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Physicochemical Characterisation of Royal Jelly from Northwestern Bosnia and Herzegovina

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The consumption of royal jelly is increasing due to its unique chemical composition and high nutritional value. With the discovery of the main bioactive compounds, royal jelly takes a significant role in the food and pharmaceutical industry. One of the most important ingredients of royal jelly is 10-hydroxy-2-decenoic acid (10-HDA), which is specific only to royal jelly. Due to the season and geographical origin, there are differences in the quality of royal jelly. In this paper, ten samples of royal jelly were analyzed, which were collected from the area of northwestern Bosnia and Herzegovina. In addition to 10-hydroxy-2-decenoic acid (10-HDA), physicochemical parameters were analyzed: pH value, total acidity, protein content, and antioxidant activity of royal jelly.

Results

Sample	pH	Total acidity	Proteins w (%)	Total phenols mg GAE/ g	10-HDA w (%)	DPPH (%) for 10% solution	FRAP Fe^{2+} µM / g
RJ 1.	5.37 ± 0.08*	33.94	**20.35 ± 1.15**	0.31 ± 0.01	**3.65 ± 0.03**	**41.69 ± 0.81**	134.78 ± 0.103
RJ 2.	5.25 ± 0.1	29.25	14.55 ± 1.69	0.21 ± 0.005	3.43 ± 0.09	38.39 ± 1.18	129.03 ± 0.103
RJ 3.	5.28 ± 0.05	29.78	13.91 ± 0.79	**0.37 ± 0.01**	2.68 ± 0.03	38.74 ± 0.87	125.765 ± 0.178
RJ 4.	5.17 ± 0.06	34.03	10.25 ± 0.39	0.19 ± 0.02	3.15 ± 0.08	37.29 ± 1.38	104.41 ± 0.178
RJ 5.	5.21 ± 0.02	**36.36**	7.63 ± 0.05	0.27 ± 0.003	3.14 ± 0.03	36.63 ± 0.05	106.19 ± 0.178
RJ 6.	5.29 ± 0.02	26.67	14.87 ± 0.61	0.18 ± 0.002	2.62 ± 0.03	39.39 ± 1.26	119.3 ± 0.741
RJ 7.	5.42 ± 0.01	19.98	17.94 ± 0.19	0.23 ± 0.002	2.82 ± 0.05	39.60 ± 1.13	125.706 ± 0.272
RJ 8.	5.45 ± 0.01	17.8	13.88 ± 0.39	0.23 ± 0.003	2.61 ± 0.04	38.26 ± 0.85	134.07 ± 0.103
RJ 9.	5.36 ± 0.02	21.95	13.06 ± 1.34	0.27 ± 0.002	2.71 ± 0.04	36.99 ± 0.05	109.81 ± 0.103
RJ 10.	**5.7 ± 0.01**	15.09	15.85 ± 0.16	0.21 ± 0.01	2.19 ± 0.04	38.38 ± 1.34	**134.84 ± 2.621**

Legend: * Mean ± SD

Methods

pH: Royal jelly-Specifications. ISO 12824:2016
Total acidity: method by Kanelis et al. (2015)[1]
Total proteins: UV/VIS spectrophotometric measurement with the Folin-Ciocalteu reagent[2]
Total phenols: method by Folin-Ciocalteu[3]
10-HDA: HPLC/DAD technique, method by Flanjak et al. (2019)[4]
DPPH: method by Brand-Williams et al. (1995)[5]
FRAP: method by Benzie and Strain (1999)[6]

Conclusions

The obtained results show that samples of royal jelly from the area of northwestern Bosnia and Herzegovina meet international standards for the specification of royal jelly with regard to the content of 10-HDA and other parameters for fresh and authentic samples.

Considering the established quality and very high antioxidant activity of the analyzed samples, they represent a significant potential for use in the development of functional products with pronounced nutritional and biological capacity.

[1] doi:10.1515/aiht-2015-66-2651
[2] PMID: 14907713
[3] doi.org/10.1016/j.foodchem.2007.01.060
[4] doi.org/10.17508/CJFST.2019.11.2.18
[5] doi.org/10.1016/S0023-6438(95)80008-5
[6] doi.org/10.1016/S0076-6879(99)99005-5