

Honey Quality- Legal Situation in Europe

Martin Linkogel

Certified Food Chemist

Intertek Food Services Bremen



- **The European honey directive 2001/110/EC:
Definition of honey and composition criteria for honey**
- **Regulations on residues and contaminants**
- **Parameters to be tested for the quality control of honey**
- **Rapid Alert System for Food and Feed (RASFF)**

- **Defines honey as product of animal origin:**

„Honey is the natural sweet substance produced by Apis mellifera bees [...] which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in honeycombs to ripen and mature.“

- **Defines important quality parameters for honey:**

Sugar composition (fructose/glucose, sucrose),
free acid content, HMF content, flavour, colour etc.

- **Does not contain any legislation for honey with regard to:**

**Residues (antibiotics, bee treatment agents) or
contaminants (for example pesticides, heavy metals)**

Residues of pharmacologically active substances

1) REGULATION (EC) No 470/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 May 2009

laying down Community procedures for the establishment of residue limits of pharmacologically active substances in foodstuffs of animal origin

- General regulation and framework for antibiotics in Europe
- Defines principles for residue control in Europe,
- Foresees a classification system
- Contains important definitions for residues
- Forbids use of drugs which are prohibited or not contained in the regulation
- Repeals Regulation (EEC) No 2377/90 of 26 June 1990 (incl. Annexes I to IV)

Residues of pharmacologically active substances

2) COMMISSION REGULATION (EU) No 37/2010 of 22 December 2009

on pharmacologically active substances and their classification regarding maximum residue limits in foodstuffs of animal origin (MRL)

→ Classifies pharmaceutical drugs with regard to maximum residue limits (MRL's)

→ Lists all drugs on 69 pages in alphabetical order in

Table 1: Allowed substances

Table 2: Prohibited substances

Residues of pharmacologically active substances

2) COMMISSION REGULATION (EU) No 37/2010 of 22 December 2009

Problem for honey:

- Only bee treatment agents against varroa mites are regulated for honey (e.g. coumaphos and amitraz)
- The common antibiotics stated in table 1 are not regulated for honey
- A so called „zero tolerance“ for antibiotics is applied by authorities
- „Zero tolerance“ can be interpreted and is a matter of the sensitivity of
the analytical method used by the competent authority for testing

Contaminants

1) Heavy metals and volatile hydrocarbons:

COMMISSION REGULATION (EC) No 1881/2006 of 19 December 2006
setting maximum levels for certain contaminants in foodstuffs

2) Pesticides:

REGULATION (EC) NO 396/2005 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 February 2005

on maximum residue levels of pesticides in or on food and feed of plant and animal origin

Honey Quality Control –

Tests based on EU honey directive



Valued Quality. Delivered.

- **Sugar spectrum:** Fructose, glucose, sucrose, sum of invert sugars, F/G ratio
- **Free acid:** Directly regulated, single acids are usually not analyzed
- **Enzyme activity:** Diastase (directly regulated) and saccharase (invertase, recommended)
- **Moisture:** Water content, directly regulated
- **HMF:** Hydroxymethylfurfural content (directly regulated)
- **Water-insoluble:** Sediment (if necessary)
- **Colour:** Important for unifloral honeys or for commercial reasons
- **Pollen analysis:** Important for unifloral honeys (includes sensorory analysis: flavour, aroma) and declaration of geographical and botanical origin (honey authenticity)
- **Bee repellents:** Phenol, naphthalene (impact on the organoleptic properties)
- **Other analyses:** Electrical conductivity, methylanthranilate (citrus honey) and others
- **Adulteration:** Addition of sugar syrups (honey authenticity, foreign enzymes)

Honey Quality Control – What else to be tested ?



Valued Quality. Delivered.

- **Residues and contaminants**
 - Antibiotics (sulfonamides, chloramphenicol, tetracyclines etc.)
 - Pesticides (about 350 different substances offered by Intertek FS)
 - Bee treatment agents (amitraz, coumaphos, fluvalinate etc.)
 - Heavy metals (e.g. lead)
 - Pyrrolizidine alkaloids (PA) as natural toxic substances in honey
 - Genetically modified organisms (GMO)
- **Declaration**
 - Labelling of honey products must be compliant with regulations
- **Migration of additives or contamination from inadequate packaging**
(e.g. softeners, volatile hydrocarbons)

Honey Quality Control – Major problems



Valued Quality. Delivered.

- No maximum residue limits (MRL) for antibiotics in honey were established to date in Europe
- Antibiotics are not at all allowed for the treatment of bees in Europe, whereas in other countries outside Europe certain antibiotics are allowed!
- No antibiotics residues should be present in honey as natural product at all !
- With regard to the zero tolerance in residue control laboratories usually an „action limit“ of 10 µg/kg for the common antibiotics is applied for honey
- This „action limit“ of 10 µg/kg can be typically achieved in all types of honey by LC-MS/MS and this limit can also be achieved by screening technologies like ELISA- or Charm-Tests, also in Third Countries like Mexico or Argentina (action limit is also recommended by the IHC)
- However, the authorities often do not tolerate residues below 10 µg/kg and several notifications of honey were made in the RASFF in recent years by different European countries

RASFF – Rapid Alert System for Food and Feed

Intertek

Valued Quality. Delivered.

- European rapid alert system
(http://ec.europa.eu/food/food/rapidalert/index_en.htm)
- Since 1979, all member states of the EU
- Based on Article 50 of Regulation (EC) 178/2002/EC
- Aim: Food Safety, Consumer safety and information of consumers
- Defines emergency measures for food and feed of European origin or imported from a third country
- If there are any notifications in the RASFF, suspension of imports of the food or feed in question from all or part of the third country concerned and, where applicable, from the third country of transit, will follow and can result in an import ban of these products from the third country
- Third countries exporting to Europe must have implemented a residue control plan and be currently listed in Decision 2010/327/EC (regularly updated)



Examples from the RASFF –

Honey notifications below 10 µg/kg

Intertek

Valued Quality. Delivered.



2007:

- **Tylosin** (0.4 and 1.1 µg/kg) in honey from **Argentina**, notified by Spain
- **Tylosin** (2.1 µg/kg) in honey from **Argentina**, notified by UK
- **Ciprofloxacin** (6.4 µg/kg) in honey from **China**, notified by Spain
- Streptomycin (179 µg/kg) and **Tylosin** (0.7 µg/kg) in honey from **China**, notified by Spain

Remark: Notifications of prohibited substances were not included above

Examples from the RASFF – Honey notifications below 10 µg/kg

Intertek

Valued Quality. Delivered.

2008:

- **Sulphadiazine** (9.2 µg/kg) in honey from **China**, notified by Germany
- **Sulphathiazole** (9 µg/kg) in honey from **Lithuania**, notified by Latvia
- **Sulphathiazole** (5.5 µg/kg) in honey from **Hungary**, notified by Italy
- **Erythromycin A, ciprofloxacin, streptomycin:**
In total 10 notifications by **SPAIN** for **Chinese** honey below 10 µg/kg



2009:

- **Tylosin** (4.3 µg/kg) in honey from **Germany**, notified by UK
- **Lincomycin** (4.1 µg/kg) in honey from **China**, notified by UK

Remark: Notifications of prohibited substances were not included above

Examples from the RASFF –

Honey notifications below 10 µg/kg

Intertek

Valued Quality. Delivered.

2010:

- **Lincomycin** (2.4, 2.4; 2.7; 2.0 µg/kg) in honey from **China**, notified by UK
- **Sulfathiazole** (7 µg/kg) in honey from **Romania**, notified by Italy
- **Sulfadimethoxine** (4; 6; 6; 6 µg/kg) in honey from **Belgium**, notified by Germany
- **Lincomycin** (2.4 µg/kg) and **Erythromycin** (2 µg/kg) in honey from **China**, notified by Belgium



2011 (notified till 25/08/2011):

- **Sulfadimethoxine** (3 µg/kg) in honey from **Czech Republic**, notified by Hungary

Remark: Notifications of prohibited substances were not included above