Influence of Climatic Factors on the Nutritional Value in Cynosbati Fructus

Sorina Ropciuc[1], Radu Cenuşă[1], Rodica Caprita[2], Iuliana Creţescu[2], Tanase Ion[1]

[1]University Stefan cel Mare Suceava – 720229, Street University 13, Romania
[2] Banat's University of Agricultural Sciences and Veterinary Medicine Timisoara – 300645, Calea Aradului 119, Romania

Abstract
Ascorbic acid (vitamin C) is an important component in the fruits of dog rose. Its slightly laxative and diuretic effect, for which the dog rose is used in folk medicine, is supposed to be due to its content rich in pectin and organic acids. The investigated material were the fruits of Rosa canina L collected from 42 biotypes marked on the route: Suceava – Pătrăuţi – Lunca Sucevei (Dărmăneşti) - Costâna - Părhăuţi - Todireşti - Cajvana - Arbore - Solca - Clit - Marginea -Rădăuţi – Suceviţa – Palma during 2007, 2008, 2009 and 2010 years. The quantitative values of rainfalls influenced the content in vitamin C and the humidity of the fruits. The content in vitamin C increased with the increase in humidity and with the decease in temperature.

Keywords: rose hip fruit, food principles, low caloric value, carbohydrates.

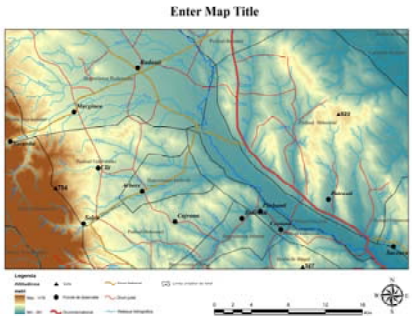
1. Introduction

Rosehip is the dry, mature and compact fruit of Rosa canina L., a shrub specific to the European and Central and West Asia area [1]. Ascorbic acid (vitamin C) is an important component in the fruits of dog rose, with values between 0.5 and 1.7 mg/% [2]. In addition they also contain many other chemical compounds such as pectin, tannins and organic acids (especially citric acid and malic acid) [3]. Rosehip (rosehip fruit) is used mainly in the support therapies in the cases of ascorbic acid deficiency [4]. Its slightly laxative and diuretic effect, for which the dog rose is used in folk medicine, is supposed to be due to its content rich in pectin and organic acids [5]. The extract of this fruit is incorporated, beside vitamin C, in some „natural" vitamin preparations, such as pills, capsules, syrups [6].

2. Materials and methods

The investigated material is the fruit of Rosa canina L collected from 42 biotypes marked on the route: Suceava – Pătrăuţi – Lunca Sucevei (Dărmăneşti) - Costâna - Părhăuţi - Todireşti - Cajvana - Arbore - Solca - Clit - Marginea - Rădăuţi – Suceviţa – Palma during 2007, 2008, 2009 and 2010 years.
Determining the content of refractometric extract (soluble extract) by refractometry. The method principle. The refractive index is determined at a temperature of 20^{o}C and from its value is deduced the soluble substances content expressed as sucrose, using a conversion table.

* Corresponding author: Sorina Ropciuc, Email: sorinaropciuc@yahoo.com



Equipment. The refactometer equipped with a graduated scale marked in values of the refractive indexes having an accuracy of ± 0.0002, or refractometer provided with a graduated scale marked in sucrose percentages, having an accuracy of 0.1%.

Calculation: if the determination was made on a diluted solution, the percentage of soluble substance is determined as follows:

% soluble substance= $\frac{c \cdot 100 \cdot v}{m \cdot 100}$, where:

c-soluble substances content,(%); v-the solution volume, (cm^3);m-the mass of the product considered for determination, (g).

3. Results and discussion

The refractometric method is quite widely used for controlling the content of soluble dried residue of a large range of products: fruits, juices, fruit smoothies, fruit preserved with sugar, products from sugar industry and confectionery. In the case of fruit and fruit products, the result is not expressed in dried residue, but as refractometric extract, which industrially has the same importance as the dried residue. To determine the refractometric extract we used the Abbé refractometer. The variation of the content of dried residue is presented in Table 1. From the obtained values we note the refractometric extract difference between the year 2007 compared with 2008, 2009, 2010. Measurements were made in 2007 from the fruit harvested in the second half of October, which led to an increase in the refractometric extract content compared to other years.

The variation of rainfalls in the studied years is presented in Table 2. The quantitative values of rainfalls influenced the content in vitamin C and the humidity of the fruits. The content in vitamin C increased with the increase in humidity and with the decease in temperature.

Table 1. Dry substance content (%)

Station		Dry substance content, %				Station		Dry substance content, %			
		2007	2008	2009	2010			2007	2008	2009	2010
S 1	T1	34.64	33.61	34.21	33.82	S8	T1	32.56	31.16	32.44	31.43
	T2	34.64	33.67	34.16	33.65		T2	32.78	32.23	32.33	32.40
	T3	35.30	34.12	34.22	34.20		T3	33.12	32.41	33.16	32.78
S 2	T1	33.45	32.47	32.53	32.44	S9	T1	33.45	32.82	32.14	32.24
	T2	35.39	33.87	34.32	34.30		T2	34.78	32.45	34.68	33.29
	T3	33.62	34.18	34.16	33.89		T3	34.12	35.61	34.17	34.16
S 3	T1	30.43	30.34	30.32	30.42	S10	T1	35.65	34.21	34.24	34.20
	T2	32.75	32.18	32.38	32.27		T2	34.78	34.44	34.61	34.60
	T3	32.61	32.15	32.17	32.17		T3	36.29	35.87	35.21	35.48
S 4	T1	36.39	35.72	36.29	36.32	S11	T1	29.79	30.68	31.10	30.54
	T2	37. 65	36.62	36.14	36.19		T2	29.59	29.46	29.64	29.48
	T3	36.90	36.35	36.62	36.44		T3	30.58	30.84	31.20	30.76
S 5	T1	34.32	33.65	32.84	32.80	S12	T1	32.54	31.50	31.65	31.22
	T2	33.48	32.18	33.58	33.04		T2	33.67	30.45	30.44	30.63
	T3	33.27	33.24	33.26	33.54		T3	32.79	31.65	31.64	31.40
S 6	T1	33.45	31.64	32.46	32.44	S13	T1	34.65	33.21	33.17	33.50
	T2	33.57	32.56	33.46	33.21		T2	34.27	31.87	31.28	31.26
	T3	34.20	33.66	34.67	33.90		T3	33.31	32.34	31.67	31.82
S 7	T1	37.06	36.67	36.78	36.68	S14	T1	30.17	30.34	30.44	30.36
	T2	36.89	36.55	36.64	36.30		T2	32.54	31.42	30.79	30.38
	T3	35.39	34.26	34.24	34.56		T3	31.23	30.44	30.23	30.10
Average								35.24	32.97	33.14	32.19

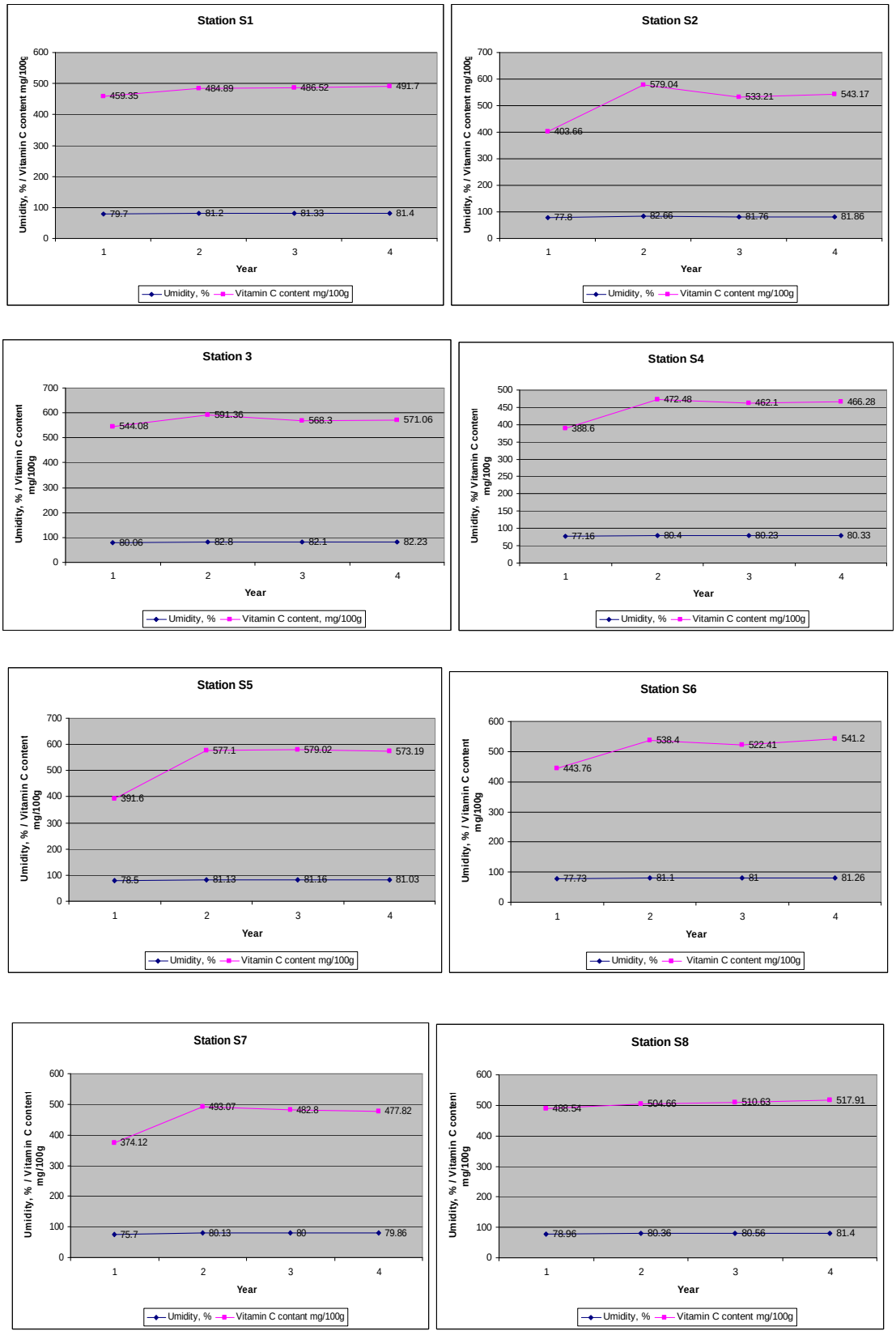


Figure 1. Variation in vitamin C and umidity

Table 2. Monthly and yearly level precipitation

Monthly and yearly precipitation in Radauti

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual amount
2007	10.8	31.3	51.1	28.8	83.8	61.9	85.8	102.0	71.8	92.8	56.7	32.2	709.0
2008	13.6	23.7	18.0	121.8	84.0	73.6	271.8	93.0	72.4	51.8	8.6	28.9	861.2
2009	31.3	17.5	23.8	18.0	90.4	114.1	73.4	33.8	8.4	82.4	19.8	40.6	553.5
2010	28.5	39.5	27.9	38.4	138.2	282.4	129.4	47.8	91.2	42.8	17.3	31.1	914.5
Average amount 2007-2010	21.1	28.0	30.2	51.8	99.1	133.0	140.1	69.2	61.0	67.5	25.6	33.2	759.6

Monthly and yearly precipitation in Suceava

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual amount
2007	10.1	45.2	41.8	32.9	53.9	30.7	105.8	135.1	67.3	87.0	43.4	34.3	687.5
2008	5.7	23.9	15.9	135.2	91.5	99.2	297.8	72.3	60.4	43.4	8.0	29.9	883.2
2009	45.3	18.9	29.2	8.4	82.2	154.8	120.8	23.7	20.1	62.9	18.7	37.1	622.1
2010	31.4	35.5	28.5	32.0	152.7	226.5	112.1	72.3	64.3	43.1	38.0	33.1	869.5
Average amount 2007-2010	23.1	30.9	28.9	52.1	95.1	127.8	159.1	75.9	53.0	59.1	27.0	33.6	765.6

Monthly and yearly precipitation in Palma

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual amount
2007	100.8	40.7	50.3	30.8	138.4	82.6	92.7	127.4	96.6	54.7	44.7	23.1	882.8
2008	16.3	15.1	107.9	70.2	122.4	73.6	159.4	24.2	57.2	60.8	66.6	32.2	805.9
2009	11.9	28.8	41.7	24.4	79.2	97.0	63.8	120.6	16.4	77.6	23.7	44.6	629.7
2010	20.5	37.0	41.3	45.0	145.6	143.0	242.2	169.3	85.8	29.8	51.4	58.2	1069.1
Average amount 2007-2010	37.4	30.4	60.3	42.6	121.4	99.1	139.5	110.4	64.0	55.7	46.6	39.5	846.9

4. Conclusions

The contents values in dry substance and vitamin C are influenced by the variations of the climatic factors especially by temperature and rainfall. During rainy and cold years we notice the contents growing in vitamin C and the contents lowering in dry substance.

References

1. Agopian, A., Medicinal Plants of spontaneous and their substitutesEditura Recoop., Bucureşti 1997, pp. 251

2. Segal, B., Segal, R., Dan, V., Teodoru, V., Determinarea calităţii produselor alimentare, Elemente de calimetrie, Editura Ceres, Bucureşti, 1985, pp. 103-104

3. Bruneton, J., Pharmacognosy, Phytochemistry, Medicinal Plants, 2nd edition, Lavoisier Tec&Doc, Paris, 1999, pp. 23

4. Bojor, O., Alexan, M., Plantele medicinale si aromatice de la A la Z., Ed.Ulpia Traian, Bucureşti, 1997

5. Bojor, O., Popescu, O., Traditional and modern Phytotherapy, Ed. Fiat Lux, 2003, pp. 212

6. Ewans, W.,C., Ewans, D., Trease and Ewans Pharmacognosy, 15th edition, Saunders, Edinburgh–London–Toronto, 2000, 26, 427