EVALUATION OF MINERAL CONTENT IN CAPSICUM AND BELL PEPPER

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Abstract. *This paper presents a mineral content study in four varieties of capsicum annum (yellow and red common capsicum and red and green bell pepper). The results may indicate some directions for using these vegetables for human health benefits.*

Key words: *capsicum, mineral content, health benefits*

INTRODUCTION

Pepper (*Capsicum annuum*), known around 5000 years BC, comes from Peru and is a vegetable originated from South America, along with beans and corn, brought to Europe by Christopher Columbus Crew. [1, 8]

The fruit has a smooth, glossy surface, a bell-shaped fleshy and dense texture and experience a variety of colors: green, yellow, red, or orange. It tastes sweet or spicy, depending on the variety. Seeds are round - flattened, yellow - goldish. [2, 11]

For consumption bell pepper varieties are harvested at maturity when the fruits are green or greenish-yellow, or physiologically ripe when the fruit is red, orange or yellow. [1, 6]

Bell peppers and other varieties, including sweet capsicum, are some of the healthiest vegetables. Chemical analysis reveals a exceptional composition: vitamins, antioxidants and minerals, nutrients extremely beneficial in the proper functioning of the body. [2, 6, 8]

In addition to the nutritional properties, peppers are high in fiber and have the ability to combat or prevent the various diseases (from heart disease, diabetes to cancer). [9]

Sweet peppers are consumed most often raw, as a salad or fresh juice, but their healing qualities continues after are pickled, baked on the stove or prepared in various dishes. [8, 10]

MATERIALS AND METHODS

Analysis of heavy metals was made with ContrAA-300, Analytik-Jena device in air/acetylene flame, by flame atomic absorption spectrometry (FASS).

Capsicum and bell pepper minerals content were analyzed after dehydration of 10 g vegetal material in quartz capsules at 105^{o}C, for 6 hours in oven and then calcinated in a muffle furnace (550°C, 4 h).

After complete burning a 0.5 N nitric acid solution was added up to 50 mL. The obtained solutions were used for minerals contents determination by flame atomic absorption spectrometry (F-AAS) with high-resolution continuum source. [7]

All analysis were perform in triplicate. The standard solutions (1000 mg/L) were analytical grade from Riedel de Haen (Germany). The nitric acid 65% solution used was of ultra pure grade (Merck, Germany). All solutions were prepared using deionised water. [4, 5]

Statistical analysis was performed using PAST software, which runs on standard Windows computers and is available free online [3]. All results were expressed as milligram per kilogram dry weight (mg x Kg^{-1} d. wt).

RESULTS AND DISCUSSIONS

FAAS analysis indicates high content of iron, and low content of zinc. The highest content of studied minerals (Fe, Mn, Zn, Cu) is observed for yellow capsicum and the lowest content of minerals for green bell pepper. (Fig. 1).

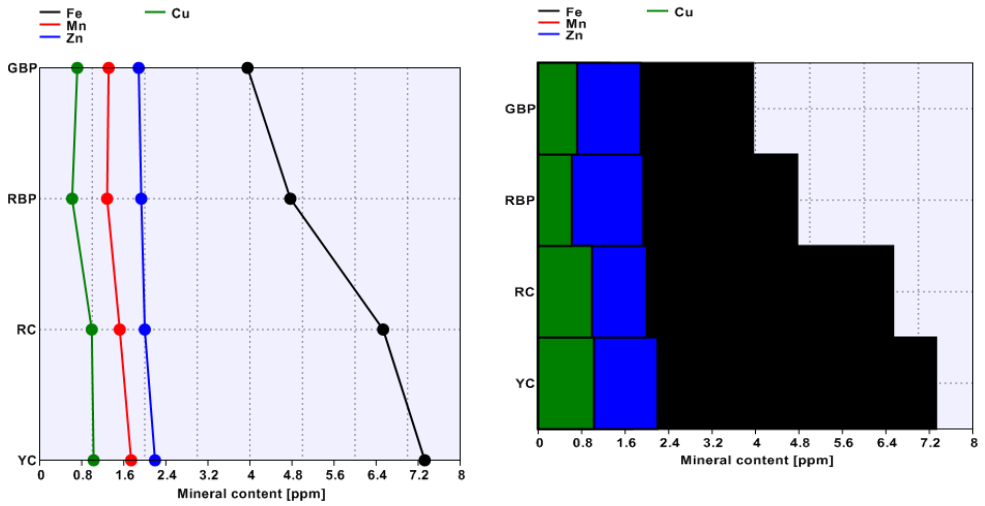

Figure 1. Graphical and Barchart representations of mineral content in analysed samples

Legend: Yellow Capsicum = YC; Red Capsicum = RC; Red Bell Pepper = RBP; Green Bell Pepper = GBP

The cluster analysis based on Paired group Algorithm using Euclidian function as similarity measure is presenting a correlation coefficient of 0.8765 grouping the capsicum varieties in accordance with the mineral content.

We observe 2 clusters, one cluster formed by red and green bell pepper samples analysis and the second formed by red and yellow capsicum samples (Fig. 2).

Spatial interpolation representation creats a map regarding capsicum iron and manganese content being correlated with the Zn content (Fig. 3).

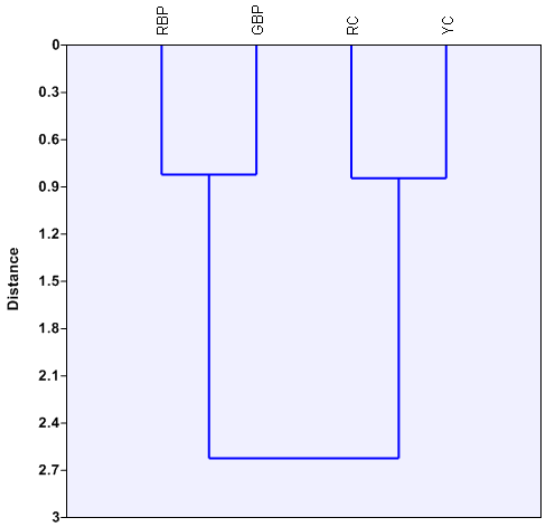

Figure 2. Cluster representation

Legend: Yellow Capsicum = YC; Red Capsicum = RC; Red Bell Pepper = RBP; Green Bell Pepper = GBP

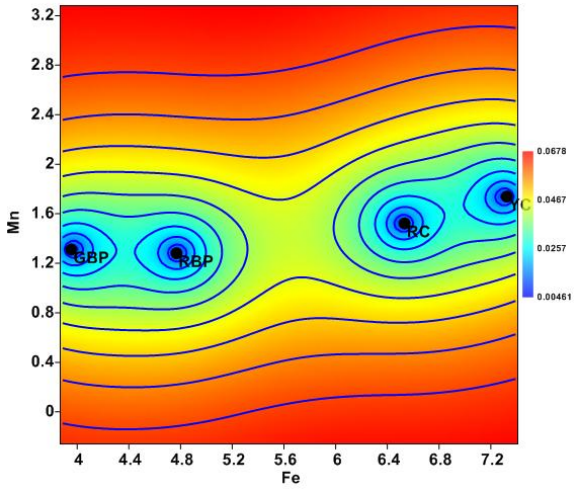

Figure 3. Spatial interpolation of capsicum varietes mineral content

Legend: Yellow Capsicum = YC; Red Capsicum = RC; Red Bell Pepper = RBP; Green Bell Pepper = GBP

CONCLUSIONS

The highest content of studied minerals (Fe, Mn, Zn, Cu) recommend the use of yellow capsicum for consumers which need a increased quantity of daily iron in the diet and for those who have diet restriction for iron, to avoid consuming capsicum or to replace capsicum with pepper.

Based on spatial interpolation we can creat a map regarding mineral content. When iron content is higher, Mn content is also increasing and its correlated with the Zn content.

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