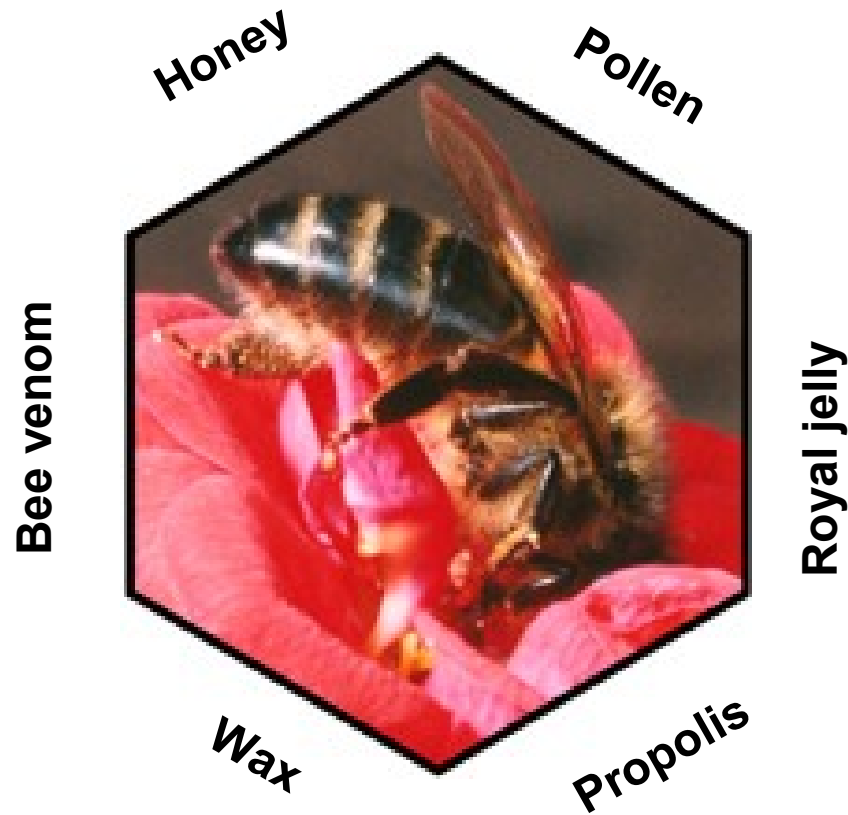


The Bee Products



Stefan Bogdanov

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Bee Product Science, www.bee-hexagon.net



Bee-Hexagon

[Deutsch](#) [English](#)

Navigation

- » **Start, News**
- » **The Products**
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 - » **Royal Jelly**
 - » **Wax**
 - » **Propolis**
 - » **Venom**
- » **Health**
- » **Network**
- » **Creative expression**
- » **Organic Beekeeping**
- » **Links**
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A bee comb has six sides,

on each a magic thing it hides:

Take wax, pollen and a spoon of honey

and you will be healthy and sunny

Try propolis, royal jelly, venom

and you'll enjoy bee's poem.

WELCOME

Stefan Bogdanov
info@bee-hexagon.net



Beekeeping

- Project
- Contacts
- Publications
- Member

- Bee products
- Bee diseases
- Biology
- Beekeeping

Environment

Colony losses

Bee Research Centre

Back to Practice

Back to Animal Foodstuffs

Home

[Print version](#)

Apiculture



Bees on a honey comb (photo: K. Ruoff)

The Swiss Bee Research Centre belongs to Agroscope Liebefeld-Posieux Research Station ALP in Liebefeld-Bern. The Swiss Bee Research Centre works in the frame on the federal agricultural research for the needs of Swiss beekeepers. It supplies scientific and technical know-how for the benefit of beekeepers and of all concerned.

Objectives

The superordinate objective is the realisation of ecological and economical beekeeping for plant pollination and the production of high quality bee products, based on an apicultural practice with healthy and strong colonies.

Search in Agroscope

[advanced Search](#)

BRC Update

■ 14.3.2011 Bee diseases > Control

A new version of the list "Chemical products in Swiss beekeeping" is provided.

■ [Chemical products in Swiss beekeeping \(by 9.3.2011\)](#)

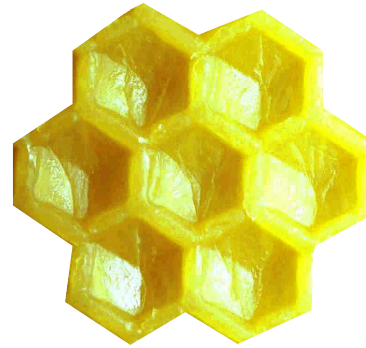
14.03.2011 | 151 kb | PDF

26 years at Swiss Bee Research Centre
www.apis.admin.ch

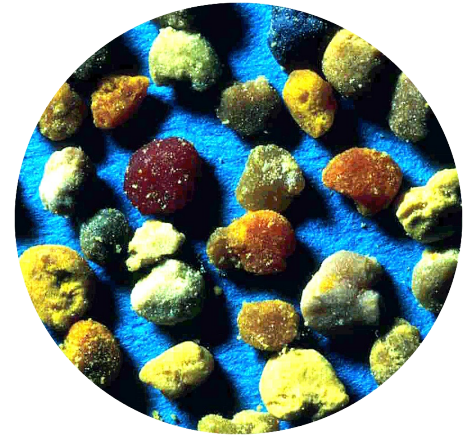
honey



wax

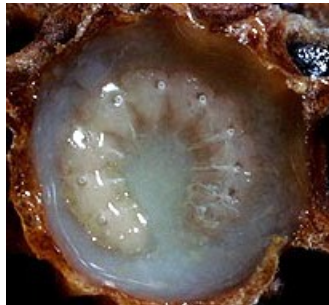


pollen

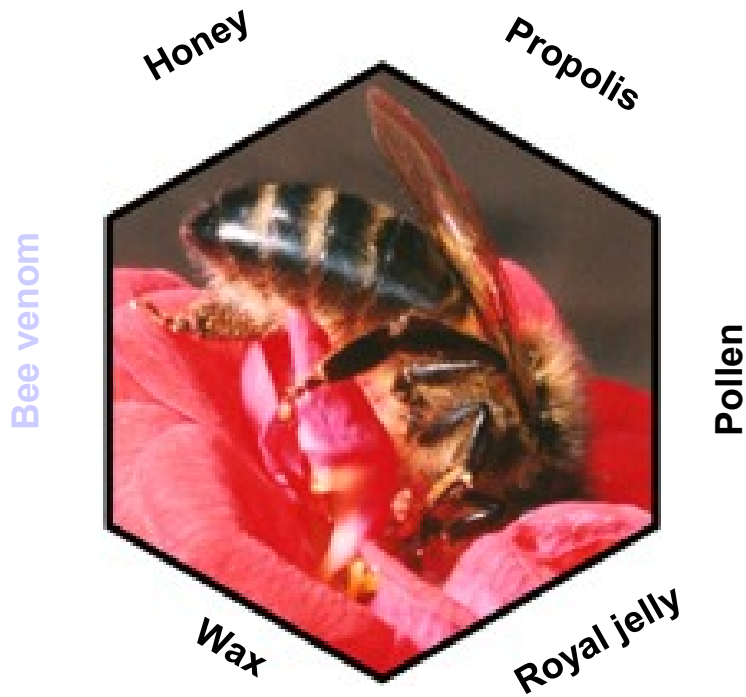


venom

Royal Jelly



propolis



- ✓ **Production**
- ✓ **Composition**
- ✓ **Properties and uses**
- ✓ **Quality and Control**

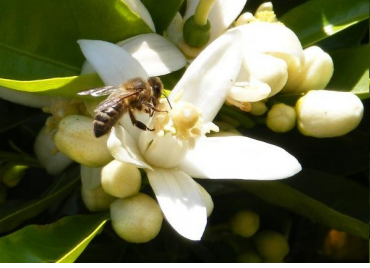
1. Honey

2. Other bee products

Honey



The energy source for the bee



Honey Elaboration



- **Honey source**
nectar, honeydew (5-80 % sugar)
- **Gathering by the bees and first elaboration**
70 mg in honey sack per flight carried into the hive,
bees add enzymes from hypopharyngeal glands
sucrose inversion and pass honey to each other, after lowering
the humidity to 30 - 40 % honey is filled into the combs
- **Final elaboration**
further lowering of humidity until < 20 % by fanning,
capping of combs

Honey Harvest



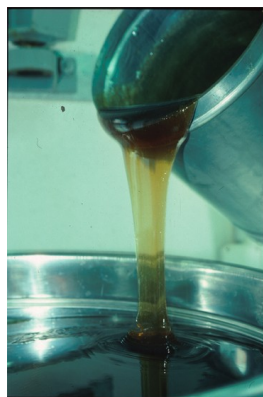
Decapping



centrifugation of the combs

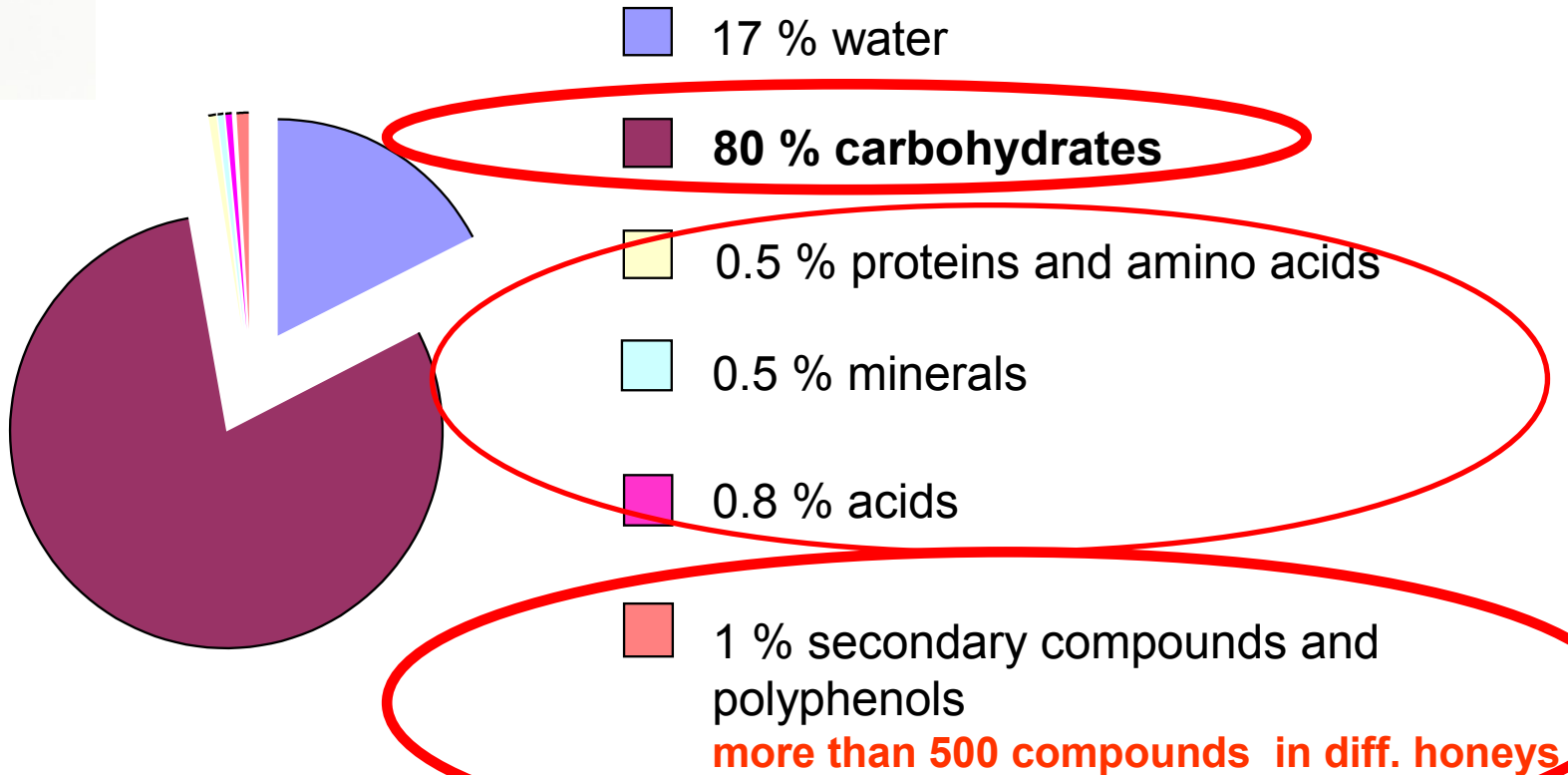


first filtration



Filling into a tank with filtering, conditioning 2-3 days, filling into jars

Honey Composition





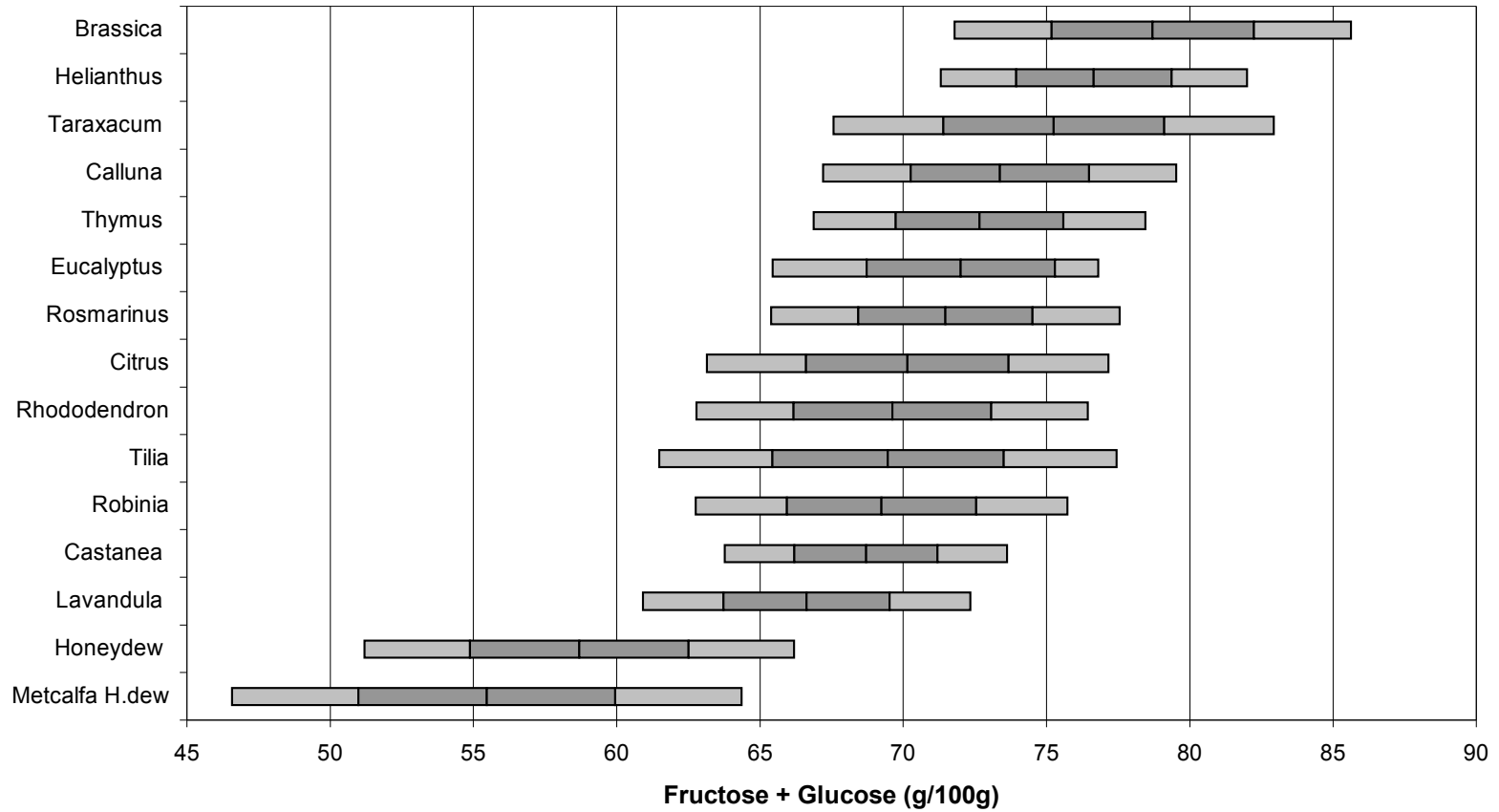
Honey Composition



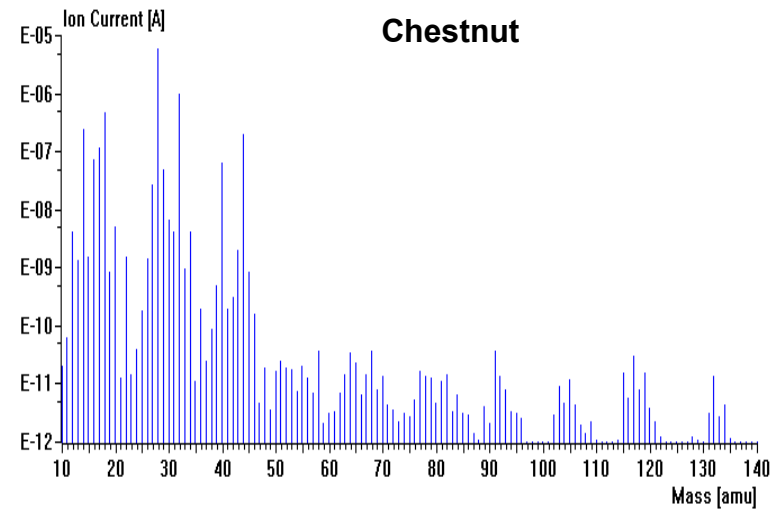
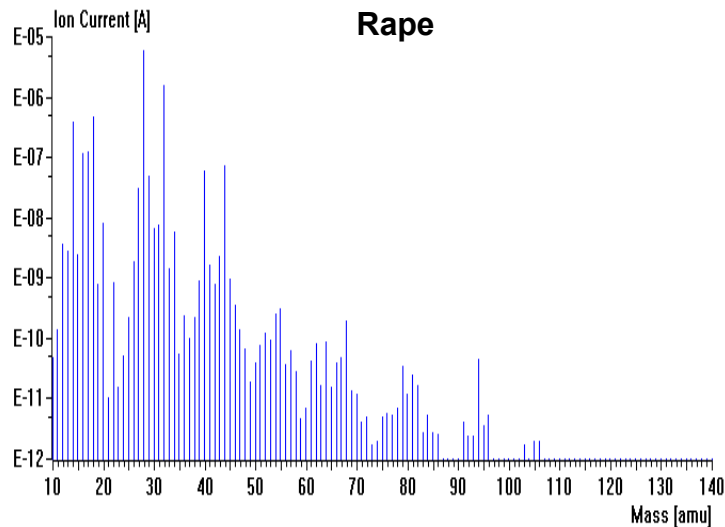
	Blossom		Honeydew	
	x	Min-Max	x	Min-Max
Water	17,2	15-20	16,3	15-20
Fructose	38,2	30-45	31,8	28-40
Glucose	31,3	24-40	26,1	19-32
Melezitose	<0,1		4,0	0,3-22,0
total sugars	79,7		80,5	
Minerals	0,2	0,1-0,5	0,9	0,6-2
A.acids , proteins	0,3	0,2-0,4	0,6	0,4-0,7
Acids	0,5	0,2-0,8	1,1	0,8-1,5
pH	3,9	3,5-4,5	5,2	4,5-6,5



Honey Composition



Determine honey origin by testing of the aroma profile with an electronic nose

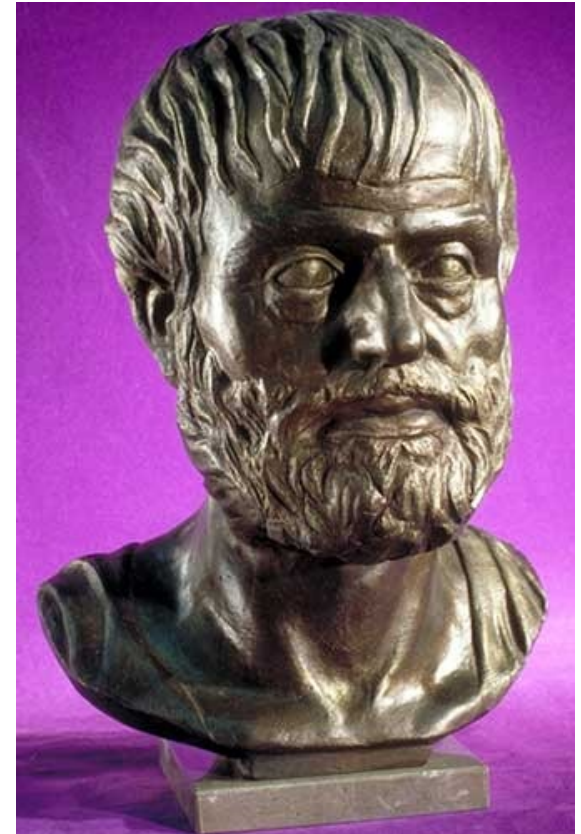
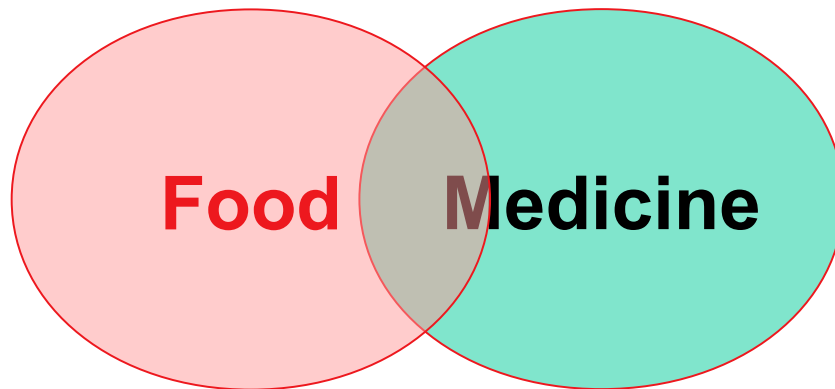


Determination of aroma compounds by MS



Honey: Food or Medicine ?

**„Your food shall be your
medicine“**

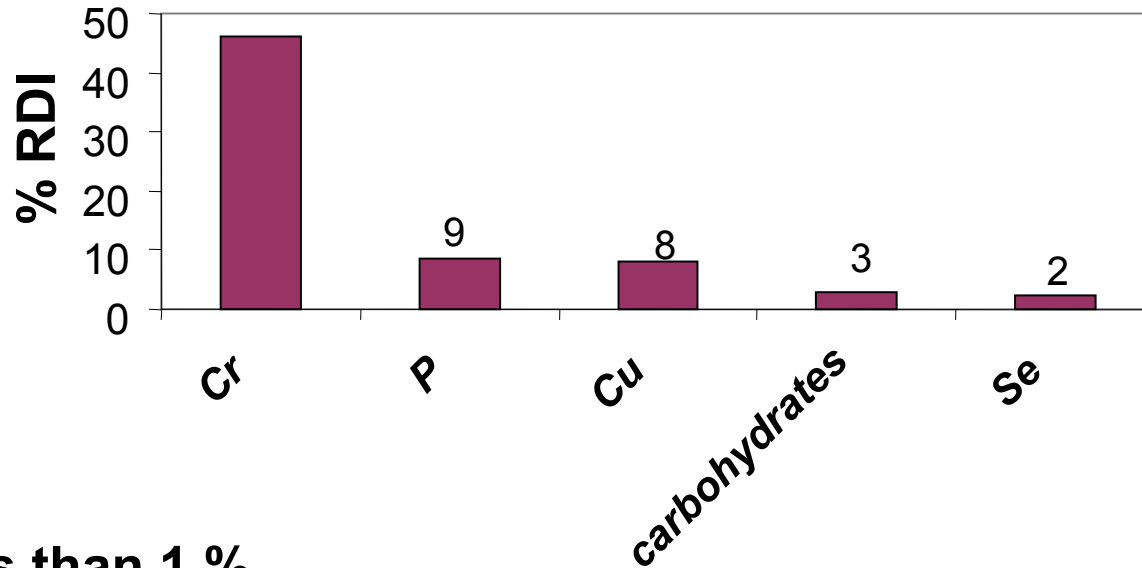


Hippokrates 460-375 BC

Honey as Food

Recommended Daily Intake (RDI)

and daily intake of 20 g „average“ honey



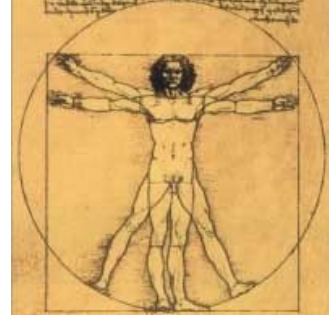
% RDI less than 1 %

- The minerals K, Na, Mg, Mn, Zn, Fe
- Proteins and amino acids
- Vitamins C, B1, B2, B5, B6, K

**50-80 g per day used in most studies
-- to be taken for health purposes**



Honey as Functional Food



➤ **Anti-microbial (bacteria, fungi, viruses)**

➤ **Anti-oxidant**

➤ **Immunomodulating**

➤ **Moderate Glycemic Index**

➤ **Prebiotic**

- **Anti-inflammatory**

- **Anti-cancerogenous**



Honey as Medicine



➤ **Wound healing**

➤ **Gastroenterology**

➤ **Cardiovascular diseases**

➤ **Influenza prevention**

➤ **Against cough**

➤ **Against hay fever**

➤ **Eye diseases**



Honey in wound healing



Figure 3a. Day 1- before honey treatment (left groin).

Figure 3b. Day 1- before honey treatment (buttocks).



Figure 3c. Left groin 1 week after honey treatment.

Figure 3d. Buttocks 1 week after honey treatment.

- Especially efficient in badly healing wounds
- Used in the past and now in developing countries
- In Europe used in many hospitals and by doctors as natural and medical grade honey
- Many publications on clinical use of honey in wound healing



Honey quality and control



1. Quality

Sensory defects

Storability

Heat damages

Functional food

2. Authenticity

botanical, geographical:

Adulteration:

3. Health protection

Residues

Control Criteria

odour or taste defects

water content, yeast content

hydroxymethylfurfural, enzyme activity

health relevant properties

chem. methods, pollen analysis

different methods used

pesticides, antibiotics etc

General Quality

Sensory defects due to improper handling



crystallisation



fermentaton



darkening



Authenticity Botanical Origin



**Sensory
Properties**



**microscopic
examination**



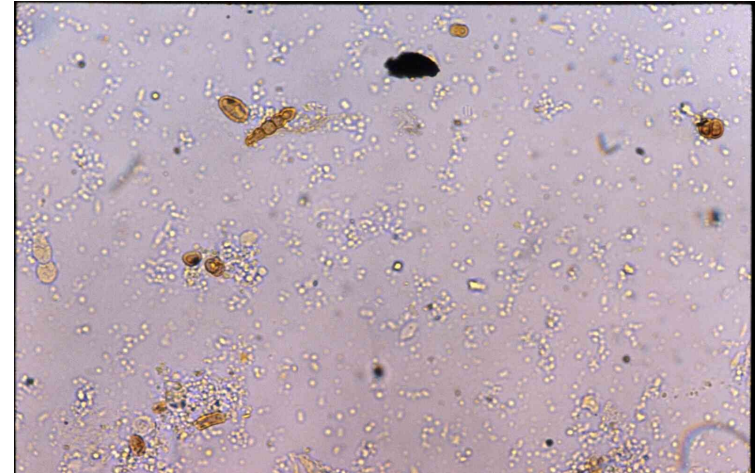
**physico-chemical
testing**

Apidologie 2004 special issue

Authenticity of botanical and geographical origin by melissopalynology (microscopy)



Rape honey



Honeydew honey





Authenticity of Production Adulteration



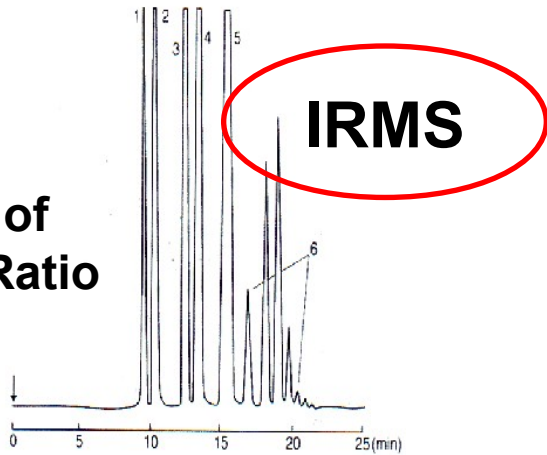
1. Adulteration by cane sugar and maize starch syrups

- Determination of $^{13}\text{C}/^{12}\text{C}$ ratio



2. Adulteration by beet sugar

- Coupling of liquid chromatography of sugars with carbon stable Isotope Ratio Mass Spectrometry

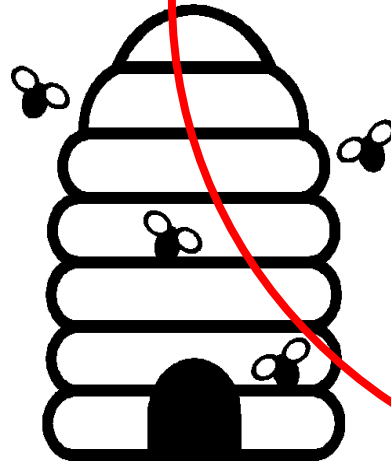
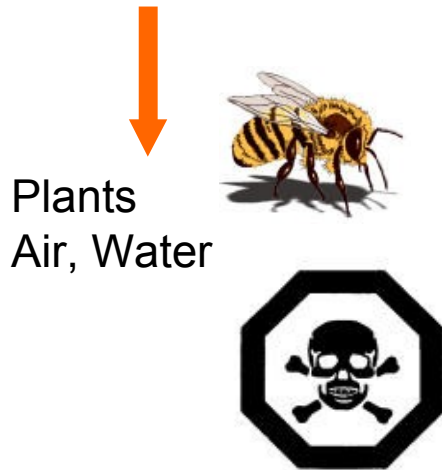


Cabanero et al. 2007 Elflein et al 2008

Honey Contamination

Environment

- Pesticides
- Heavy metals
- Bacteria
- GMO
- Radioactivity

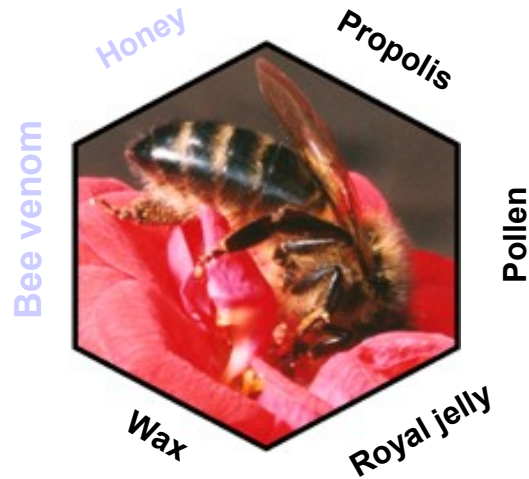


Beekeeping

- **Acaricides for Varroa control**
- **Antibiotics against AFB, EFB**
- Pesticides for wax moth control
- Pesticides against SHB
- Bee repellents at honey harvest

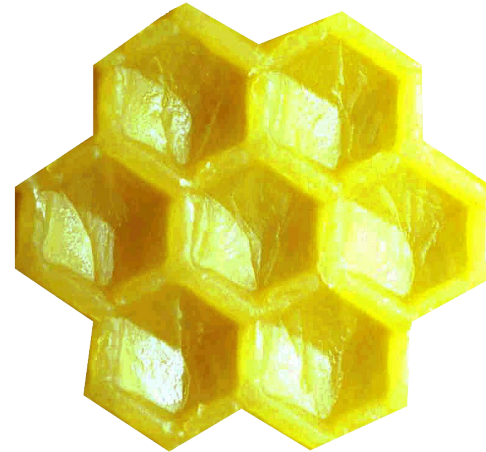


2. The other bee products

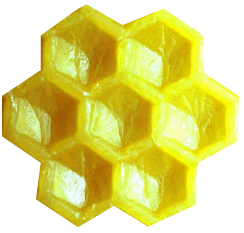


- ✓ **Production**
- ✓ **Composition,**
- ✓ **Properties and uses**
- ✓ **Quality and Control**

2. Beeswax



Economical importance: second after honey



Production



Production in wax glands by sugar feeding.

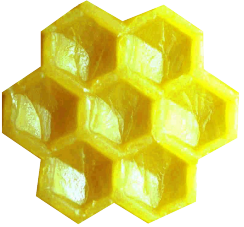
Maximal production in 12-16 days workers

For 1 kg wax: feeding of 5 bis 30 kg sugar is necessary

1 comb weighing 100 g can hold 2-4 kg honey!

Fresly produced wax is white, colour is added afterwards (pollen, propolis)



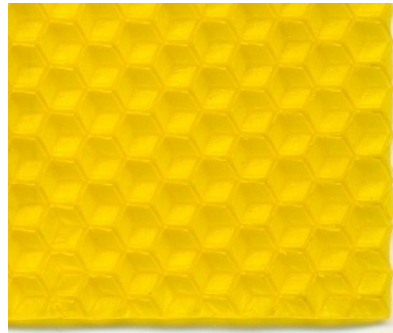


Wax circulation

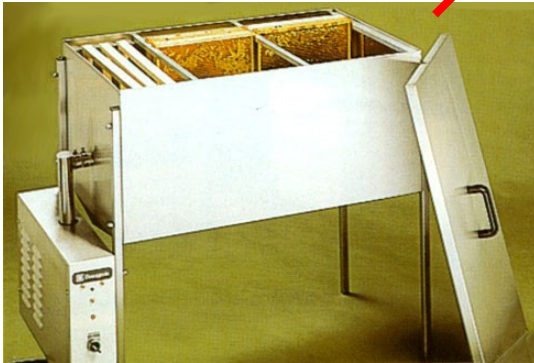
Wax glands



Comb foundations



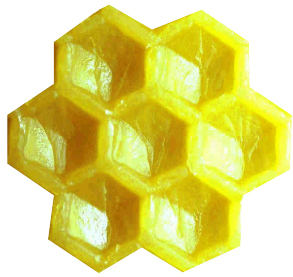
Comb building



Melting

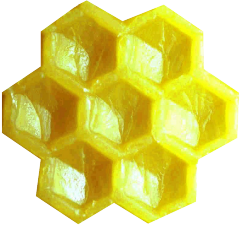


Old combs

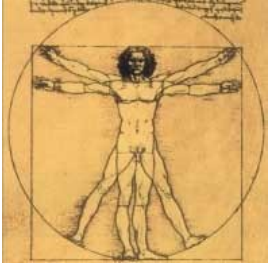


Composition

Esters	67 g/100 g
Carbohydrons	14 g/100 g
Acids	12 g/100 g
Alcohols	1 g/100 g
Others	6 g/100 g
Total:	280 different compounds



Functional Food and Medicine

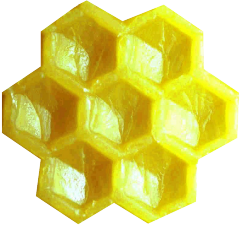


➤ **Food additive E 901: for surface treatment of chocolate, fruits, nuts, coffee beans, bakery,**



➤ **Cosmetic component of creams and ointments**

➤ **Against inflammation of nerves, joints and muscles**



Quality

1. Quality

Sensory defects

2. Authenticity

origin

adulteration

3. Health protection

Residues

Control Criteria

odour, elasticity, hardness

Apis mellifera, A. cerana (Asia)

physical properties, composition

acaricides (beekeeping)

3. Pollen



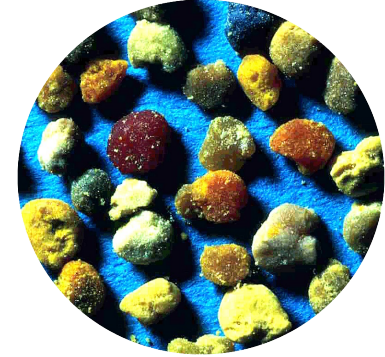
The role of bee pollen



**Nourishment of bee brood
(protein source)**

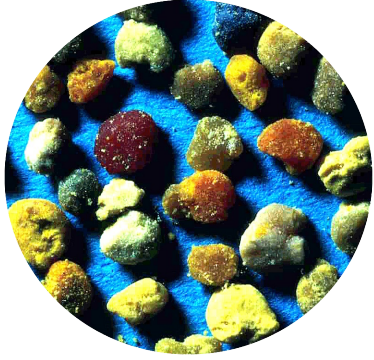


Collection



Gathering of pollen (1 to 200 μm) and
packing of pollen loads (2-3 mm)
1 load: 15 mg, 80 blossoms

Storage in the comb as
pollen bread



Harvesting



Collect by a
pollen trap



Drying



Cleaning and packing



Sardinia,



Composition

Carbohydrates ca. 40 - 60 %

fructose, glucose, fibre

Proteins, amino acids 10 - 40 %

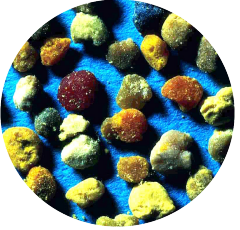
Lipids 1 – 13 %

Minerals: 1-2 %

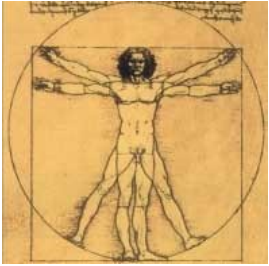
Flavonoids, sterols: 0.1 - 2 %

Vitamins: beta-Carrotin (A) B-vitamins, folic acid,

Wide variation depending on the botanical origin !



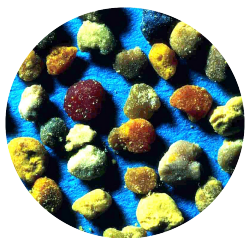
Pollen: Functional Food and Medicine



- **Anti-oxidant**
- **Chemo-preventive, anticancer**
- **Hepatoprotective, anti-radioaton**
- **anti-inflammatory, antimicrobial, Immuno-modulating**



- **Benign prostatic hyperplasia**
- **Against hay fever (pollen vaccine)**
- **Heart and blood circulation deseases, gastroenterology, hepatitis, anti-aging,**



Quality

1. Quality

Sensory defects

Storability

Heat damages

Functional food

Control Criteria

odour or taste defects

water content, bacteria content

loss of antioxidant activity

health relevant properties

2. Authenticity

botanical, geographical:

pollen analysis

3. Health protection

Residues

pesticides (environment)

4. Propolis



Greek pro-polis – in front of the city, propoliso (glue),

Propolis collection



collect

Poplar (Europe)

Seal cracks

In the hive

Collection

by a mat

Sardinia,



Composition

Compound class

Substances

Polyphenols 40-60 %

poplar propolis

Aromatic compounds without free phenolic group, other phenolics, phenolic acids, phenolic acid esters, flavanones and dihydroflavanons, flavones and flavonols, chalcones, phenolic triglycerides

Waxes: 20-30 %

Beeswax components

Essential oils: 10 %

Volatiles: mono- and sesquiterpenoids

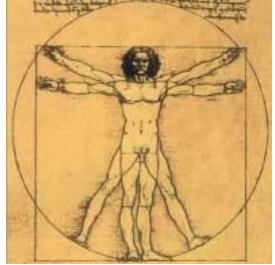
Others: up to 5 %

Minerals, sugars

Wide variation depending on the botanical origin (about 15 propolis types) and harvesting time



Functional Food and Medicine



- **Anti-microbial, anti-oxidant, immunoactivating**
- **Chemo-preventive, anticancer**
- **Hepatoprotective, anti-radioaton**
- **anti-inflammatory, antimicrobial, Immuno-modulating, antidiabetic**



- **Stomatology, odontology**
- **Otorhinolaryngology**
- **Infection prevention**
- **Gastroenterolgy, wound, burns, gynecology, urology, skin diseases, eye diseases**



Quality

1. Quality
stardardisation

2. Authenticity
botanical type
geographical

3. Health protection
residues

Control Criteria

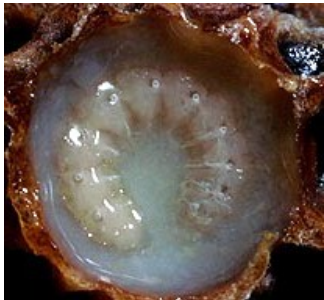
health relevant compoments

chemical analysis
pollen analysis

acaricides (beekeeping),
heavy metals (environment)

5. Royal Jelly



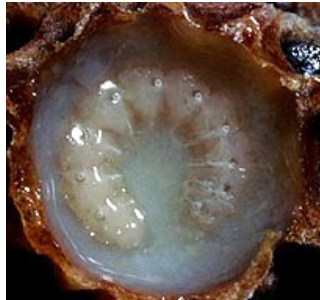


The food given to the bee queen to make her live much longer (2-3 years) than the worker bees (3-4 weeks in summer, 3-6 months in winter)

Production



Queen rearing



Collection from larvae cells



Packing (storage in freezer)



Composition

	g/100 g
Water	60-70
Proteins, amino acids	9-18
Fat	4-8
Sugars	11-23
10-Hydroxydecenoic acid	1.4-6
Vitamins	traces

Functional Food and Medicine

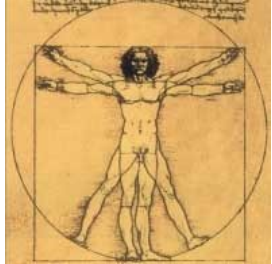


➤ **Bio-stimulator**

➤ **Increases differentiation of brain cells**

➤ **Immuno-modulating, skin-protective**

➤ **anti-inflammatory, antimicrobial, antioxidant, anti-osteoporosis , antidiabetic**



➤ **Anti-aging, regeneration medicine**

➤ **Heart and blood circulation diseases, gastroenterology, respiration diseases, diabetes, gynecology, urology, skin diseases, cosmetics**





Quality

1. Quality
Stardardisation

Control Criteria
health relevant compoments

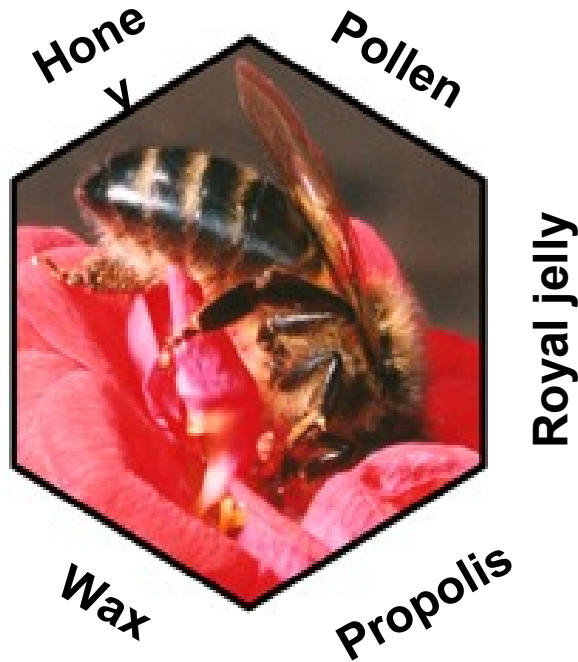
2. Authenticity
adulteration
geographical

chemical analysis
pollen analysis

3. Health protection
Residues

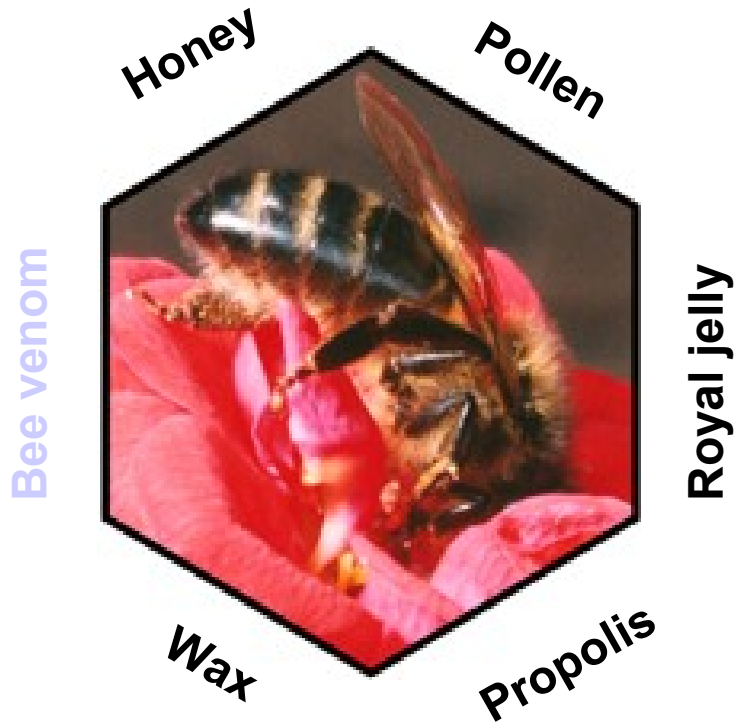
antibiotics (beekeeping)

Bee Products Quality By



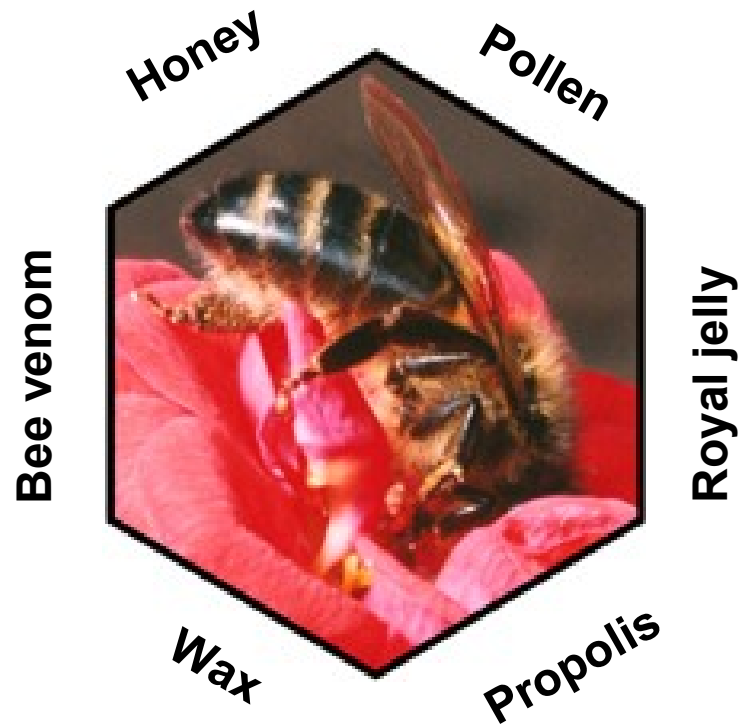
- ✓ **Good production and technology practice**
- ✓ **Testing of Authenticity of origin and production**
- ✓ **Use of alternative disease control in beekeeping**
- ✓ **Avoidance of external contaminaton (organic beekeeping)**

Bee Products: Uses



- ✓ **Food, food supplement, food additive**
- ✓ **Medicine (Apitherapy)**
- ✓ **Necessity for standardisation in order to ensure optimal quality as food and medicine**

Bee Products Science



More information:

Bee Hexagon Book

Online on www.bee-hexagon.net