CHEMICAL COMPOSITION OF BERRY FRUITS

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Introduction

Berries are fruits that are very well known and recognized for its sweet taste and colour that variates from red to blue or black. They have different chemical composition and numerous healthy properties. The chemical composition of berry fruits can be highly variable depending on the cultivar, growing location, ripeness stage, and harvest and storage conditions. They are a good source of essential vitamins and minerals, and have diverse phytochemical compositions that relate to consumer satisfaction and health. Because of its possible positive health impact insufficiently researched berries for consumption are increasingly being explored.

Vaccinium myrtillus L.

The purpose of this work was to compare basic fruit chemical composition of three berries grown as wild plants, two of which (*Juniperus communis* L. and *Sorbus aucuparia* L.) are poorly researched.

Juniperus communis L.

Materials and methods

For the analyses were used 35 samples of bilberries (*Vaccinium myrtillus* L.) from different locations in Gorski kotar; 21 samples of common juniper (*Juniperus communis* L.) from 7 different regions (Istra, Lika, Gorski kotar, Velebit, Northern Adriatic, Slavonia and Žumberak); and 63 samples of rowanberry (*Sorbus aucuparia* L.) from different locations in both Gorski kotar and Velebit, Republic of Croatia. Basic chemical composition of fruit including moisture, total ash, fibre, total fat, crude protein, total sugar was determined according to the official AOAC methods (AOAC 992,15:2000; AOAC 925,03:2000; AOAC 925,35:2000; AOAC 989,05:2000).

Fresh berry samples were freezed until chemical analyses were performed. Before the analyses berries were chopped with a mixer into small pieces so that the analysis could be carried out as well as possible. The chopped pieces of fruits were homogenized and transferred with a spatula into plastic cups marked with the specified location and sample number.

Results

Results of the determination of main chemical composition of bilberry, juniper and rowanberry are shown in Table 1. and Figure 1. Numerous parameters, besides the methods of sample preparation (freezing, storage temperature, time of storage, etc.) and chemical analyses, can affect the chemical composition results, like variety, growing conditions, harvesting, maturity stage, transport and handling conditions. For these reason it can be a quite difficult to interpret and compare the results obtained by different researchers.

Table1. Total moisture, ash, fat, protein and sugar content (%) in fresh weight of bilibery, juniper and rowanberry fruits

CHEMICAL COMPOSITION OF BERRY FRUITS							
REGION		No. of the samples	MOISTURE [%]	ASH [%]	TOTAL FAT [%]	CRUDE PROTEIN [%]	SUCROSE [%]
BILBERY	*Vrbosko*	10	87.24	0.25	0.38	0.79	7.53
	Skrad	5	86.59	0.25	0.51	0.97	6.88
	Ravna Gora	5	87.03	0.27	0.52	1.08	7.34
	Mrkopalj	15	86.98	0.22	0.46	1.04	7.64
AVERAGE			**87.00**	**0.24**	**0.45**	**0.96**	**7.46**
MINIMUM			**85.07**	**0.13**	**0.29**	**0.56**	**6.30**
MAXIMUM			**89.39**	**0.34**	**0.79**	**1.81**	**8.70**
SD			**0.98**	**0.04**	**0.13**	**0.24**	**0.69**
JUNIPER	*Gorski Kotar*	3	26.77	3.00	8.03	3.33	17.70
	Lika	2	35.91	1.85	8.67	2.11	24.76
	Istra	8	30.10	2.45	8.20	2.66	26.73
	Velebit	3	35.50	2.43	7.20	3.02	12.59
	Slavonia	2	27.07	2.47	10.21	2.44	27.73
	Northen Adriatic	2	33.97	2.11	6.71	1.89	24.46
	Žumberak	1	18.19	2.77	7.50	2.12	35.43
AVERAGE			**30.46**	**2.45**	**8.22**	**2.63**	**23.49**
MINIMUM			**12.74**	**1.82**	**6.25**	**1.85**	**6.95**
MAXIMUM			**46.06**	**4.12**	**11.01**	**4.25**	**35.43**
SD			**7.84**	**0.55**	**1.55**	**0.71**	**7.08**
ROWANBERRY	*Vlebit*	30	73.43	1.16	1.44	2.85	5.31
	Gorski Kotar	33	77.80	1.00	1.52	3.01	4.14
AVERAGE			**75.72**	**1.07**	**1.48**	**2.93**	**4.70**
MINIMUM			**61.12**	**0.52**	**0.73**	**0.45**	**2.08**
MAXIMUM			**83.42**	**2.53**	**3.18**	**4.13**	**7.61**
SD			**4.63**	**0.41**	**0.56**	**0.63**	**1.30**

Obtained result have shown that juniper and rowenberry had higher total solids compared to bilberry fruits. Fruits with higher total solids, are more convenient and desirable for processing. Generally, the highest share in total solids of fruit is contributed by carbohydrates, i.e. sugars.

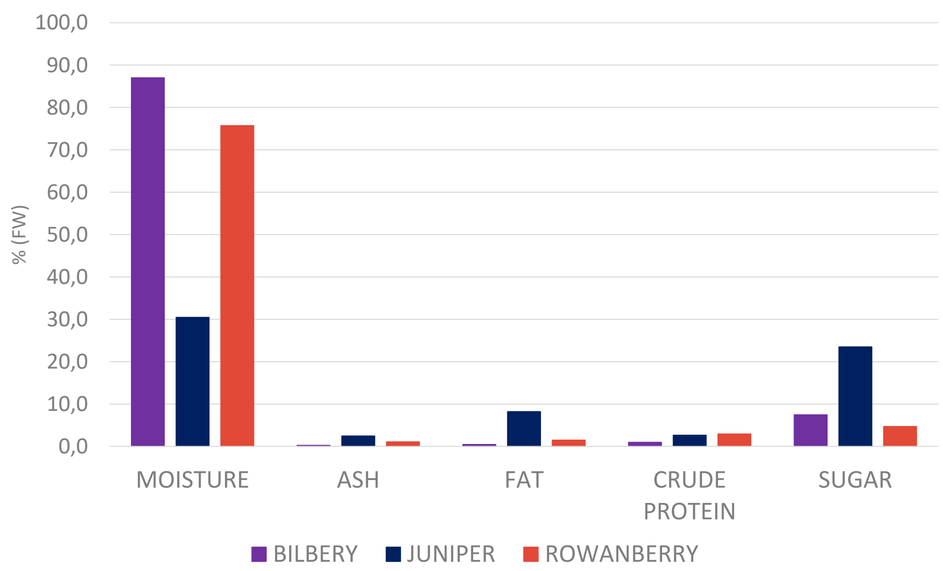

Figure 1. Total moisture, ash, fat, protein and sugar content (%) in fresh weight of bilibery, juniper and rowanberry fruits

Conclusion

On average, bilberries showed the highest moisture content (87.01%) and the lowest content of ash (0.24%), fat (0.45%) and the crude protein (0.95%); while rowanberry showed the highest crude protein (2.93%) and the lowest total sugar (4.70%) content. Juniper berries showed the lowest moisture content (30.46%) and the highest content of ash (2.45%), total fat (8.22%) and total sugar (23.49%).
The results indicate the great potential of the less studied berry fruit species for culinary use and nutrition.

Sorbus aucuparia L.

References

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AOAC 992,15:2000, Fruits and fruit products – Crude proteins in fruits and fruit products; AOAC 925,03:2000, Fruits and fruit products – Moisture in fruits and fruit products; AOAC 925,35:2000, Fruits and fruit products – Sucrose in fruits and fruit products; AOAC 989,05:2000, Fruits and fruit products – Total fat in fruits and fruit products