UDC: 635.649(497.75)
Short communication

COMPARATIVE STUDY ON NUTRITIONAL AND TECHNOLOGICAL VALUES OF RED PEPPERS FROM SOME LOCALITIES OF POLOG REGION IN MACEDONIA

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Abstract

The aim of the presented study is to characterize the proteins, ascorbic acid, capsanthin, dry matter and ash content of sweet (B) and hot (L) red pepper cultivar (*Capsicum annum* L.) from Macedonia using the localities' combinations: Falishe (BF and LF), Zhilce (BZH and LZH), Sedlarce (BS), Brvenica (BB) and Rataje (BR and LR). The peppers fruit were harvested on october and dried in a semi-shading conditions for 7 – 8 months on traditional conditions. The dried red pepper from the (HR) locality has a higher content of dry matter 86.40% compared to other localities which indicates that it is dried and stored in more favorable conditions compared to other localities. The highest ash content has dried red pepper from the SZH locality with 8.27%. The results show great differences between localities' combinations and sampling dates for the protein, ascorbic acid and capsanthin content.

Keywords:*Capsicum annum* L, peppers fruit, capsanthin

1. Introduction

Pepper (*Capsicum annuum*), is the most popular vegetable crop in the country, with an area of 8.528 ha. Pepper production is more common in the regions of Strumica, Polog, Skopje and Kumanovo. In the Polog region, the pepper cultivar covers an area of 856 ha, with an average yield of about 21.362 kg / ha. It is used for fresh and processed consumption such as: semi-products (semi-frozen, frozen, dried, peppers in vinegar, pineapple wafers) and as final products (Ajvar, dumplings, chillies, baked peppers, fried peppers and pepers in vinegar).

Red pepper (*Capsicum annuum* L.) is a valuable vegetable crop not only because of its economic importance but also because of its nutritional value, mainly as a great source of reddish natural color due to the pigment content capsicum and antioxidant compounds (Lee et al., 1995, Howard et al, 2000) Cultivation of Kurtovska kapija is the most requested cultivar by the processing industry, due to its preservation quality and processing into ajvar; one of the most sought products abroad. They are exported as fresh, and processed.

The results of chemical analysis of pepper fruit by many authors showed that: it is very rich in high content of carbohydrates, proteins, coloring matters (carotenoids), mineral substances (K, Ca, Fe, P, Na) Vitamin C (Vitamin C to 270 mg / 100g) and Vitamin B. It is estimated that in the fresh state the species contains twice as much vitamin C as the lemon.

Pepper fruits in the processing industry must be full, rich in high percentage of fruit pulp and intensely red colored. Pepper fruits are rich in ascorbic acid. This depends on the fact that during processing and conservation of high temperature production, vitamin C is lost and that the ascorbic acid is not stable at temperatures ranging from 60 to 65 °C

The red color of pepper derives from carotene and carotenoid capsanthin and capsarubin, which are very valuable, as they are used for production of chili and sweet peppers. Capsanthin and capsorubin are the main carotenoids responsible for the red pepper color. In addition to their main role as a dyestuff, they are also known as antioxidants and inhibitors of colon cancer cells (Zachariah et al., 2008).

The aim of this study was to determine the content of dry matter, protein, ash, ascorbic acid and capsanthin of sweet (S) and hot (H) peppers during natural drying conditions by farmers' combinations of localities: Falishe (BF and LF), Zhilce (BZH and LZH), Sedlarce (BS), Brvenica (BB) and Rataje (BR and LR). The fruits of peppers were harvested in October and were dried in semi-dark conditions for 7-8 months under traditional conditions. Due to the high nutritional value, it represents the most important vegetable culture in the country.

2. Material and methods

Cultivar of Kurtovksa Kapija from main localities of the Polog region is used as a sample. The sweet red pepper seed and the chili sowing are used for the production by local farmers. For many years, red pepper varieties have been cultivated in the localities of the Polog area where it is adapted to the natural conditions of the area. The period of red pepper vegetation is around 75-80 days. The dried red peppers collected from five localities in the Polog region were prepared for sampling by removing the stems and seeds, and as such were ready for analysis. The analyses were conducted at the Laboratory of Food Technology in Tetovo. Standard laboratory methods equipment and reagents were used (Vracar, 2001).

Figure 1. Preparation of red peppers fruit samples and homogenization

For the analysis of the chemical components of the material, the standard analytical methods described by AOAC (1995) were used. The procedure for determining the dry matter content is determined by drying it at 105 °C until reaching the constant mass. The ash content was determined by burning it at 550 °C until a constant mass was obtained according to the procedures 923.03 and 971.3 given by AOAC. Nitrogen content (N) was determined using the Kjeldah method according to AOAC 978.04, the protein content is calculated as N × 6.25. The content of vitamin C in red pepper fruit and carotenoids were determined by the iodometric method and extraction with acetone according to Vracar (2001).

3. Results and discussions

Pepper cultivars are distinguished by specific biological, morphological and productive properties as well as the purposes for which they can be used (Jankulovski, 1983). The peppers that are collected in the technological maturation are characterized by the shape and appearance that is characteristic of the variety culture (Marković et al., 1998). The first raw fruit used for analysis should be of good quality, which is evaluated by sensorial characteristics, physical-chemical analysis and nutritional value (Pruthi, 2003). Varieties for drying must be at the time of technological maturity. The overcooked fruit is not suitable for drying due to tissue softening and may result in bark separation during drying. The analyzed results of the dry sample for each type of locality are presented in Figure 2 and 3 with the following characteristics:

Figure 2. Chemical components (dry matter on the left) of red pepper cultivars from different localities

According to the figure above, it can be seen that dried red pepper from the locality HR has a higher content of dry matter 86.40% compared to other localities, which indicates that the LR locality species is dried and stored in more favorable conditions compared to other localities. The highest ash content is in dried red pepper from the SZH locality with 8.27%. By comparing the results of the quality parameters between the dried red pepper cultivars for the five localities there was a noticeable change in dry matter and ash, which is due to the water content along with soluble substances during drying (Cvetkov, 1982).
From the obtained results, it appears that the highest percentage of protein is found in the locality of SZH 21.26% and lower in SF 10.89%, which is not the same as per vitamin C, showing the best results in HF 952 (mg / kg), while lower results were reported at HZH 532 (mg / kg). The content of vitamin C in peppers depends on: growth conditions, maturation rate, etc, and ranges from 200-400 mg/100g, and it is more present in small fruit peppers than in large ones (Jankulovski, 1983). According to Vracar (2001), the vitamin C content in red peppers is about 200 mg / 100 g.

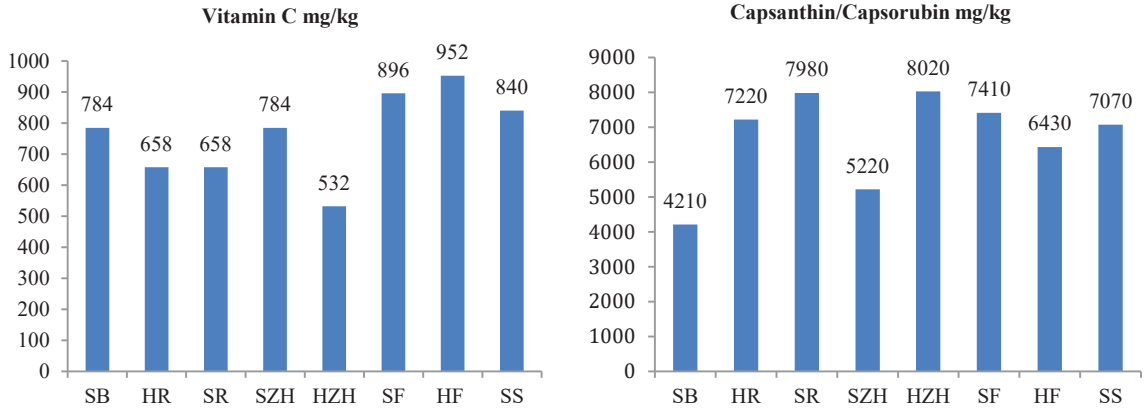

Figure 3. Vitamin C and Capsanthin content of red pepper cultivars from different localities

Differences in color content in pepper fruits are due to many factors such as agricultural agrochemicals, fruit maturity, and so on. In the fruits of red pepper, the color is expressed as: capsicum about 70%, capsule 14%, carotene about 6%, zeaxanthin 5%, cryptoxanthin and others about 5% (Jankulovski, 1983).

4. Conclusions

The results show great differences between localities' combinations and sampling dates for the content in proteins, ascorbic acid and capsanthin. Due to the high nutritional and biological value the species represents the most important vegetable culture in the country.

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