

RESEARCHES ON THE CONTENT OF VITAMIN C AT SOME BREEDS OF TOMATOES CULTIVATED IN ECOLOGIC SYSTEM

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Abstract

The present paper is proposing to analyze in ecologic culture many breeds of tomatoes, under the aspect of the quality of the fruits, parameter interpreted by the point of view of the content in vitamin C.

The objectives of the experiment concerned, the color of the fruits in different stages of development correlated with the content of vitamin C, that vary in the wide limits in the same species, depending on the variety, breed, natural and technical conditions of culture and depending on the conditions of development and the degree of maturity of these.

Key words: vitamin C, tomatoes, ecological systems of culture, the quality of the ecologic tomatoes, the color of the fruits of tomato

INTRODUCTION

Vitamin C is found in the products of vegetal origin but also in those of animal origin under the form of ascorbic acid and dehydroascorbic acid, the best sources being the fruits, vegetables but also the viscera, having a great importance in the body based on its main and multiple properties.

As antioxidant substance, it neutralizes the harmful action of the free radicals and protects the body against some types of cancers by blocking the activity of a protein called HIF-1 (factor induced by hypoxia). This way vitamin C blocks the development of the cancerous tumors.

The human body doesn't have the property to synthetize the ascorbate through its viscera, thus the daily necessary has to be obtained on digestive way, by alimentation, because they don't have the L-gulonolactone oxidase enzyme.

MATERIAL AND METHODS

The biological material was represented by a number of 13 breeds and a hybrid of tomatoes respectively Merveille des Marchés, Double Rich, Brandywine Pink, Roze de Berne, Giant Belgium, Osu Blue, Blue Fog, Caroten de Plovdiv, Blue Beauty, Pineapple, JL Midnight Select, Potiron Ecarlate, Estiva F1, obtained in a vegetable micro farm ecologically

certified from Husasău de Tinca, locality situated in NW of Romania, an area of passage from the Western hills to the Western plain of Romania.

The experiment was a mono factorial one organized with the method of sub divided blocks, the 14 versions had three repetitions, each version having 10 plants. The witness of the experiment was Roze de Berne, an old breed of tomatoes that was already cultivated in the respective micro farm, having the color of the fruit at maturity and the color of the pulp pink. The breeds from the experiment have the fruits with different colors at maturity.

The determination of Vitamin C by direct Iodometry afterwards (Neamțu, 1997), using as reagents:

- standard solution of vitamin C 1 mg/ml: are weighed 50 mg of ascorbic acid p.a and are brought at the balloon quoted of 50 ml
- amylum 1%
- HCl 1M
- Solution of Iod-potassium iodide 0.004N (1.2g KI + 0.478g I₂, are brought to 1000 ml with distilled water).

Standardization of the benchmark solution of vitamin C:

- 10 ml of standard solution of vitamin C is mixed with 20 ml distilled water, 2 drops of HCl 1 M and 15 drops of amylum 1%, are titrated with K iodate until the blue color that persists 15 seconds. Is noted with V the volume of iodate used for titration.

Fruit juice: - are repeated the same operations for the juice instead of 10 ml of standard solution will be used 10 ml of juice or filtrate, from the fresh juice extorted. Is noted with V₁ the volume of iodate used for titration.

Fresh fruits – is extorted the vitamin C from the fruits by grinding in the mortar for 10 minutes with sea sand and a solution of metaphosphoric acid 5% (15 g + 2.5 g + 10 ml) after which is brought to the balloon quoted with 50 ml. The extraction can be practiced also with solution of HCl 2%, the quantities of fruit, sand and the volumes of solution of the extraction can vary depending on the necessities. The bringing to a balloon quoted of 100 ml can help the determination especially in the case of the fruits strongly colored where is necessary the dilution in order to be able to observe the change of color at the equivalence.

Method of calculation

For the juice

$$\text{vitamin C mg /100 ml juice} = (V_1/V) \times 100$$

For fruits and vegetables

$$\text{Vitamin C mg/100 g} = (10 \times V_1 \times 5)/(V \times m) \times 100$$

Where:

V = vol. de iodine used for the titration of the standard solution

V₁ = vol. de iodine used for the titration of the sample

10 = ml standard solution taken for processing

m – mass of fruit taken for determination

5 = dilution (50:10)

100 = reporting to 100 g of product

RESULTS AND DISCUSSION

The content of fruits of tomatoes in vitamin C varied in the limits pretty wide depending on the breed and especially depending on the color of the fruits at maturity and the color of the pulp. The breeds of tomatoes studies and which have the color of the fruits at maturity red are the breed Merveille de Marchés, the breed Double Rich, the breed Muscat, the breed Blue Fog to which is added the breed Giant Belgium of red color to pink, the hybrid Estiva F1 of light red color and the breed Osu Blue of dark red color (table 1), have an average content of vitamin C expressed in mg/100 g of fresh juice included between 55.3 mg/100 g fresh juice and 27.95 mg/100 g fresh juice.

The average content of vitamin C registered the largest value, of 55.3 mg/100 g fresh juice for the breed Double Rich, followed by Giant Belgium and Merveille de Marchés with an average content of vitamin C of 44.24 mg/100 g fresh juice and respectively 42.66 mg/100 g fresh juice. The breeds Muscat, Blue Fog registered an average content of vitamin C of 37.92 mg/100 g fresh juice.

The hybrid Estiva F1 had a content in vitamin C of 31.6 mg/100 g of fresh juice which classified it between the breeds that have the color of the fruit at maturity and the color of the pulp red on 6th place of 7.

The most decreased average quantity in vitamin C was registered at the breed Osu Blue, being of 27.95 mg/100 g fresh juice, even if from the analysis of the taste this breed is very tasty (table 1).

With the greatest quantity of vitamin C of 63.2 mg/100 g fresh juice, reported to the quality of the fruits of tomato evaluated by the color of the fruits at maturity and the color of the pulp at maturity was obtained for the breed Potiron Ecarlate, breed with fruits of pink color.

A large quantity of vitamin C of 50.56 mg/100g fresh juice was obtained for the breed Caroten de Plovdiv, breed with fruits of orange color at maturity and with pulp of orange color with redish shades.

For the breed Pineapple, a very tasty breed of yellow orange color with shades of red at the basis of the fruit was obtained a quantity of 39.5 mg/100 g fresh juice.

The breeds of indigo color in mixture with red, the breed Blue Beauty and indigo with shades of red at the basis the breed JL Midnight Select with the pulp of red purple color and respectively dark red have a content of vitamin C of 47.4 mg/100g fresh juice, and respectively 26.86 mg/100g fresh juice.

Table 1.

The content of the fruits of tomato in vitamin C compared to the color of the fruit at maturity and the color of the pulp at maturity

No. crt.	Version	The color of the fruit at maturity	The color before the maturity	The color of the pulp at maturity	The taste of fruits of tomato	The average content in vitamin C mg/100 g
1	Rose de Berne Mt	Pink	Green	Pink	Tasty	44.24
2	Merveille de Marchés	Red	Green	Red	Average	42.66
3	Double Rich	Red	Green	Red	Average	55.3
4	Muscat	Red	Green	Red	Average	37.92
5	Brandywine Pink	Pink	Green	Pink with white nervures	Tasty	42.66
6	Giant Belgium	Red to pink	Green	Red	Average	44.24
7	Osu Blue	Dark red	Violet with shades of green	Red purpurie	Very tasty	27.95
8	Blue Fog	Red	Green	Red	Average	37.92
9	Caroten de Plovdiv	Orange	Green	Orange with red shades	Tasty	50.56
10	Blue Beauty	Mixture of red and indigo	Mixture of green and indigo	Purple red	Very tasty	47.4
11	Pineapple	Orange yellow with shades of red on the basis of the fruit	Green	Yellow with red streaks	Very tasty	39.5
12	JL Midnight Select	Indigo with shades of red at the basis	Dark violet with green at the basis	Dark red	Very tasty	26.86
13	Estiva F1	Light red	Green	Red	Tasty	31.6
14	Potiron Ecarlate	Pink	Green	Pink	Very tasty	63.2

CONCLUSIONS

1. In the description of the breed Double Rich, breed with fruits of red color is mentioned a high content of vitamin C, aspect confirmed also in the present experiment with 55.3 mg/100g, but the greatest quantity was determined at the breed Potiron Ecarlate, breed with fruits of pink color, to which was obtained a quantity of vitamin C of 63.2 mg/100g.
2. Among the 14 breeds of tomatoes studies on the third place from the point of view of content in vitamin C was classified the breed Caroten de Plovdiv, breed with fruits of orange color and a content in vitamin C of 50.56 mg/100g.
3. The breed Blue Beauty with fruits of indigo color in mixture with red had a content of vitamin C of 47.4 mg/100g

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