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LOUWAIN



## Good beekeeping practices: honey and beehive products quality

The first international conference of the Arab Beekeeping Organization  
5-6 Feb. 2018 – Etienne Bruneau

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## Honey and beehive products: the image



- ▶ The images: "Nature" and "Health"
- ▶ Products
  - ▶ collected and/or produced by bees without processing or external inputs.
  - ▶ Without foreign substances or damage.
- ▶ Used as medicine for a very long time

## Honey and beehive products: the reality

### ▶ Adulterated products - Top 10 of (Journal of Food Science)

- ▶ 1. Olive oil
- ▶ 2. Milk
- ▶ **3. Honey**
- ▶ 4. Saffron
- ▶ 5. Orange juice
- ▶ 6. Coffee
- ▶ 10. Apple juice
- ▶ 10. Grape wine
- ▶ 10. Maple syrup
- ▶ 10. Vanilla extract



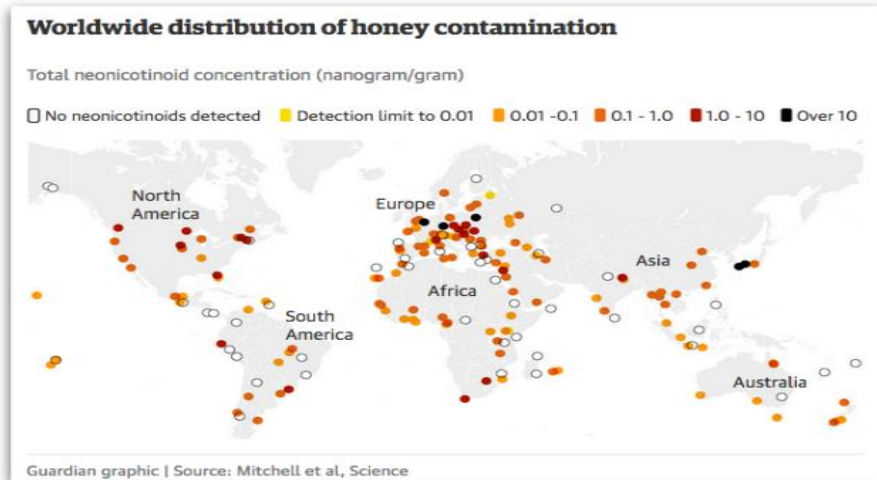
Honey is not safe for children under the age of 1 because of the risk of infant botulism, but it may help soothe an older child's throat and cough. In a 2007 study, giving half a teaspoon of honey to children ages 2 to 5 at bedtime seemed to suppress coughing, although more research is needed. (In the study, children ages 6 to 11 and 12 to 18 also benefited from 1 and 2 teaspoons of honey, respectively.) "In my experience, while there isn't a lot of medical evidence that honey works to stop a cough, it may help the child feel a little better," says Dr. Cardello. More from Health.com: 12 vaccines your child needs **ISTOCKPHOTO**

#### 3. Honey

Percentage of total records adulterated: 7

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## Honey and beehive products: the reality



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## Honey and beehive products: the reality



### **Public health issues**

- *Paraffin issue: adulteration plus potential safety issue depending on the chemical nature of paraffin used (EFSA Scientific Opinion on Mineral Oil Hydrocarbons in Food)*
- *Contamination issue if 'dirty' paraffin was used*

### **Animal health**

- *Paraffin mixed with natural beeswax is an accepted practise among beekeepers*
- *Maximum up to 10%*
- *BE field trail: addition of 15% of stearin to beeswax results in significant mortality of the worker bee brood*



Health and Food Safety

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## Good beekeeping practices

### ▶ Who is concerned ?

- ▶ The large majority of beekeepers that are regarded as primary producers

### ▶ Must take into account

- ▶ => Measures on reducing contamination of food, treatment, biocides, water, air. . .
- ▶ => The formalization of efforts to clean facilities and equipment and waste management
- ▶ => Items for inclusion in a registry
- ▶ => establish the traceability of honey

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## The main challenges today - contaminants



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## Origin of contaminants

### Environment

#### Contaminated plants

(Polycyclic aromatic hydrocarbons, radiations, heavy metals...)

#### Treated plants

(Pesticides)

#### Toxic plants

(Pyrrolizidine alkaloids)



#### Air

(Polycyclic aromatic hydrocarbons, pesticides...)

#### Water

(Pesticides, microorganism...)

### Beekeeping practices

#### Medicines used

#### by the beekeeper

(miticides, antibiotics...)

#### Management of hives:

Feeding, smoke, microorganism...

#### Material used

#### for the production:

wax, hives, pollen trap...

(Pesticides, microorganism...)

#### Honey house: Material used

for the harvest and the packing, water, workers, environment, jars...

(Microorganism, chemicals...)



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## Ideals rules to avoid contaminants

### ► Environment

- Foraging areas must be unpolluted (at least respect the organic criteria)
  - at least 3 km radius (5 km) with bio melliferous plants or natural landscape
  - Absolutely no conventional crop and pasture around 1 km
  - No sources of contamination in a radius of 3 km (important road, industry...)
- Food requirements must be respected for
  - Material and equipment in contact with bees and bee products;
  - Rooms used for harvest and packaging bee products



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## Ideals rules to avoid contaminants

### ► In the apiary

- Work only with non-toxic substances (smoke...);
- Honeycombs should be
  - Natural constructions (the best)
  - Wax processed by the beekeeper itself or come from bio honeycombs;
  - Changed (at least 30% of the frames every year);
- Hives must come from dividing or originate in units with bio accreditation;
- Bees should be fed only with hive products produced on place;



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## How can we avoid the contamination by syrup ?

- ▶ **Good beekeeping practices**
  - ▶ Keep limited reserve (2 frames) in the colony before the installation of the supers
  - ▶ Avoid all feeding in presence of supers during potential honey flow
  - ▶ Use only “good” syrup
  - ▶ Be careful with little colony (fecundation nucs...) fed with sugar
  - ▶ Avoid the situation of robbing
- ▶ **At a legal point of view**
  - ▶ We have to fix maximum residue limit of foreign sugars in the honey
- ▶ **Applied research**
  - ▶ We have to analyze the movement of sugars in the hive and to have a better view of the contamination of honey by the reserve

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## How can we avoid syrup in honey?

- ▶ **We have to be very careful with the feeding:**
  - ▶ **Quality**
    - ▶ Honey is the best food for the bees
    - ▶ Sucrose inverted by the bees stay a good solution
    - ▶ Avoid all the food coming from starch
    - ▶ Avoid HFCS...
    - ▶ You must know the composition of the syrup or the patty: the C<sub>4</sub> must be near 0

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## Ideals rules to avoid contaminants



### ▶ Regarding pathogens and parasites

- ▶ Prophylaxis management must be the base for all pathologies
- ▶ Treatments against *Varroa* must be done only with
  - ▶ Biotechnical techniques
    - Queen cages (Scalvini...)
    - Creation of nucs during the development period
    - Caped male brood reduction in spring
  - ▶ Use of natural products that do not remain in wax and do not affect the hive products: essential oils, oxalic, formic and lactic acids ...;
  - ▶ Action based on the level of infestation (control)
- ▶ The material should be thermally disinfected

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## The main challenges today - Degradation



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## Origin of degradations

### Harvesting and conditioning

**Extraction technique**  
(propolis, bee venom and honey)

**Transformation**  
(Propolis, Royal Jelly, Pollen, Venom)

**Packing**  
(Pollen, Royal Jelly, bee bread)

**Storage conditions**



### Product and Environment

**Biological evolution**  
=> Product life

**Humidity**  
Influence a lot of biological process (microbiological...)

**Temperature**  
Influence a lot of biological process  
Important source of degradation

**Oxidation**  
by the air, by some material

**Radiations**  
UV,...

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## Honey

### ▶ Harvesting:

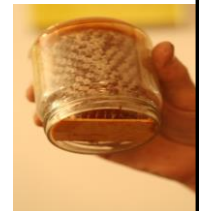
- ▶ Only capped honey - use smaller combs that need more frequent harvesting
- ▶ humidity <18%

### ▶ Packaging: honey can remains in frames

- ▶ Avoid oxidation by air, risk due to:
  - ▶ extraction by centrifugation (manual pressing is better),
  - ▶ filtration (close filter)
  - ▶ drying
- ▶ Avoid heating process (liquefaction, pasteurization...)
- ▶ Final packaging – just after the harvest

### ▶ Storage

- ▶ kept in dark, in opaque jars;
- ▶ Max 2 years at  $T^{\circ} < 16^{\circ}\text{C}$



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## Pollen

### ▶ Harvesting:

- ▶ Collect pollen and clean the collector every day.
- ▶ A primary segregation must be done immediately.

### ▶ Packaging:

- ▶ Freezing must be done in max. 30 minutes after harvest.
- ▶ Drying process: 5°C (cold and dry ventilation) - 32°C max  
Pollen drying causes a loss up of 20% weight, but also of the nutritious value, enzyme and antibiotic;
- ▶ A complete segregation is a key point

### ▶ Storage

- ▶ Raw pollen stored in cool (-15° C) and dark - keeps its therapeutic properties up to 2 years.
- ▶ Dry pollen stored at 5° C in glasses anti UV - loses 75% of its nutritive value after 1 year and becomes unusable after 2 years;

### ▶ Transport

- ▶ Raw pollen can be transported at low temperature (frozen) for a short time.

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## Propolis

### ▶ Harvesting:

- ▶ Use of specific (new) grids (plastic, wood, inox) - No scraping
- ▶ Summer - Not during the period of chemical treatments

### ▶ Packing :

- ▶ By heating and/or exposure to air, propolis lost parts of the volatile substances and deteriorates its biological value.
- ▶ Supercritical extraction with CO<sub>2</sub> seems to keep most of the components
- ▶ The preparation of propolis tincture 30 - 70% used in the apitherapy - with ethylic alcohol between 70-80°;

### ▶ Storage

- ▶ Raw propolis ideally stored in the freezer in vacuumed plastic bags, in smaller quantities (max 1 kg)
- ▶ Propolis tincture must be stored in dark places, in small black bottles, at a temperature of up to 20° C.

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## How can we avoid these problems ?

It's all together that we can find solutions and reduce these problems.

I am sure that most of you try to do their best to produce very high quality of bee products.

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## Thank you for your attention

Produce and eat good bee products,  
you will discover their importance for your health

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5 - 6 فبراير 2018م  
مركز أبوظبي الوطني للمعارض - دولة الإمارات العربية المتحدة