

CHARACTERISTICS OF POLISH UNIFLORAL HONEYS. III. HEATHER HONEY (*CALLUNA VULGARIS* L.)

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S u m m a r y

The aim of the study was to characterise Polish heather honey harvested under local climatic conditions. The characterisation was based on sensory analysis (evaluation of aroma, flavour, colour, consistency), and analysis of pollen as well as physicochemical parameters (electrical conductivity, activity of α -amylase enzyme, pH and free acidity, the water content, sugars, 5-hydroxymethylfurfural and proline). The research material consisted of 26 samples of heather honey, collected from selected apiaries over the years 2008-2010.

The organoleptic traits, typical for heather honey, were determined: strong aroma, approaching the aroma of the heather flower, and flavour - not overly sweet, spicy and slightly bitter. A feature typical only for this honey variety, is its gelatinous consistency. Moreover, the examination of physicochemical parameters demonstrated that heather honey is characterised by high water content, an elevated fructose to glucose ratio, electrical conductivity which is relatively high for a nectar honey variety, high proline content and activity of α -amylase enzyme.

Keywords: heather honey, honey variety, characteristics, organoleptic traits, pollen analysis, physicochemical parameters, Poland.

INTRODUCTION

Calluna vulgaris L. is widely present in Poland: in light, dry pine forests, pastures and meadows adjacent to forests and, quite frequently, in high peat bogs. Nevertheless, it is only in some areas which are mainly sandy and limestone deficient, where extensive moorlands exist, that beekeepers are able to collect up to twenty kilograms of honey per bee colony (Jabłoński, 1988).

Heather honey, due to the geographical limitations of its production, is a relatively rare honey variety in Poland. It is harvested at the end of September and beginning of October, chiefly in Dolny Śląsk, but also in Podkarpackie and Zachodniopomorskie Voivodships. The unique qualities of honey from Bory Dolnośląskie allowed it to be entered onto the 2005 "Traditional Product List" of the Ministry of Agriculture and

Rural Development. In 2008, the honey was registered by the European Commission as a Regional Product, which enabled its producers to adopt the EU symbol "Protected Geographical Indication" (<http://www.minrol.gov.pl>).

According to the analysis of the Polish apiculture sector, as mapped out for the National Beekeeping Support Program in 2010-2013, favourable climatic conditions in 2007-2009 meant that the heather honey harvest was larger than ever before. The same analysis demonstrates that heather honey was the most expensive variety of domestic honey sold in Poland (Semkiw and Skubida, 2010).

Organoleptic traits typical for heather honey and the requirements concerning the dominant pollen content in honey sediment (45% or more), are defined by the Polish Standard (PN-88/A-77626, 1998). Heather honey is characterised by

a varied proportional content of *Calluna* pollen in honey sediment, and a wide range in the total number of pollen grains in 10 g of honey (PG/10 g). This is caused by the frequent secondary addition of pollen from beebread during honey extraction. The pollen analysis of Polish heather honeys was carried out by Serwatka (1958), Woźna (1966) and Poszwiński and Warakomska (1969). Results of European heather honeys pollen analyses, obtained with the cooperation of several European laboratories, were published by Persano Oddo and Piro (2004).

Detailed guidelines referring to physicochemical properties of honey are contained in the Regulation of the Ministry of Agriculture and Rural Development, of Oct. 3, 2003 about detailed requirements for commercial honey quality (Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 03.10.2003). The decree is concurrent with the EU Directive (Council Directive, 2002).

Heather honey harvested under Polish climatic and forage conditions is characterised by amber or tea colour with lighter or darker shades; it has a strong, pleasant aroma approaching that of the aroma of heather flowers. Its flavour is distinctive, sweet and slightly bitter (Rybak, 1986). Similar organoleptic properties were presented by Persano Oddo and Piro (2004) for heather honey originating from the countries of Northern and Western Europe. Moreover, the same study noticed that gelatinous consistency, found only in heather honey varieties, impedes the extraction of honey. The phenomenon is a result of thixotropy (the ability to form colloidal solutions and change from sol to gel form). The gel form is made possible by elevated protein content, higher than in other honey varieties.

Heather honey is also characterised by a higher, in comparison with other varieties, water content (Rybak, 1986; Persano Oddo and Piro, 2004; Semkiw et al., 2008a). According to Persano Oddo and Piro (2004), elevated water content and a faster increase

of 5-hydroxymethylfurfural (HMF) content caused by a higher incidence of free acidity (HMF content grows markedly in acidic environments) is responsible for the rapid fall of heather honey quality parameters. Moreover, a relatively high activity level of α -amylase enzyme was found (Rybak, 1986; Semkiw et al., 2010) as well as a high amino acids content, which, according to Serra Bonvehi and Grandos Tarres (1993), may be a distinctive trait of this honey variety. Another significant feature is its electrical conductivity which is the highest of all nectar honeys, except chestnut honey (Rybak, 1986; Persano Oddo and Piro, 2004).

Apart from the works mentioned above (Rybak, 1986; Semkiw et al., 2008a, 2008b, 2009, 2010), elements of the characteristics of Polish heather honey are also presented in the following publications: Curyło and Rybak (1973); Piekut and Borawska (2000); Rybak-Chmielewska and Szczęsna (2000). However, none of the previously published works includes a full compilation of all the physicochemical characteristics of this honey variety.

The aim of the study was to characterise Polish heather honey harvested under the local climatic conditions. The characterisation was based on sensory analysis (evaluation of aroma, flavour, colour, consistency), and analysis of pollen as well as physicochemical parameters (electrical conductivity, activity of α -amylase enzyme expressed as diastase number, pH and free acidity, the water content, sugars, 5-hydroxymethylfurfural and proline).

MATERIALS AND METHODS

Twenty six samples of heather honey were analysed; the samples came from selected apiaries and were collected in the years 2008-2010. Test samples were initially qualified for the research purposes by organoleptic appraisal. The variety of honey was confirmed by pollen analysis; the method used conformed to the Polish Standard (PN-88/A-77626, 1998 based

on Louveaux et al., 1978). Following the standard's requirements, flavour, aroma and consistency were also determined. The colour of honey was defined in mm Pfund scale by the colorimetric method and using Lovibond PFX 195 colorimeter. The methods compiled by the International Honey Commission (Bogdanov et al., 1997) were used for testing of the physicochemical parameters. Some of the methods, such as chromatographic sugars content and HMF determination or testing for electrical conductivity, were modified according to the conditions of the Bee Products Quality Testing Laboratory (Rybak-Chmielewska and Szczesna, 2003; Szczesna and Rybak-Chmielewska, 1999; 2004).

The methods utilised for determining physicochemical parameters are also detailed in the Regulation of the Ministry of Agriculture and Rural Development, of Jan.14, 2009 for the methods of analyses used in honey assessment (Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 14.01.2009).

RESULTS AND DISCUSSION

According to the sensory analysis, heather honey is characterised by strong aroma, resembling the aroma of heather flowers; its flavour is spicy, slightly bitter and not overly sweet. The colour is amber with reddish tone. The distinguishing feature, present only in this honey variety, is its gelatinous consistency. A similar organoleptic assessment of honey was presented by Rybak (1986). The results of the sensory analysis are concurrent with the requirement for this honey variety as defined in the Polish Standard (PN-88/A-77626, 1998).

Physicochemical parameters and pollen analysis results are presented in Tab. 1.

The minimum value determined for colour in the samples tested was 69 in mm Pfund scale. For some samples, exact colour determination (above 114) was not possible due to a limited range of the equipment in high registers. Measurements were also

impeded by the gelatinous consistency of honey, preventing total clarification of the samples. Slightly lower colour values (from 63.8 to 90.0; average 76.9 in mm Pfund scale) were obtained by Persano Oddo and Piro (2004) for heather honey from Northern and Western Europe.

Calluna pollen content in the 26 samples tested was 45.4 - 82.3%; average 56.7%. The total number of pollen grains in 10 g of honey (PG/10 g) was between 17 100 - 134 400; average 69 500 (Tab. 1). The results obtained are similar to the ones published elsewhere (Serwatka, 1958; Woźna, 1966; Poszwiński and Warakomska, 1969; Persano Oddo and Piro 2004).

Water content in the samples tested ranged from 15.4 to 21.9%. The average value of the parameter was 19.1% and was much lower than the permitted value for heather honey (23%) as defined by the Regulation of the Ministry of Agriculture and Rural Development, of Oct. 3, 2003 (Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 03.10.2003). The standard deviation was 1.5 and the variation coefficient was 7.9%. The rather large variability of this factor is caused, as in the case of the problems with colour determination, by the gelatinous consistency preventing total clarification of the samples. The results obtained are congruent with earlier results of other authors: from 17.6 to 24.6%, on average 20.1% (Rybak, 1986); from 19.1 to 21.0%, on average 20.0% (Semkiw et al., 2008a). A slightly lower water content (from 15.6 to 21.4%, on average 18.5%) was found in the heather honey tested by Persano Oddo and Piro (2004). The differences might have resulted from diverse climatic conditions.

Total content of monosaccharides (fructose and glucose) was from 62.4 to 76.1 g/100 g, with the average of 69.3 g/100 g, and with the standard deviation and the variation coefficient 3.3 and 4.8%, accordingly. The results for the monosaccharides correspond to the requirements (Rozporządzenie

Table 1

Physicochemical properties and pollen analysis of heather honey

Parameter	Unit	Min-Max	Mean	Standard deviation	Variation coefficient (%)
Colour	mm Pfund	69 - higher than 114	-	-	-
<i>Calluna</i> pollen	%	45.4 - 82.3	56.7	12.3	21.7
Pollen absolute number	PG/10 g-103	171 - 134.4	69.5	41.7	60.0
Water	%	15.4 - 21.9	19.1	1.5	7.9
Fructose (F)	g/100 g	36.5 - 43.3	39.3	1.8	4.6
Glucose (G)	g/100 g	25.9 - 34.3	29.9	2.0	6.7
F+G*	g/100 g	62.4 - 76.1	69.3	3.3	4.8
F/G**		1.12 - 1.46	1.32	0.1	7.6
Sucrose	g/100 g	0.5***- 0.6	-	-	-
Turanose	g/100 g	0.9 - 2.7	1.4	0.4	28.6
Maltose	g/100 g	0.8 - 2.8	1.8	0.4	22.2
Trehalose	g/100 g	0.7 - 2.2	1.3	0.4	30.8
Isomaltose	g/100 g	0.5***- 0.7	-	-	-
Diastase (DN)	Schade****	19.0 - 57.3	32.7	9.4	28.7
HMF	mg/kg	0.7 - 14.8	4.8	4.1	85.4
Free Acidity	mval/kg	14.9 - 33.8	22.1	5.4	24.4
pH		4.07 - 4.66	4.37	0.17	3.9
Electrical Conductivity	mS/cm	0.37 - 0.82	0.62	0.1	16.1
Proline	mg/100 g	33.1 - 92.1	55.3	12.5	22.6

* total content of monosaccharides (fructose and glucose)

** fructose to glucose ratio

*** limit of determination

**** one diastase unit is equivalent to the activity level of the enzyme contained in 1 g of honey which may hydrolyze 0.01 g of starch within 1 hour at the temperature of 40°C

Ministra Rolnictwa i Rozwoju Wsi z dnia 03.10.2003) describing the minimum value for this parameter in nectar honey (60 g/100 g). Similar parameter values (from 69.26 to 70.9%, average 69.96 %) were found by Semkiw et al. (2009). A slightly higher monosaccharides content, on average 73.4 g/100 g, was detected by Persano Oddo and Piro (2004).

In the samples tested, a high ratio of fructose to glucose (F/G) was found; from 1.12 to 1.46, on average 1.32, with the standard deviation of 0.1 and the variation coefficient 7.6%. The much lower glucose content (from 25.9 to 34.3 g/100 g, average 29.9 g/100 g) in comparison with fructose (from 36.5 to 43.3 g/100 g, average 39.3 g/100 g) results in a slow crystallisation process of heather honey and prolonged retention of its gelatinous consistency. Similar results for the sugars content were presented by

Rybak-Chmielewska and Szczęsna (2000); the range for fructose was from 38.79 to 39.54%, on average 39.17% and for glucose from 28.49 to 30.13%, on average 29.31%, with the F/G from 1.31 to 1.36, on average 1.34. A slightly lower average value for the F/G (1.25) was found by Semkiw et al. (2009). However, it must be noted that the differences may result from the low number of samples tested by these authors. A high proportion of fructose to glucose content is also confirmed by the results obtained by Persano Oddo and Piro (2004): from 1.15 to 1.40, with the average of 1.26. As was similar in this work, Persano Oddo and Piro found a much lower glucose content (from 29.3 to 35.7 g/100 g, on average 32.5 g/100 g) in comparison with fructose content (from 37.1 to 44.9 g/100 g, on average 40.8 g/100 g).

In almost all the samples tested (25), the sucrose content was found below the level of 0.5 g/100 g (the method's determinability limit). In only one sample the sucrose content was established at 0.6 g/100 g. The parameter values in all samples were much lower than the admissible 5 g/100 g (Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 03.10.2003). A similarly low content (on average 0.85%) was found by Semkiw et al. (2009).

Apart from sucrose, other disaccharides were determined: turanose, maltose, trehalose and isomaltose. The content range for turanose was from 0.9 to 2.7 g/100 g, on average 1.4 g/100 g; for maltose from 0.8 to 2.8 g/100 g, on average 1.8 g/100 g; and for trehalose from 0.7 to 2.2 g/100 g, on average 1.3 g/100 g. In the majority of samples (17), the content of isomaltose was below the level of 0.5 g/100 g; in 5 samples the content was 0.5 g/100 g, in 3 samples it was 0.7 g/100 g and in 1 sample it was 0.6 g/100 g. The standard deviation and the variation coefficient for the content of the disaccharides tested were on similar levels and were accordingly: for turanose - 0.4 and 28.6%; for maltose - 0.4 and 22.2%; for trehalose - 0.4 and 30.8%.

The activity level of α -amylase determined by the diastase number (DN) for the samples tested, ranged from 19.0 to 57.3 Schade units, on average 32.7 Schade; with the standard deviation of 9.4 and variability coefficient of 28.7%. The values are much higher than the minimum - 8 Schade units (Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 03.10.2003). The DN results presented here are slightly lower than the results obtained earlier by other authors. The range for α -amylase activity level in heather honey presented by Rybak (1986) was from 33.7 to 69.7 Schade units, on average 48.4. Those results which were closer to the results from this work were obtained by Semkiw et al. (2010). The range they presented was from 29.82 to 53.76, on average 37.19. A much lower α -amylase activity (from 12.0 to 36.0; average 23.4) was found in heather honey by Persano

Oddo and Piro (2004).

In the samples tested, HMF content was in the range of 0.7 - 14.8 mg/kg. Only in four samples did the parameter value surpass 10 mg/kg; in the majority of samples (21) the levels were much lower. The average content for all the samples tested was 4.8 mg/kg and was much lower than the admissible level of 40 mg/kg (Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 03.10.2003). The standard deviation for the value searched was 4.1 and the variation coefficient was 85.4%. A much higher than the average HMF content was observed in the samples with a higher incidence of free acidity.

All the tested samples of heather honey had free acidity in the range of 14.9 to 33.8 mval/kg, on the average, 22.1 mval/kg with the standard deviation of 5.4, and an admittedly high - but lower than in HMF determination, variability coefficient of 24.4%. The range of pH in the samples tested was from 4.07 to 4.66, on average 4.37. The results of pH testing were characterised by much lower variability than the results of testing for free acidity. The standard deviation and coefficient of variation for the pH tests were 0.17 and 3.9%, respectively. A similarly wide range of results in free acidity testing was found by other authors: from 17.9 to 37.6 mval/kg, average 26.5 mval/kg (Rybak, 1986); from 18.9 to 35.0 mval/kg, average 24.55 mval/kg (Semkiw et al., 2010) and from 20.8 to 43.0 mval/kg, average 32.1 mval/kg (Persano Oddo and Piro, 2004). These publications also presented the range and average values of pH results, which were accordingly: from 3.9 to 4.4, average 4.17 (Rybak, 1986); similarly Persano Oddo and Piro (2004) - from 3.9 to 4.7, average 4.2. Unfortunately, the works mentioned do not present data concerning HMF content in heather honey samples. Only Persano Oddo and Piro (2004) briefly mention that heather honey is characterised by a higher-than-elsewhere noted content of HMF related to the higher free acidity.

The heather honey samples tested were distinguished by relatively high electrical conductivity in comparison with other nectar honey varieties. The conductivity range was from 0.37 to 0.82 mS/cm, on average 0.60 mS/cm, with the standard deviation and variability coefficient 0.1 and 16.7%, respectively. Requirements concerning the electrical conductivity of particular honey varieties are stated rather ambiguously in the Regulation of the Ministry of Agriculture and Rural Development, of Oct. 3, 2003 (Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 03.10.2003). The parameter is described more precisely in the Polish Standard (PN-88/A-77626, 1998), which states the minimum 2×10^{-4} S/cm for nectar honey; 6×10^{-4} S/cm for nectar-honeydew honey, 8×10^{-4} S/cm for deciduous honeydew varieties and 9.5×10^{-4} S/cm for coniferous honeydew honey varieties. Similarly high values of electrical conductivity in Polish heather honey samples were found by other researchers: from 4.65 to 11.08×10^{-4} S/cm, on average 6.92×10^{-4} S/cm (Rybak, 1986); from 4.94 to 8.02×10^{-4} S/cm, on average 5.73×10^{-4} S/cm (Semkiw et al., 2008b). Even higher values of electrical conductivity (from 0.49 to 0.97, average 0.73 mS/cm) were determined in heather honey samples originating from Northern and Western Europe (Persano Oddo and Piro, 2004).

The range for proline content results was from 33.1 to 92.1 mg/100 g, on average, 55.3 mg/100 g with the standard deviation and variability coefficient 12.8 and 23.1%, accordingly. The parameter value for heather honey was decisively higher in comparison with other nectar honey varieties. The requirements concerning minimum of proline content (25 mg/100 g) are described only in the Polish Standard (PN-88/A-77626, 1998) which currently is not a binding document in regards to commercial honey quality. Proline content in the samples tested was much higher than the minimum required and only slightly lower than the content presented

in the results obtained by Persano Oddo and Piro (2004) for the samples they tested (from 309 to 1033 mg/kg, average 646 mg/kg).

CONCLUSIONS

1. The results obtained allowed to characterise heather honey harvested in the climatic and apicultural conditions of Poland.

2. Heather honey is characterised by a strong aroma, approaching the one of heather flowers, its flavour is spicy, slightly bitter and not overly sweet. The colour is amber with reddish tone. The distinguishing feature, present only in this honey variety, is its gelatinous consistency.

3. Heather honey is characterised by a varied percentile content of *Calluna* pollen and a wide range of total number of pollen grains in 10 g of honey.

4. Physicochemical parameters typical for heather honey are: high water content, elevated fructose to glucose ratio, relatively high, for a nectar honey variety, electrical conductivity, and also high proline content and activity of α -amylase enzyme.

REFERENCES

- Bogdanov S., Martin P., Lullmann C. (1997) - Harmonised methods of the European Honey Commission, *Apidologie*, extra issue, 1-59.
- Council Directive 2001/110/EC of 20 December 2001 relating to honey (2002) - *Official Journal of European Communities L.*, 10, 47-52.
- Curyło J., Rybak H. (1973) - Kwasowość krajowych miodów odmianowych i „syropu pszczelego” (SP). *Pszczeln. Zesz. Nauk.*, 17: 177-189.
- Jabłoński B. (1988) - przyczynek do poznania biologii kwitnienia, nektarowania i miododajności wrzосу (*CALLUNA VULGARIS* (L) SALISB.) *Pszczeln. Zesz. Nauk.*, 32: 55-76.

- Louveaux J., Maurizio A., Vorwohl G. (1978) - International Commission for Bee Botany of IUBS. Methods of Melissopalynology. *Bee World*, 59, 139-157.
[online] <http://www.minrol.gov.pl>
- Persano Oddo L., Piro R. (2004) - Main European unifloral honeys: descriptive sheets. *Apidologie*, 35 (Suppl. 1): 38-81.
- PN-88/A-77626 „Miód Pszczeli” (1998) - Dziennik Norm i Miar nr 8, Wydawnictwo Normalizacyjne Alfa.
- Piekut J., Borawska M. (2000) - Wpływ różnych metod dekrystalizacji na wartość liczby diastazowej oraz zawartość 5-hydroksymetylofurfuralu w miodach pszczelich. *Pszczeln. Zesz. Nauk.*, 44(1): 23-32.
- Poszwiński L., Warakomska Z. (1969) - Analiza pyłkowa miodów rzepakowych i wrzosowych województwa warszawskiego. *Pszczeln. Zesz. Nauk.*, 13(1-2-3): 147-158.
- Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 3.10.2003 w sprawie szczegółowych wymagań w zakresie jakości handlowej miodu (D.U. Nr 181, poz.1773 z późn. zm. Dz.U. Nr. 40, poz. 370).
- Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 14 stycznia 2009 w sprawie metod analiz związanych z dokonywaniem oceny miodu (Dz.U. 2009 nr 17 poz. 94).
- Rybak H. (1986) - Charakterystyka chemiczna krajowych miodów odmianowych. *Pszczeln. Zesz. Nauk.*, 30: 3-17.
- Rybak-Chmielewska H., Szczęśna T. (2000) - Mono- and oligosaccharides composition of some Polish unifloral honeys by means of gas chromatography. *Pszczeln. Zesz. Nauk.*, 44(2): 93-101.
- Rybak-Chmielewska H., Szczęśna T. (2003) - Determination of saccharides in multifloral honey by means of HPLC. *J. Apic. Sci.*, 47(2): 93-101.
- Semkiw P., Skowronek W., Skubida P., (2008a)- Changes in water content of honey during ripening under controlled conditions. *J. Apic. Sci.*, 52 (1): 57-63.
- Semkiw P., Skowronek W., Teper D., Skubida P. (2008b) - Changes occurring in honey during ripening under controlled conditions based on pollen analysis and electrical conductivity. *J. Apic. Sci.*, 52(2): 45-53.
- Semkiw P., Skowronek W., Skubida P., Rybak-Chmielewska H., Szczęśna T. (2009) - Changes on saccharide composition of honey during ripening under controlled conditions. *J. Apic. Sci.*, 53 (1): 81-93.
- Semkiw P., Skubida P. (2010) - Evaluation of the economical aspects of Polish beekeeping. *J. Apic. Sci.*, 54 (2): 5-15.
- Semkiw P., Skowronek W., Skubida P., Rybak-Chmielewska H., Szczęśna T. (2010) - Changes occurring in honey during ripening under controlled conditions based on α -amylase activity, acidity and 5-hydroxymethylfurfural content. *J. Apic. Sci.*, 54 (1): 55-63.
- Serra Bonvehí J., Granados Tarrés E. (1993) - Physicochemical properties, composition and pollen spectrum of ling heather (*Calluna vulgaris*) (L) Hull honey produced in Spain, *Apidologie* 24, 586-596.
- Serwatka J. (1958) - Wyniki analizy pyłkowej miodów wrzosowych z 1956 r. *Pszczeln. Zesz. Nauk.*, 2(2): 55-66.
- Szczęśna T., Rybak-Chmielewska H. (1999) - Determination of hydroxymethylfurfural (HMF) in honey by HPLC. *Pszczeln. Zesz. Nauk.*, 43(1): 219-227.
- Szczęśna T., Rybak-Chmielewska H. (2004)- The temperature correction factor for electrical conductivity of honey. *J. Apic. Sci.*, 48(2): 97-103.
- Woźna J. (1966) - Obraz pyłkowy i barwa niektórych odmianowych miodów handlowych. *Pszczeln. Zesz. Nauk.*, 10: 139-153.

CHARAKTERYSTYKA POLSKICH MIODÓW ODMIANOWYCH. III. MIÓD WRZOSOWY (*CALLUNA VULGARIS* L.)

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S t r e s z c z e n i e

Celem badań była charakterystyka miodu wrzosowego, pozyskiwanego w warunkach klimatyczno-pożytkowych naszego kraju. Charakterystyki tej dokonano na podstawie: oceny organoleptycznej (zapachu, smaku, barwy, konsystencji), analizy pyłkowej i parametrów fizykochemicznych (przewodność elektryczna właściwa, aktywność enzymu α -amylazy, pH i wolne kwasy oraz zawartość: wody, cukrów, 5-hydroksymetylofurfuralu i proliny). Materiał do badań stanowiło 26 próbek miodu wrzosowego, pozyskanych z różnych pasiek w latach 2008-2010.

Miód wrzosowy charakteryzuje się silnym zapachem, zbliżonym do zapachu kwiatów wrzosu oraz mało słodkim, ostrym i gorzkawym smakiem. Cechą właściwą tylko dla tej odmiany miodu jest galaretowata konsystencja. Miód wrzosowy ma barwę bursztynową z rudawym odcieniem, wyrażona w mm Pfunda mieściła się w zakresie od 69 do 114. Dla kilku próbek, niemożliwe było dokładne oznaczenie barwy ze względu na ograniczony zakres górnej skali aparatu (114). Analiza pyłkowa wykazała dużą zmienność pod względem procentowej zawartości pyłku *Calluna* (od 45,4 do 82,3%; średnio 56,7%) oraz całkowitej liczby ziaren pyłku w 10 g miodu wrzosowego (od 17 100 do 134 400; średnio 69 500). Ponadto, badania właściwości fizykochemicznych wykazały, że miód wrzosowy w porównaniu z innymi odmianami, odznacza się: wysoką zawartością wody (od 15,4 do 21,9%; średnio 19,1%), wysokim stosunkiem fruktozy do glukozy (od 1,12 do 1,46; średnio 1,32), wysoką, jak dla miodu nektarowego przewodnością elektryczną właściwą (od 0,37 do 0,82 mS/cm; średnio 0,62 mS/cm) oraz wysoką zawartością proliny (od 33,1 do 92,1 mg/100 g; średnio 55,3 mg/100 g) i aktywnością enzymu α -amylazy (od 19,0 do 57,3 Shade; średnio 32,7 Shade).

Słowa kluczowe: miód wrzosowy, odmiana miodu, charakterystyka, cechy organoleptyczne, analiza pyłkowa, parametry fizykochemiczne, Polska.

