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EFFECT OF FOLIAR FERTILIZATION ON THE CHEMICAL COMPOSITION OF FIVE GHERKINS FRUIT HYBRIDS *(CUCUMIS SATIVUS* L.) GYNOECIOUS TYPE AND PARTHENOCARPIC FRUCTIFICATION

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Abstract

Large number of gherkins type cucumbers varieties and hybrids emerging as a result of increasing demands from pretentious consumers related to quality aspects such as shape, color, firmness, appearance and capacity of storage, have led in time to change culture technology, foliar fertilization having a key role to achieve these goals, without knowing in detail the long-term influence on the chemical composition of the fruits used or human consumption. Therefore, this study comes to support clarification of these issues. As a result of data obtained concerning chemical composition of the fruits of five cucumber gherkins hybrids: Promisa, Trilogy, Karaoke, Kybria and Componist and interpreted in the USAMVB it was concluded that it differs depending on fruit size and age at which they were collected. Soil pH, fertilizer pH which is applied to leaf and the degree of hydration of the fruits has a direct influence on the chemical composition.

Key words: *Cucumis sativus L., fertilization, fruits, number, quantity.*

INTRODUCTION

Chemical composition represents an important factor with direct influence on fruits quality of gherkins cucumber. Information concerning the amount of different chemicals can be obtained from the analysis of dry matter and organic acid titration. Concentrations of these organic compounds in fruits are different depending on the cultivar and strongly influenced by their land reserve, which can be found in the form of ions, being picked up by plants (Rivis, 2004). In order to obtain conclusive results is very important to know the exact amounts of substances ($N\text{-}NH_4$, $N\text{-}NO_3$, P, K) in the soil and their concentrations in the solutions used to foliar fertilization.

In one plant exist at one point all common fructification elements: flowers, small, medium and large fruit, located to a distance less or greater than the radicular system having a significant influence on the chemical composition of gherkins cucumber fruits. Results follow in the first place nitrates and nitrites route from the moment of foliar fertilization through fruit until using them in close correlation with their quantities in the soil. According to studies on the pollution of horticultural products where there is a balanced diet, approximately 75-80% of nitrate derived from vegetables, nearly 15-20% from water and somewhere in the 5-7% from meat and milk. Their accumulation in different organs of the plant depends on the speciesWith 1349 samples to *Cucumis sativus L.* and its varieties originating in China, India and Turkey, The U.S. National Plant germplasm is the largest in the world.

MATERIALS AND METHODS

To accomplish this work were studied five different variants (for five hybrids *Promisa, Trilogy, Karaoke, Kybria and Componist)* on which foliar fertilization was performed with Cropmax product. The pH of the culture substrate (soil in which was embedded well fermented manure) was 7.4 for Trilogy and

Componist variants, 7.5 for Kybria variant and 7.6 for Karaoke and Promisa variants. Experimental field was conducted in a large solar farm, the culture being founded in the summer of 2010 from seedlings personally obtained. After soil analysis were obtained results which gives to the soil good fertility, N-NH4 content range between 18,25-51,30 ppm, N-NO3-136,7-356,2 ppm, P-28,4-42,1 and K-178,2-223,5 ppm.
During the experiment of the summer of 2010 soil samples were taken for each variant and fruit samples for each category according to size (3-6 cm, 6-9 cm, 9-12 cm).

RESULTS AND DISCUSSIONS

This study followed the route up to the fruits level of nitrogen compounds based on monofactorial research conducted. Samples collected were analyzed in the Laboratory of Biotechnologies of USAMVB and after obtaining the results we could notice that in most cases they did not exceed permissible levels of quality standards.

Table 1. Experimental results concerning nitrogen content of gherkins fruit.

Cultivar	N soil, ppm	N fruits (3-6 cm), ppm	N fruits (6-9 cm), ppm	N fruits (9-12 cm), ppm
Trilogy F1	161.45	144.4	152	120
Karaoke F1	266.60	285	76	95
Promisa F1	226.85	456	114	105
Componist F1	281.09	114	323	95
Kybria F1	386.78	76	95	114

Nitrogen content ranged between ranged from 76.00 to 323.00 ppm values in fruits and only in one case it exceeded the permissible limit of 400.00 ppm (Promisa hybrid sample of small fruit 3-6 cm, where the value of was 456 ppm). By considering the following aspects: vegetation period was equal for all studied hybrids, irrigation was performed using a uniform system of drip irrigation and foliar fertilization was achieved with the same product, we believe that small differences between the results obtained cannot be made only on account of hybrid, is being in close correlation with fruit size. Maximum permitted limit for nitrogen and its compounds in fruits gherkins is 400 ppm.

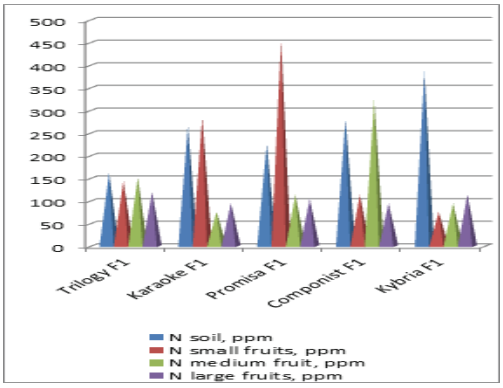

Figure 1. Experimental results representation concerning nitrogen content of gherkins fruit.

After analyzing the results we can distinguish as follows: for hybrid Promised starting from a concentration of 226.85 ppm nitrogen in the soil can be seen a sharp increase in its concentration to small fruit stage 3-6 cm with a value of 456.00 ppm, then decreased to a level of 105 ppm for large fruit stage 9-12 cm. This threshold which has exceeded the permissible limit by 56 ppm not constituted a risk to human health; the fruits of this size are only collected for laboratory analysis. According to analyzes of fruits, in the case of Phosphorus the values ranged from 179.92 to 193.76 ppm for different fruit sizes of Componist hybrid, observing a slight decrease in concentration as the fruit increases in size.

Table 2. Experimental results concerning phosphorus content of gherkins fruit.

Cultivar	P soil, ppm	P fruits (3-6 cm), ppm	P fruits (6-9 cm), ppm	P fruits (9-12 cm), ppm
Trilogy F1	28.4	373.68	553.6	420.1
Karaoke F1	32.5	664.32	664.32	512.08
Promisa F1	34.1	809.64	588.2	511.3
Componist F1	42.1	193.76	186.84	179.92
Kybria F1	40.2	276.52	560.52	449.8

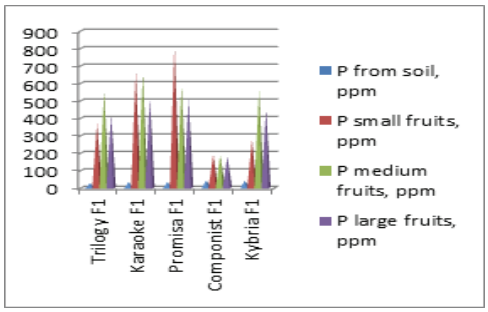

Figure 2. Experimental results representation concerning phosphorus content of gherkins fruit

Table 3. Experimental results concerning potassium content of gherkins fruits.

Cultivar	K soil, ppm	K fruits (3-6 cm), ppm	K fruits (6-9 cm), ppm	K fruits (9-12 cm), ppm
Trilogy F1	185.2	2840	2620	2560
Karaoke F1	223.5	3080	2740	2570
Promisa F1	215.8	2840	2620	2490
Componist F1	178.2	2840	2980	2540
Kybria F1	180.2	3340	2620	2700

For Karaoke and Promisa hybrids can be observed sudden decline of P values from 664.32 and 809.64 ppm for 3-6 cm fruits to P values of 512.08 or 511.3 ppm for 9-12 cm fruits. Trilogy and Kybria presents one maximum concentration peak for 6-9 cm fruits, with values of 553.60 ppm and 560.52 ppm respectively, after which it decreased to 420.1 and 449.80 ppm for 9-12 cm fruits.

For potassium, as can be seen from the figure 3, the differences are not significant, the concentrations of all the studied variants being in the range of 2620 ppm to 3080 ppm, with a slight peak concentration of 3340 ppm for Kybria hybrid with 3-6 cm fruits.

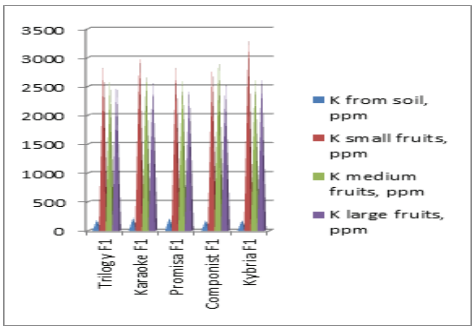

Figure 3. Experimental results regarding concerning potassium content of gherkins fruits.

CONCLUSIONS

In most cases N content was within normal limits. In the case of Promisa hybrid version (fruit 3-6 cm) was found a high value of N concentration that exceeding by 56 ppm the normal concentration. Growing season, irrigation and the product used for foliar fertilization had no influence on the N amount in the fruits level, variations are due to the studied hybrid and are based on its ability to synthesize nitrogen compounds. Phosphorus concentration varies depending on the size of the fruit and the hybrid used. Potassium analysis showed significant differences.

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National Plant Germplasm System: Csativus [en linea]


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