



Spotlight Honey

Quality, Authenticity and Integrity

**New approaches in sugar composition analysis for
simultaneous honey quality and authenticity assessment**

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EU Honey Directive (2001/110/EC)

- **Defines the term "honey"** and the product which is **labelled as "honey"**
- **Specifies composition criteria for**
 - **sugar content** (fructose, glucose, sucrose)
 - **quality parameters** (moisture, sediment, electrical conductivity, free acid, diastase, HMF)
- **Demands 100 % purity** (no additions of e.g. sugar syrups)

"When placed on the market as honey or used in any product intended for human consumption, **honey shall not have added to it any food ingredient, including food additives, nor shall any other additions be made other than honey.**"

Sugar

Composition

EU Honey Directive

(2001/110/EC)

Annex II

1. Sugar content

1.1. Fructose and glucose content (sum of both)

- blossom honey not less than 60 g/100 g
- honeydew honey, blends of honeydew honey with blossom honey not less than 45 g/100 g

1.2. Sucrose content

- in general not more than 5 g/100 g
- false acacia (*Robinia pseudoacacia*), alfalfa (*Medicago sativa*), Menzies Banksia (*Banksia menziesii*), French honeysuckle (*Hedysarum*), red gum (*Eucalyptus camadulensis*), leatherwood (*Eucryphia lucida*, *Eucryphia milliganii*), *Citrus* spp. not more than 10 g/100 g
- lavender (*Lavandula* spp.), borage (*Borago officinalis*) not more than 15 g/100 g

Sugars in honey:

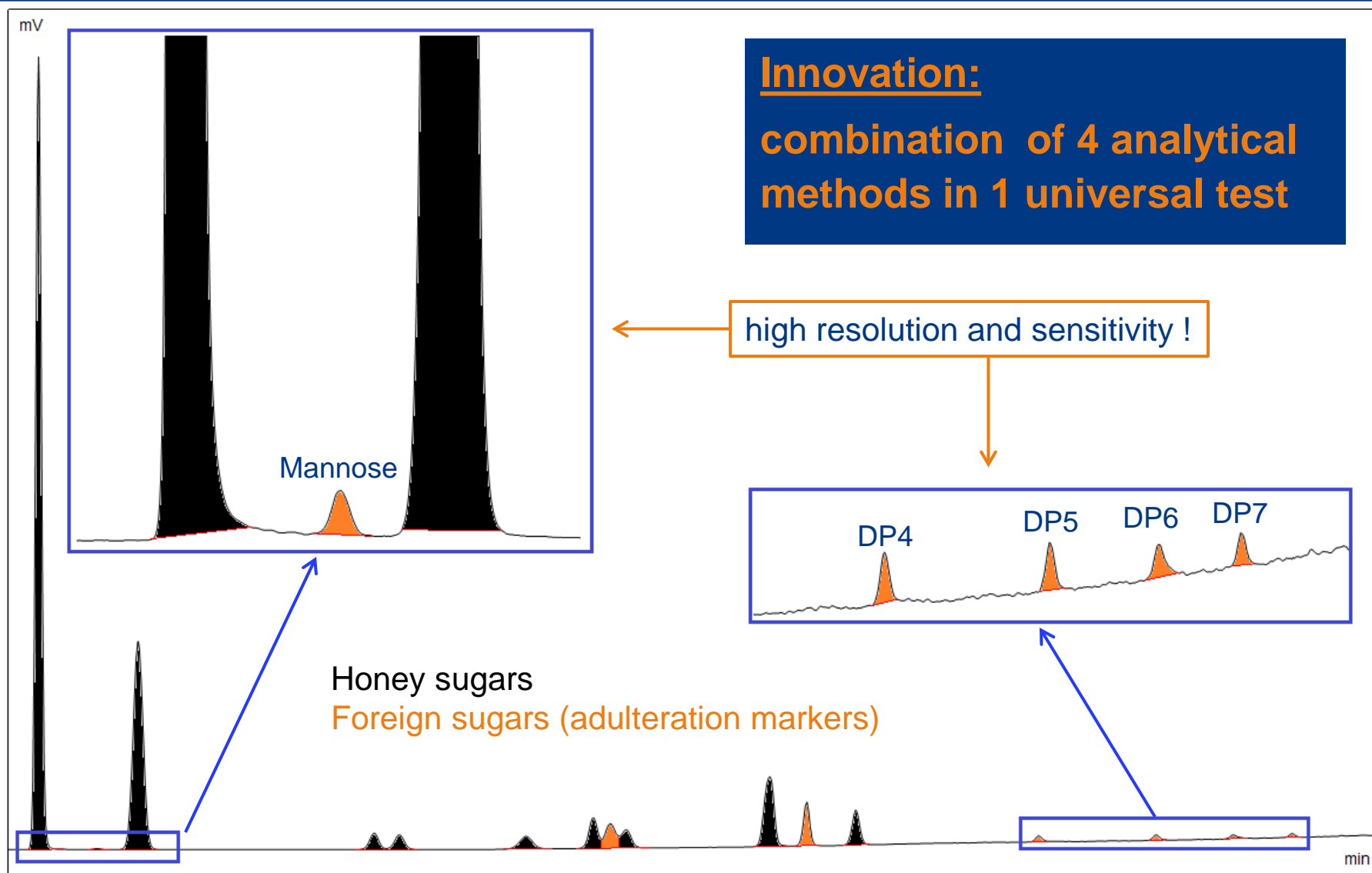
- **Monosaccharides:** fructose, glucose (main sugars)
- **Disaccharides:** sucrose, turanose, maltose, isomaltose, trehalose, cellobiose, nigerose, kojibiose, maltulose, gentiobiose, laminaribiose, palatinose, trehalulose
- **Trisaccharides:** melezitose, erlose, raffinose, theanderose, panose, isopanose, maltotriose, isomaltotriose, 1-kestose
- **Oligosaccharides:** traces of tetra- and pentasaccharides <0,45% (honeydew honey only)

Sugars as authenticity markers:

- **Monosaccharides:** mannose ($\leq 0.04 / 0.15\%$ flower/honeydew)
- **Disaccharides:**
 - sucrose ($\leq 5\%$)
 - turanose ($\geq 0.3\%$)
 - maltose ($\leq 5\%$, Metcalfa $< 8\%$)
 - isomaltose/maltose ratio (≥ 0.3)
 - sucrose/maltose ratio (< 1)
 - melibiose ($< \text{LOQ}$)
- **Trisaccharides:**
 - maltotriose ($\leq 0.5 / 1.5\%$ flower/honeydew)
 - erlose ($< 3\%$)
 - melezitose (honeydew)
 - raffinose ($< 2\%$ honeydew)
- **Oligosaccharides:**
 - maltooligosaccharides ($< \text{LOQ}$)
 - traces DP ≤ 3 (flower honeys)
 - traces DP ≤ 5 (honeydew honeys)

Current analytical methods:

- **Composition and Quality:**
 - ***Sugar profile by LC-RI (DIN, IHC, AOAC methods)***
fructose, glucose, sucrose, turanose, maltose
(optional: + trehalose, isomaltose, erlose, melezitose, maltotriose)
 - ***Sugar profile by IC/PAD (not yet harmonized, advanced equipment)***
- **Authenticity:**
 - ***Foreign oligosaccharides by LC-ELSD***
 - ***Foreign invertase test (via sugar markers) by LC-RI***
 - ***Mannose (syrup marker) by IC or NMR***
 - ***$d^{13}C$ isotopic values of mono-, di- & trisaccharides (C4/C3 plant origin) by EA/LC-IRMS***



Benefits:

- Only one instrumentation and lab workflow
- Equivalent performance with less effort
- More sample information from one analytical test
- Higher efficiency:
 - shorter response time
 - higher throughput
 - more cost effective
- Reduces the necessary analytical arsenal and thus simplifies testing recommendations and complex analytical test packages

**We are looking forward
to a successful cooperation!**



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