

DETERMINATIONS OF THE CONTENT OF VITAMIN C, CAROTENE AND PROTEIN IN DIFFERENT LOCAL POPULATIONS OF HOT PEPPER FOR USE IN THE PHARMACEUTICAL INDUSTRY

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Abstract

To demonstrate the importance of biochemical compounds in peppers, 47 variants were studied; each variant is represented by a local population, each with three repetitions, populations derived from Oltenia. Since the study performed is more complex, in this paper we will present the content in carotene, vitamin C and protein in 6 variants.

Experience was located in the area of Almaj and Teasc in ecological cultivation system. Biochemical determinations and methods applied were conducted in the Central Laboratory of the Faculty of Agriculture of Craiova; the biochemical determinations were made from pepper fruit at physiological maturity. Local populations were observed: T2, T3, T4, A4 - for vitamin C content, T4 and A4 - for protein content and T1, T2, T6, A2, A3 for carotene content. To interpret the results, statistical calculations were performed and the reporting was done by the average of variations [5].

Key words: *physiological maturity, local population, statistical calculations.*

INTRODUCTION

The pepper (*Capsicum annum* L) originates from Central America and South America. Christopher Columbus found the pepper in Haiti, where it was brought from, to Europe [2]. The pepper is grown in Europe for the first time mid way through the 16th Century in Spain and Portugal, followed by Germany, England and Hungary. The pepper reached Romania much later, being brought here by Bulgarian gardeners in the 18th Century. It was first grown in the South of the country, and was later taken to other more favourable regions [1]. Ascorbic acid is found in large quantities in the fruit of the pepper, this varies according to species, variety or the maturity of the fruit, reaching levels of 139-160mg/100g of raw substance for fruits arriving at technological maturity and 211-300mg/100g of raw substance

for fruits arriving at physiological maturity, some species of the *Capsicum* variety may reach higher levels up to 400mg/100g of raw substance – for the *Capsicum frutescent* species [1].

The high levels of ascorbic acid and capsaicin in the *Capsicum* variety give it the status of medicinal plant. The human body requires a minimum of 100mg of ascorbic acid daily, which can be easily ensured by a daily intake of pepper in our diet, consumed raw or in salads, and by no means heat-processed.

This paper aims to recommend some Romanian varieties of long pepper for raw consumption, according to their levels of ascorbic acid and carotene.

MATERIAL AND METHOD

The biological material studied in this paper consists of 13 local populations grown in Oltenia, namely 7 local populations cultivated (in the field) in Teasc and 6 local populations cultivated in the area of Almaj, Dolj county. Recognizing the importance of peppers and the beneficial effects on the human body through the components it contains, experiments aimed at conducting analyses and measurements on the chemical composition of local populations of these fruit. The main chemical analysis conducted on the chemical composition of pepper fruit were: vitamin C content, protein content and carotene content.

These reviews were conducted in the Central Laboratory of the Faculty of Agriculture, Craiova. The analysis methods used were: the titrimetric method for vitamin C, Kjeldahl method for protein and the spectrophotometer method for carotene [3, 4].

To test the significance between local populations studied, the variant analysis was used [5].

RESULTS AND DISCUSSIONS

The results on vitamin C content of pepper fruits in the local populations studied are presented in Tables 1 and 2. From these data it is observed that local populations grown in the area of Almaj showed an average vitamin C content higher with 0.69% compared to those grown in the area of Teasc.

Among local populations cultivated in the area of Teasc were noted: T3 local population which recorded a very significant content compared with the sample (average experience), T4 local population which recorded a significantly distinct content and T2 local population which recorded a significant content of vitamin C compared with the sample. Among local populations cultivated in the area of Almaj, only A4 population was noted which has overcome significantly the sample experience (the average) regarding the vitamin C content.

Table 1. The significance of vitamin C content of the 7 local populations studied, grown in the area of Teasc

Local population	Content of vitamin C (mg/100 g)	%	± Diference dry Mt	Significance
T1	352.00	100	+0.78	ns
T2	403.16	115	+54.94	*
T3	468.10	133	+116.88	***
T4	420.30	120	+69.08	**
T5	245.30	70	-105.92	000
T6	382.46	109	+31.24	ns
T7	187.23	53	-163.99	000
Mean (control)	351.22	100	-	-

DL_{5%} = 42.96

DL_{1%} = 60.31

DL_{0.1%} = 85.14



Fig. 1. Preparation of samples for the production of vitamin C

Table 2. The significance of vitamin C content of the 6 local populations studied, grown in the area of Almaj

Local population	Content of vitamin C (mg/100 g)	%	± Diference dry Mt	Significance
A1	269.43	76	- 84.25	00
A2	318.73	90	- 34.95	ns
A3	375.57	106	+ 21.89	ns
A4	419.88	119	+ 66.20	*
A5	335.14	95	- 18.54	ns
A6	403.32	114	+ 49.64	ns
Mean (control)	353.68	100	-	-

DL_{5%} = 54.0

DL_{1%} = 76.0

DL_{0.1%} = 110.0

In terms of protein content (Table 3 and 4) of pepper fruit, local populations in the area of Teasc have registered an average of 15 mg/100 g s.u., higher with 4.2% compared to those grown in the area of Almaj which registered an average of 14.39 mg/100g s.u. Local populations T4 and A4 recorded a significantly distinct protein content compared to the sample.

Table 3. The significance of protein content of the 7 local populations studied, grown in the area of Teasc

Local population	Content of protein (mg/100g)	%	± Diference dry Mt	Significance
T1	16.12	107	+1.12	ns
T2	13.66	91	-1.34	0
T3	14.02	93	-0.98	ns
T4	16.76	112	+1.76	**
T5	15.31	102	+0.13	ns
T6	13.87	92	-1.13	ns
T7	15.27	102	+0.27	ns
Mean (control)	15.00	100%	-	-

DL_{5%} = 1.19
 DL_{1%} = 1.68
 DL_{0.1%} = 2.37

Table 4. The significance of protein content of the 6 local populations studied, grown in the area of Almăj

Local population	Content of protein (mg/100 g)	%	± Diference dry Mt	Significance
A1	12.24	85	- 2.15	00
A2	15.39	107	+ 1.00	ns
A3	13.15	91	- 1.24	ns
A4	16.73	116	+ 2.34	**
A5	15.21	106	+ 0.82	ns
A6	13.63	95	- 0.76	ns
Mean (control)	14.39	100%	-	-

DL_{5%} = 1.31
 DL_{1%} = 1.87
 DL_{0.1%} = 2.70



Fig. 2. Extracts used for the determination of protein

The carotene content in pepper fruit widely varies from one place to another, the highest concentration occurring in local populations grown in the area of Almăj.

Local populations were observed: T1, T2, T6 and A3 which registered a very significant content of carotene in comparison with the sample. The local population A2 also registered a significantly distinct carotene content compared to the sample experience.

Table 5. The significance of carotene content of the 7 local populations studied, grown in the area of Teasc

Local population	Content of carotene (mg/100 g)	%	± Diference dry Mt	Significance
T1	4.78	178	+2.10	***
T2	6.07	227	+3.39	***
T3	0.60	22	-2.08	000
T4	0.60	22	-2.08	000
T5	0.23	9	-2.45	000
T6	3.80	142	+1.12	***
T7	2.70	101	-0.02	ns
Mean (Control)	2.68	100	-	-

DL_{5%} = 0.318
 DL_{1%} = 0.446
 DL_{0.1%} = 0.630

Table 6. The significance of carotene content of the 6 local populations studied, grown in the area of Almăj

Local population	Content of carotene (mg/100 g)	%	± Diference dry Mt	Significance
A1	3.73	96	- 0.15	ns
A2	5.39	139	+ 1.51	**
A3	10.09	260	+ 6.21	***
A4	0.23	6	- 3.65	000
A5	3.31	85	- 0.57	ns
A6	0.54	14	- 3.34	000
Mean (control)	3.88	100	-	-

DL_{5%} = 0.896
 DL_{1%} = 1.274
 DL_{0.1%} = 1.845



Fig.3. Preparation of samples for the determination carotene

CONCLUSIONS

The local populations grown in the area of Teasc had a greater concentration of vitamin C and carotene in comparison with those grown in the area of Almaj.

In terms of chemical composition the following local populations were observed:

- T2, T3, T4, A4 – for vitamin C content;
- T4 and A4 - for protein content;
- T1, T2, T6, A2, A3 - for carotene content.

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