

# **HMF Content in Honey**

## **Critical Comparison of Winkler Photometric Method and HPLC**

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### **HMF Measurements in Honey - Objective:**

- **Comparison HPLC - Photometric Method**
- **Influence of band width for photometric quantification of HMF**
- **Influence of Carrez for HMF determination**
- **Stability of HMF after warming**

## Specifications

	Vis-Photometer	HPLC-UV-System
Price (Euro)	3000,00	15.000,00
Method	indirect	direct
Run time	3 min	10 min
Sample preparation	start 24 h befor measure immediately complex toxic	in time 24 h less complex less toxic
Specifity	middle	high

## Comparision HPLC - Photometric Method

	Vis-Photometer	HPLC-UV-System
<b>Honey</b>	<b>HMF mg/kg</b>	
Polyflora with Arbutus	10,0	7,4
Polyflora	9,8	4,3
Polyflora	18,8	11,7
Polyflora	1,0	0,7
Coriander	11,6	10,3
Polyflora	23,2	22,1
Fir Tree	6,6	6,1
Baker's Honey	82,8	70,2

**Influence of band width for photometric quantification of HMF**

Reference	0,5 mm	1,0 mm	2 mm	4 mm
mg/kg				
10	9,8	10,0	9,7	9,7
20	20,1	19,8	19,5	19,5
40	40,3	40,7	40,2	39,6

**Influence of Carrez for HMF determination****Wild Blossom**

<b>Date</b>	<b>Sample with Carrez mg/kg</b>	<b>Sample without Carrez mg/kg</b>
19.06.2006	22,5	21,3
20.06.2006	22,1	18,0
21.06.2006	22,2	16,4
22.06.2006	22,3	12,7
23.06.2006	19,9	4,9
28.06.2006	20	1,2

### Stability of HMF after warming

#### Original Jar - sunny day (40 °C in the sun)

Day	HMF mg/kg	Diastase	Saccharase
0	12,4	20,9	73,8
1	11,5	21,4	70,2
2	12,6	21,2	69,8
3	11,2	20,3	63,3
4	10,3	20,9	66,8
5	11,5	19,4	59,4

#### Original Jar, covered dark - sunny day (40 °C in the sun)

0	12,4	20,9	73,8
1	12,2	21,2	82,3
2	12,5	20,5	76,3
3	11,6	20,6	76,9
4	11,8	21	76,5
5	12	20,4	77,8

## Conclusions

- The HMF content measured by Winkler's photometric method is significantly higher than measured by HPLC
- The calculation of the reference concentration by UV measurement is dependent on the chosen band width of the UV photometer
- The addition of Carrez is required
- Short time tempering – 1 week outside in the sun (< 40 °C) has no influence on the HMF concentration
  
- **Recommendation:**  
HPLC as reference method for determination of HMF in honey