

Report

Project: Bioactivity of unifloral honeys from Nordic countries

Honey analyses were conducted in the Natural Products Research Laboratory, University of Eastern Finland, in 2015 and 2016.

Results in this report refer only to the analysed sample.

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Honey sample

Number	31
Country	Norway
Botanical origin	Heather
Beekeeper	Kurt Birkeland / Arendal

Physico-chemical properties

	value	Normal values	Method
Moisture %	18.9	< 19	<i>Digital Refractometer</i>
pH	4.2	3.5-5	<i>Digital pH meter</i>
Conductivity $\mu\text{S/cm}$	1071	100-1600	<i>Digital conductivity meter</i>

Method: Salonen, 2011

Sugars

Monosaccharides	%		
fructose	40.8	Fructose/ glucose**	1.3
glucose	31.9	Glucose/ water***	1.69
Disaccharides			
sucrose	0	Trisaccharides	
turanose/palatinose*	1.1	erlose/ melezitose*	0.4
maltose/cellobiose*	1.1	raffinose	0
trehalose	0.8	panose	0
isomaltose	0.9	Total amount	76.9

*compounds can't be separated -> total amount of these two compounds

**Fructose/ glucose > 1.3= honey crystallizes slowly

***Glucose/ water >2= fast crystallization

Method: Salonen, 2011

Pollens

Dominant pollen: 73 %mixed Others: <i>Calluna</i> 26.1 %

Method: Salonen, 2011

Bioactive components

Polyphenols

Total amount of the identified polyphenolics 31.1 µg/g	In honey samples of this research 4.0-80.0 µg/g
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Method: Sergiel, Pohl & Biesaga, 2014.

Methylglyoxal

0 mg/kg	In Manuka honey 38-761 mg/kg
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Method: Mavric, Wittman, Barth & Henle, 2008

Hydrogen peroxide

1.2 µmol/ml/ g of honey	In honey samples of this research 0.1-619.6 µmol/ml
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Method: Amplex® Red Hydrogen Peroxide Assay kit. Manufacture: Invitrogen.

Bioactivity

Antioxidant activity

IC ₅₀ value of your sample: 48 mg/ml	In honey samples of this research 5-238 mg/ml
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IC₅₀ value= the amount of honey that is providing 50% inhibition of oxidation. The lower the IC₅₀ value of the sample is the higher is its antioxidant activity.

High antioxidant activity	IC ₅₀ value < 10 mg/ml
Remarkable antioxidant activity	IC ₅₀ value 10-100 mg/ml
Low antioxidant activity	IC ₅₀ value >100 mg/ml

Method: Bertoneclj, Dobersek, Jamnik & Golob, 2007.

Antibacterial activity

30 % dilution of your honey sample inhibited the growth of *Pseudomonas aeruginosa* (gram negative) bacterium by **89 %** compared with the total inhibition exhibited by antibiotic. (In honey samples of this research 66-100 %).

30 % dilution of your honey sample inhibited the growth of *Staphylococcus aureus* (gram positive) bacterium by **83 %** compared with the total inhibition exhibited by antibiotic. (In honey samples of this research 13-96 %).

Literature

About honey analyses in general: Harmonised methods of the International Honey Commission, 2009

Bertoneclj, Dobersek, Jamnik & Golob, 2007. Evaluation of the phenolic content, antioxidant activity and colour of Slovenian honey. *Food Chemistry* 105: 822-828.

Mavric, Wittman, Barth & Henle, 2008. Identification and quantification of methylglyoxal as the dominant antibacterial constituent of Manuka honeys from New Zealand. *Mol.Nutr.Food Res.* 52:483-489.

Salonen A. 2011. Boreal unifloral honeys: Screening of composition and properties. Dissertation of the University of Eastern Finland, no 51.

Sergiel, Pohl & Biesaga, 2014. Characterisation of honeys according to their content of phenolic compounds using high performance liquid chromatography/tandem mass spectrometry. *Food Chemistry* 145: 404-408.