

PURPOSE

ARTICLE 1:

(1) The purpose of this Regulation; Breeding in beekeeping, research, detection of genetic resources, conservation, breeding, artificial insemination, creation of new lines, import and export of breeding material, determination and dissemination of the basic principles of queen bee breeding for commercial purposes and taking measures to protect bee health.

SCOPE

ARTICLE 2:

(1) This Regulation; All kinds of production related to beekeeping, breeding, obtaining breeding material, determining the principles of fixed and migratory beekeeping, taking the necessary precautions regarding bee health and transportation, standardization of tools, machines and materials, training, project planning, development of honey plants agriculture, queen bee breeding, It covers artificial insemination in honey bees.

BASIS

ARTICLE 3:

(1) This Regulation; It was prepared based on the Decree Law on the Organization and Duties of the Ministry of Food, Agriculture and Livestock No. 639 dated 3/6/2011 and the Veterinary Services, Plant Health, Food and Feed Law No. 5996 dated 11/6/2010.

DEFINITIONS

- a) **Queen Bee Producer:** Persons or legal entities who have a Queen Bee Breeder Certificate and who produce and sell queen bees from breeding queen bees,
- b) **Queen Bee Production:** Raising and breeding queen and drone bees from different colonies selected as breeding stock using the grafting technique,
- c) **Beekeeper:** Those who adopt beekeeping as a profession and earn their living partially or completely by this way,
- d) **Beekeeping:** The actual work done on bees and bee products, using the bee as living material.
- e) **Beekeeping Registration System (AKS):** The Ministry's registration system in which information about tagged hives is recorded, monitored and reported in a central database,

DEFINITIONS

(1) Mentioned in this Regulation;

f) Beekeeper identity card: The document containing the beekeeper's information given to its members by the central unions,

g) Bee Accommodation Certificate (AKB): The document received by the beekeeper to stay outside the province/district where he is registered,

h) Apiary: Open or closed facilities and areas where beehives and equipment are located,

i) Bee products: Honey, pollen, beeswax, propolis, royal jelly, bee venom, produced as a result of beekeeping activities.

j) Ministry: Ministry of Food, Agriculture and Livestock,

k) Union: Beekeeper organizations operating within the framework of the Veterinary Services, Plant Health, Food and

DEFINITIONS

l) Mobile beekeeper: A beekeeper who moves his colonies in order to benefit from the different flowering periods of plants and to protect his bees from winter conditions.

m) Provincial directorate: Provincial directorate of the Ministry of Food, Agriculture and Livestock,

n) District directorate: District directorate of the Ministry of Food, Agriculture and Livestock,

o) Business identification number: The number given by the provincial/district directorate for each business defined in the Turkvet registration system,

p) Isolated zone: The mating zone area, determined by the Ministry and with a radius of at least 15 km, containing only pure breed, ecotype or colonies forming the paternal line of the hybrid to be produced, free from foreign colonies and closed to outside bee entry,

q) Colony: A family of 6-8 or more framed bees, with 3-4 open and closed broods, which has an egg-laying queen and where production activities are carried out,

r) Accommodation capacity: The amount of beehives that can be kept in a unit area without reducing the productivity of existing colonies, taking into account the flora and ecological conditions in a region,

s) Hive: Portable bee family shelter,

t) Pollination: The fertilization of flowering plants is carried out by honey bees,

u) Permanent beekeeper: A beekeeper who keeps his colonies in the place where he is registered in the Turkvet Registration System with his Business Identification Number throughout the year,

v) Artificial insemination: Taking the sperm of a bee that has reached mating maturity and introducing it into the reproductive tract of a queen bee that has reached mating maturity, with the help of a tool.

w) Basic honeycomb: Wax sheets of standard sizes, sterilized from pure beeswax and manufactured according to its technique,

x) TSE: Turkish Standards Institute,

y) Turkvet registration system: It refers to the database created by the Ministry's General Directorate of Food and Control within the framework of the Regulation on Identification, Registration and Monitoring of Bovine Animals, where the identity information of enterprises, breeders and bovine animals is recorded.

SECOND SECTION

Traveller Beekeeping

TRAVELLER BEEKEEPING

ARTICLE 5:

(1) MOVING BEEKEEPING ACTIONS ARE CARRIED OUT WITHIN THE FRAMEWORK OF THE FOLLOWING CONSIDERATIONS

- a) Provincial/district directorates are authorized for the placement of migratory beekeepers.
- b) Provincial and district directorates; accommodation and capacities of mobile beekeepers; It is determined by a commission of at least three people, consisting of two technical personnel experienced in beekeeping working in the provincial/district directorate and representatives of the union(s), taking into account the plant flora, topographic and ecological structure, and the presence of colonies of permanent beekeepers, if any, and these are marked on the map. While determining the capacities of forest regions, the representative of the Ministry of Forestry and Water Affairs also takes part in the commission. The region colony capacity is updated in case of significant changes in the presence of flora (climatic or opening of new locations).
- c) When determining colony capacity for regions, the presence of all nectar and pollen-yielding plants is taken into consideration.
- d) Apiaries are placed at least 150 meters apart in bee wintering areas, regardless of the flora capacity. However, when wintering in citrus areas, the distance between apiaries is arranged according to the flora capacity of the region and is at least 300 meters. The provincial/district directorate is authorized to determine the distance in special cases to the land.

TRAVELLER BEEKEEPING

- e) Migrant beekeepers who will stay in the designated area must make an agreement with the individual if the place they will stay in belongs to a real person, with the village headman if the land is a village land, with the authorities if the land belongs to other legal entities, and with the relevant units of the Ministry of Forestry and Water Affairs for the beekeepers who will stay in the state forests, after making an agreement with the relevant units of the Ministry of Forestry and Water Affairs. Section 1 of the Bee Accommodation Certificate (AKB) is signed.
- f) The beekeeper who determines his accommodation place and requests settlement permission applies to the AKB and the provincial/district directorate of the province where he will stay. If the accommodation location determined by the beekeeper is found appropriate by the provincial/district directorate, Section 2 of the AKB is approved. The beekeeper releases the AKB and obtains a Domestic Veterinary Health Report for Animal Shipments from the provincial/district directorate of the province in which he will depart and ships his bees based on these documents. The shipping address in the report and the accommodation address at AKB must be the same. A veterinary health report is not issued to a beekeeper who does not have an AKB. AKB is also requested from beekeepers who are wandering and return to their registered address and/or their own land to control and monitor bee movements.
- g) The bees of a beekeeper who settles without being shown a location and without documents are removed from their location by the local authority through the security forces upon the request of the provincial/district directorate. The provincial/district directorate files a criminal complaint against the occupiers to the Public Prosecutor's Office, in order to take action in accordance with Article 154 of the Turkish Penal Code No. 5237 dated 26/9/2004. The beekeeper is responsible for any damage that occurs during the removal process. Transportation and labor costs are collected from the beekeeper. If the provincial/district directorate deems the excuse appropriate for a beekeeper who is forced to land his bees outside the address for which he received permission due to force majeure, no penal action will be taken, and the beekeeper will be sent to the address for which he received permission in AKB within five days.

TRAVELLER BEEKEEPING

h) AKB transactions may be followed by third parties on behalf of the beekeeper.

i) No fee, including accommodation fee, is charged from the beekeeper by any muhtar's office or public institution or organization other than the land owners.

j) Settlement requests exceeding the colony capacity determined for the accommodation area are not allowed by the provincial/district directorates. However, in accommodation planning, provincial/district directorates only grant accommodation permissions above the regional colony capacity, in a way that does not victimize the last beekeeper.

k) Producers who engage in migratory beekeeping are obliged to take the necessary precautions to prevent bees from harming the environment in places where they stay. It is the responsibility of animal owners to take precautions to prevent the animals grazing in areas where bees are kept from being harmed by bees.

l) The names of the beekeepers and the people working with them, whose placement procedures have been completed, are notified to the security units of that locality in a list by the provincial/district directorates.

m) In order to identify bee genetic resources and protect them in situ, the Ministry determines the isolated areas in line with the decision of the commission to be formed as a result of scientific studies. The Commission, by the General Directorate of Livestock; It is formed with the participation of representatives from universities, unions and relevant institutions and organizations. Outside bee entry into isolated areas is prohibited. Provincial/district directorates submit a criminal complaint to the Public Prosecutor's Office for action in accordance with Article 154 of the Turkish Penal Code No. 5237, against those who enter the declared isolated area illegally.

TRAVELLER BEEKEEPING

- n) Apiaries are placed at least 200 meters away from the road in areas with heavy traffic and at least 30 meters away from stabilized secondary roads.
 - o) Beekeepers who practice migratory beekeeping place their bees outside residential areas in a way that does not disturb the environment. Stationary beekeepers, on the other hand, place their colonies in villages and towns in a way that does not disturb the environment and at least 200 meters away from similar areas such as mosques, schools, health centers, police stations, where people receive public services. In areas where settlements are dispersed, this distance should be at least 50 meters to the nearest house.
- p) Provincial/district directorates are authorized to resolve disputes arising from bee accommodation within the borders of residential areas and adjacent areas.
- q) In cases where the location of the apiary is approved by the commission, any negativities that may occur will not eliminate the beekeeper's responsibility.
- r) Procedures and principles regarding the permit of beekeepers who will stay in state forests, arrangement of bee accommodation, drinking water and transportation routes for bees are provided by the Ministry of Forestry and Water Affairs.
- s) Beekeeping activities in the Wildlife Protection and Development Areas declared in accordance with the Land Hunting Law No. 4915 dated 1/7/2003 are carried out within the framework of the Management and Development Plan Decisions prepared within the framework of the relevant legislation.
- t) The beekeeper must show his beekeeper ID card to prove that he is registered with the union, if requested by official officials.

THIRD SECTION

Basic Comb and Honey Standart

BASIC COMB

ARTICLE 6: (1) BASIC HOBBERs OFFERED ON THE MARKET MUST HAVE THE FOLLOWING FEATURES.

- a) The wax used in the production of basic honeycomb must be subjected to a sterilization process at 120 °C at 1 atmosphere pressure for 15 minutes or an equivalent sterilization process.
 - b) Foreign substances such as paraffin, ceresin, tallow, resin, oxalic acid and bleaches, which are not found in the natural structure of the wax, are not mixed into the base honeycomb.
 - c) Provincial directorates check the basic honeycomb production enterprises for compliance with the standards at least twice a year.
- (2) TSE standards are taken as basis until a regulation is made by the Ministry.

HONEY STANDART

ARTICLE 7:

- (1) Honey production standard is carried out within the framework of the relevant legislation.

FOURTH SECTION

**Queen Bee Breeding, Training and Artificial Insemination in
Bees**

QUEEN BEE BREEDING AND TRAINING

**ARTICLE 8: (1) IMPLEMENTATION
PROCEDURES AND PRINCIPLES OF
BREEDING QUEEN BEE, QUEEN BREEDING
AND TRAINING ARE DETERMINED BY THE
MINISTRY.**

(2) The Ministry organizes and organizes queen bee breeding courses in order to issue Queen Bee Breeding Certificates to beekeepers; It determines the procedures and principles regarding the organization of these courses, including course fees.

ARTIFICIAL INSEMINATION IN BEES

ARTICLE 9:

(1) Real and legal persons who will perform artificial insemination are given a certificate by the Ministry as a result of the training. Procedures and principles regarding artificial insemination are determined by the Ministry.

FIFTH SECTION

Honey Plants and Forest Management Plan

HONEY PLANTS

ARTICLE 10:

(1) Measures to develop and encourage honey plants cultivation and pollination are taken by the Ministry.

FOREST MANAGEMENT PLAN

ARTICLE 11:

- (1)) Cutting down of forest trees that can be used by bees is implemented within the framework of an appropriate management plan prepared by the Ministry of Forestry and Water Affairs.
- (2) Forest areas to be allocated for honey production; Determination of management plans, benefit time, duration, conditions, criteria for breeders who will receive priority in benefiting, and the number of hives to be placed per unit area are determined by the Provincial Directorates of the Ministry, the union and the relevant Regional Directorate of the Ministry of Forestry and Water Affairs.

SIXTH SECTION

Pest Control Measures

PEST CONTROL MEASURES

ARTICLE 12: (1) THE FOLLOWING ISSUES ARE FOLLOWED IN DISINFESTATION

- a)** To the extent of available possibilities, care is taken to locate beeyards away from areas where pesticides are applied.
- b)** Beekeepers in and around the areas where agricultural control will be carried out are notified seven days in advance by the organizations and individuals that will carry out the control, the width of the area included in the pesticide program, the type of pesticide to be used, the time of application, the duration of effect and its effect on honey bees.
- c)** Beekeepers receive information from the provincial/district directorates about the control programs in their region.
- d)** Plant protection products are applied as they are presented for use and in accordance with the recommendations stated on the label. In case of practices contrary to this, the responsibility belongs to the person who implements and allows it to be implemented.
- e)** Residual and packaging of used plant protection products must be disposed of appropriately by their users.

- f)** Liquid pesticides are primarily used to protect honeybees in agricultural control.
 - g)** During spraying, the sources where bees drink water are not contaminated with pesticides.
 - h)** Disinfestations are applied in the evening or early in the morning, when the bees are not flying
- (2)** Those who do not use plant protection products in accordance with the label information and those who do not destroy the waste and packaging of plant protection products in accordance with the principles determined by the Ministry will be subject to action in accordance with Article 39 of the Veterinary Services, Plant Health, Food and Feed Law No. 5996.
- (3)** By the Ministry; Regular training is provided to beekeepers, pesticide growers and pesticide applicators to ensure that bees are not affected by pesticides and to prevent possible harm.

SEVENTH SECTION

Log Allocation, Import and Export Permit

LOG ALLOCATION

ARTICLE 13:

(1) Timber allocation to private and legal persons and organizations that will manufacture hives is made by the Ministry of Forestry and Water Affairs.

IMPORT AND EXPORT PERMIT

ARTICLE 14:

(1) Timber allocation to private and legal persons and organizations that will manufacture hives is made by the Ministry of Forestry and Water Affairs.

EIGHTH SECTION

Bee Health, Inspection, Control and Registry

BEE HEALTH

ARTICLE 15:

(1)) In order to effectively and widely fight against bee diseases and pests, central unions and provincial unions carry out mass pesticide application within certain programs.

INSPECTION

ARTICLE 16:

- (1)** By the Ministry; Breeding queen bees produced by real and legal persons and their work on queen bee breeding and artificial insemination are inspected within the framework of the relevant legislation.
- (2)** As a result of the inspection, if the real or legal persons engaged in queen bee breeding or bee artificial insemination, or the queen bees they produce are found to be defective or inadequate, those responsible will be warned in writing for the first time, and if the negligence or fault continues, their work permits will be cancelled.

CONTROL

ARTICLE 17:

- (1)** Provincial and district directorates take the necessary precautions and carry out inspections to ensure that beekeepers produce honey in accordance with the relevant legislation. It also carries out domestic inspections and controls of other bee products within the framework of the Veterinary Services, Plant Health, Food and Feed Law No. 5996.
- (2)** In the use of veterinary medicinal products, beekeepers must comply with the relevant legislation, register the veterinary medicinal products they use, keep the prescriptions and submit them to the Ministry during inspections.
- (3)** Provincial/district directorates; It is authorized to have the produced bees, bee products and all kinds of tools, machines, honeycombs, hives and beekeeping materials inspected by personnel trained in beekeeping and to prepare reports.

REGISTRY

ARTICLE 18:

- (1)** The Ministry determines the procedures and principles regarding the establishment of the beekeeping registration system and the content and standards of the hive plate.
- (2)** Beekeeping Registration System is carried out within the framework of the following issues.
 - a)** Beekeeping Registration System (AKS) is carried out in cooperation with associations within the principles determined under the responsibility and authority of the Ministry.
 - b)** Authorized provincial/district directorate personnel are authorized to open businesses in the system with the business identification number for beekeepers registered in Turkvet, and to enter hive plates and data into the opened businesses. The data entry authorities of the Union personnel into the system are determined by the Ministry.

NINTH SECTION

Last Provisions

Repealed Regulation

ARTICLE 19:

(1) The Beekeeping Regulation published in the Official Gazette dated 25/5/2003 and numbered 25118 has been abolished.

Executive

ARTICLE 21:

(1) The provisions of this Regulation shall be enforced by the Minister of Food, Agriculture and Livestock.

Force

ARTICLE 20:

(1) This Regulation shall enter into force on the date of its publication.

T.C.
GIDA, TARIM VE HAYVANCILIK BAKANLIĞI
Hayvancılık Genel Müdürlüğü
Arı Konaklama Belgesi (AKB)

1.Bölüm

Arıcı tarafından doldurulacaktır;_

Tarih:/...../20..

İşletme Tanımlama Numarası:

TC Kimlik No:

Adı ve Soyadı:

Daimi Adres:

Tel: ()

Arılı Kovan Sayısı:

Boş Kovan Sayısı:

İşletme Tipi:

Arı Ürünleri Üretimi

Ana Arı Üretimi

Çıkış Yapılacak Adres:

Konaklanacak Adres:

Konaklama Tarihi (başlama-bitiş):/...../20..... -/...../20.....

Arıcının
Adı Soyadı İmza

Arazi Sahibi /Kurum Yetkilisi
Adı Soyadı İmza

2.Bölüm

Yukarıda miktarı gösterilen ait arılı kovanların, Hayvan Sevklarine Mahsus Yurtiçi Veteriner Sağlık Raporu ile ilimiz sınırları içerisinde yukarıda belirtilen tarihler arasında ve adreste konaklaması için nakline müsaade edilmiştir. .../.../20..

Arıcının Konaklayacağı
İl/İlçe Müdürlüğü
Adı Soyadı imza