

# Animal welfare, etológia és tartástechnológia



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## MAGYAR BIOMÉZEK EGYES MINŐSÉGI PARAMÉTEREINEK VIZSGÁLATA

Szalai Dániel<sup>1</sup>, Sütő Julianna<sup>2</sup>, Szalainé Mátray Enikő<sup>3</sup>

<sup>1</sup>Szent István Egyetem, Környezet- és Tájgazdálkodási Intézet  
2103 Gödöllő, Páter Károly út 1.

<sup>2</sup>Ana-Ling Bt.

<sup>3</sup>Állattenyésztési és Takarmányozási Kutatóintézet, Méhtenyésztési és Méhbiológiai Kutatócsoport  
[Szalai.Daniel@kti.szie.hu](mailto:Szalai.Daniel@kti.szie.hu)

### Összefoglalás

A magyarországi flóra kiváló nektárforrás a méhek számára. Az európai mézpiacon az akácmez (*Robinia pseudo-acacia*) jelenléte meghatározó. Hazánkban az akác az összes erdőterület 19 százalékát teszi. A kezeletlen erdők adják a növekvő öko-méhészetek egyik alapját. Az elmúlt években több cikk értékelte a különböző mézfajták minőségi paramétereit. Munkánkban a hagyományos akác és vegyes virágméz mellett a különlegesnek és európai viszonylatban is jelentősnek számító selyemkóró mézet (*Asclepias syriaca*) is elemeztük, amely az elmúlt 20 évben kapott nagyobb figyelmet. A biomézek, mint kiemelt termékek több kutatás témái voltak (2000-2007). Célunk, az egyes biomézek legfontosabb értékmérő tulajdonságainak (cukorösszetevők mennyisége és aránya, HMF-, nedvességtartalom, forgatóképesség) meghatározása volt. Első évben az akác minták (n= 20) átlag fruktóz-tartalma 43,26%, glükóz-tartalma 28,28%, míg 2008-ben 40,19% ill. 28,23%. A legmagasabb HMF értéket a 2005-ös vegyesmézek átlaga mutatta (18,5), míg a legalacsonyabbat a 2004-es akácmezek átlaga (4,8%).

**Kulcsszavak:** bioméz, minőségi paraméterek

### Some quality parameters of various Hungarian certified organic honey

#### Abstract

The Hungarian flora is a good source for bees to collect nectar. The market is dominated by the Robinia (*Robinia pseudoacacia*) honey. In Hungary the share of Robinia is 19% of the total forests. This gives the environmental basis for organic honey. Robinia as a botanical species is well known by the researchers but *Asclepias syriaca* has currently received more attention. The importance of organic honey is quite high since it has got a special status on the market. Therefore certified honey deserves more studies and consideration. Our aim was to get information about the most important parameters of Robinia and multifloral and *Asclepias* honeys from organic apiaries in Hungary. Invert sugar, invertase activity, diastase activity, HMF, optical rotation, Fructose, Glucose, Fructose/Glucose ratio, saccharose, turanose, maltose, isomaltose, water content. In the first year the mean fructose content of the samples (n= 20) of black-locust honey was 43.26%, the glucose was 28.28%, while in 2005 it was (n=39) 40.19% and 28.23%, respectively. The highest mean HMF value of the samples was 18.2 in the multifloral honey (n=16) from 2005, while the lowest mean HMF value was 4.8 in Robinia honey (n=20) from 2004.

**Keywords:** organic honey, quality parameters



## Introduction

The Hungarian flora is a good source for bees to collect nectar. The share of robinia is 22% of the total forests (ÁESZ, 2005). This gives the environmental basis for organic honey as well. In the recent years the number of organic beekeepers has increased though their number is still low compared to the conventional colleagues (Szalai et al., 2005).

Beside the classical robinia honey the milkweed honey as an organic product is becoming popular. Some studies and surveys dealt with the results of different honey analysis in Europe (Persano Oddo et al., 2004) and in Hungary (Kasper-Szél et al., 2003). The information about the European honeys was useful tool in the comparison of different types of honey. Robinia as botanical species is well known by the researchers but *Asclepias syriaca* has currently received more attention (Kasper-Szél, 2006). The study of the enzyme activity, together with its content of hydroxymethylfurfural (HMF), can give us information about the intensity of the heat treatment carried out and the aging degree of honey. The enzyme compound of honey and its HMF content is the quality indicator of an authentic, nonadulterated product (Salud et al., 2007).

## Materials and methods

95 samples of honey from 37 certified organic apiaries were selected from 7 regions of Hungary in 2004 and 2005. The selected apiaries were organic certified according to the EU Reg. 2092/91 and 1804/99 by Biokontroll Hungária Kft. Determination of HMF was made according to the method of Winkler (1955). HMF is expressed in ppm. Invertase activity and sugar and water content were measured with the harmonized method of the European Honey Commission (Bogdanov et al., 1997). The results are expressed as an invertase number which indicates the amount of sucrose per g an hour hydrolysed by the enzymes contained in 100 g of honey. The diastase activity was determined photometrically (Schade et al., 1958). The results are expressed as a diastase number in Schade units.

## Results and discussion

Honeys originated from Robinia in 2004 showed the lowest deviation in F/G ratio, however other values may have been influenced by site specific and technology factors as well.



In 2004 the studied Hungarian Robinia honey was observed to contain 71.5% invert sugar and in 2005 it was 69.1%. The result in the multifloral honey was 71.3 and 68.9 for the Asclepias honey in 2005.

In the Asclepias honey (only one year was represented) invertase and diastase activity were the highest among the samples. In the first year the fructose content of the robinia honey was 43.26%, the glucose was 28.28%, while in 2005 it was 40.19% and 28.23%.

The highest HMF value, 18.2 was in the multifloral honey from 2005, while the lowest was 0.7 in Robinia honey from 2005 (Table 1).

**Table 1. Summarised results of the honey analyses**

<b>Robinia 2004 n= 20</b>	Invert sugar%	Invertase	Diastase	HMF	F/G	Fructose	Glucose	Water cont.
mean	71,54	8,12	17,77	4,81	1,54	43,26	28,28	18,25
s.d.	7,47	3,80	4,78	2,52	0,06	4,32	3,29	1,51
minimum	54,50	2,40	9,40	2,30	1,40	32,51	22,00	14,36
maximum	86,00	18,20	28,99	10,60	1,63	50,60	35,60	20,84
<b>multifloral 2004 n= 12</b>								
mean	73,59	7,77	20,28	8,86	1,17	39,58	34,05	16,92
s.d.	3,94	5,60	8,95	7,06	0,14	1,37	3,90	1,67
minimum	66,60	0,00	11,70	1,90	0,94	37,40	28,10	14,72
maximum	80,10	18,20	38,80	27,10	1,54	41,90	40,50	20,10
<b>Robinia 2005 n= 39</b>								
mean	69,10	7,39	17,45	7,65	1,44	40,19	28,23	17,70
s.d.	1,62	3,54	5,38	5,02	0,24	4,78	1,70	1,34
minimum	66,27	2,90	9,70	0,70	0,41	32,51	22,00	14,36
maximum	72,09	17,60	38,20	22,80	1,65	50,60	35,60	20,84
<b>Asclepias 2005 n= 8</b>								
mean	68,99	11,26	22,39	11,26	1,13	36,66	32,33	17,89
s.d.	1,86	3,20	5,94	5,49	0,06	1,58	1,08	1,52
minimum	66,39	4,20	12,30	4,50	1,05	34,03	31,10	15,12
maximum	71,52	15,90	29,30	34,70	1,25	39,19	34,15	20,36
<b>multifloral 2005 n= 16</b>								
mean	71,30	10,77	21,84	18,22	1,12	37,34	33,96	17,78
s.d.	2,53	7,38	10,11	17,05	0,17	2,64	3,58	1,78
minimum	64,48	0,00	8,30	0,80	0,72	31,25	27,70	13,36
maximum	74,84	25,00	42,10	68,10	1,47	41,60	43,45	21,56



## Conclusions

*Kasper-Szél et al.* (2003) measured 6.04 for invertase activity in an earlier Hungarian analysis. Their samples had lower (12.93) diastase activity and the mean fructose content was significantly higher (50.26). The minimal level of diastase activity set by the 110/2001 Honey Directive (EU, 2002) is 8 on Schade scale, in our case the lowest value was 8.3. *Persano és mtsai* (1990) measured lower diastase activity (mean 8.4; min-max 3.1-15.0) in Robinia honey as well as *Krauze and Zalewski* (1991) had lower values (11.5; 8.3-13.9). These samples did not involve Hungarian honey, thus we can say that our robinia samples referred to higher quality in the case of diastase activity. The results from other Hungarian samples (*Széles et al.*, 2006) were also less (14,6; 10,7-22,2).

In Hungary some data on quality parameters were published on milkweed honey (*Kasper-Szél et al.*, 2006). The asclepias honey had higher mean values for diastase (23.58), for invertase (13.56), for fructose (46.63) and for glucose (36.33) (*Kasper-Szél et al.*, 2003). Another result for diastase of milkweed has lower values (15.8) (*Széles et al.* 2006).

The fructose+glucose content should be more than 60 g/100 g according to the composition criteria for honey of the Directive. All of our samples fulfilled this requirement.

The content of HMF can give us information about the intensity of the heat treatment carried out or not proper storage and the aging degree of the honey. The EU set the maximum level of HMF in 40 ppm.

Eighty-nine honey samples out of the 95 meet the EU composition criteria for honey in the examined parameters. Five were out of range because of higher water content due to earlier harvest. The maximum moisture content is 20 percent. One samples had higher HMF value because storage was not satisfactory.

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