THE INFLUENCE OF FOLIAR FERTILIZER WITH ORGANIC SUBSTANCES ON PHOSPHORUS CONTENT IN MAIZE PLANT

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Abstract: *Paper presents the experimental results obtained by applying a new foliar fertilizer with organic substances and the influence of the foliar fertilization on the phosphorus content in maize plant. Research was carried out in the green house by INCDPAPM-ICPA Bucharest (2010) and the soil from experiment was Vermic Chernozems. The experiment was organized in Mitscherlich pots with 20 kg of soil. The tested inbred maize line from experience was: PR38A24. The novelty and complexity of new foliar fertilizer consist in the possibility of association of mineral nutrients (macro and micronutrients) from the foliar fertilizer with organic substances as a source of physiologically active. According to the methodology of testing for each variant of treatment a number of three replicates were provided. All the variants received soil fertilization with 50 mg N/kg soil, 50 mg P_2O_5/kg soil and 50 mg K_2O/kg soil, excepting the control unfertilized in soil. In these conditions, the application of new foliar fertilizer assured positive increases of phosphorus content in dry matter of maize plant as compared to controls.variants of the experiment were: V1-control unfertilized in soil, sprayed with water, V2 – control fertilized in soil, sprayed with water, V3-fertilized with 1% solution, V4-fertilized with 0.5% solution, V5-fertilized with 0.25 % solution (fertilizer with organic substances). The variants V6, V7, V8 were fertilized with foliar fertilizer without organic substances. The experiment was carried out to see the effect of foliar fertilizer with organic substances on dry matter yield, phosphorus content and uptake of maize plant. The foliar application of organic fertilizer on maize crop in green house, led to increased phosphorus content in dry matter yield and exported phosphorus compared with the controls. The phosphorus content was assimilated by the maize plant. This work is part of the doctoral thesis.Foliar fertilization is a ordinary practice for additional stimulation and correction from plant nutrition. The largest increases in phosphorus content were obtained by plant treatment with foliar fertilizer with organic substances.*

Key words**:** *foliar fertilization, maize, phosphorus*

INTRODUCTION

The foliar fertilization method appertains to new developments from crop fertilization domain. Two fertilizers were obtained: the first with microlements, NPK matrix with organic substances and the second with NPK matrix and microelements withoud organic substances. The new foliar fertilizers with organic substances was obtained in the Testing Laboratory and Fertilizers Quality Control INCDPAPM-ICPA Bucharest.

The fertilizers with organic substances have an additional contribution of nutrients. The organic substances were used in the fertilizer because it contains essential nutrients as: nitrogen, phosphorus, potassium, calcium, iron, manganese, zinc, copper, magnesium and protein substances with nutritional role that stimulate plant metabolism.

MATERIAL AND METHODS

The new foliar fertilizer applied in maize crop have in the composition the macro and micronutrient and physiologically activ organic substances witch stimulate the plant

metabolism.

The maize hybrid used in the experiment was PR38A24 by Pioneer Hi-Bread Services GmbH company. This hybrid was semi early witch have a high production capacity. The experiment was organized in Mitscherlich pots with 20 kg of soil. According to the methodology of testing for each variant of treatment a number of three replicates were provided. All the variants received soil fertilization with a complex fertilizer type 15-15-15, in doses of 50 to for each nutrient/kg soil, excepting the control unfertilized in soil. Foliar treatments were applied in concentrations of 1%, 0.5% and 0.25%. Leaf samples were collected before treatment (plant height was 20cm) and 10 days after each treatment. Treatments applied were: T1-to six healthy leaves of the plant, T2- to 10 days after treatment 1, T3- to 10 days after treatment 2. Control variants were not treated leaves. The variants were: V1- non-fertilized watered control, V2- fertilized watered control, V3 - 1% fertilizer solution, V4-0,5 % solution, V5- 0,25% solution, V6-1% fertilizer solution, V7- 0,5 % solution, V8-0,25% solution . The variants V3, V4 and V5 were treated with organic fertilizer. The variants V6, V7 and V8 were treated with fertilizer without organic substances.

RESULTS AND DISCUSSIONS

The table 1 shows the nutrients contents in the new foliar fertilizer manufactured with organic substances. Analytical data presented in figure 1 show that foliar fertilizer has determined a positive increase of the phosphorus content in dry matter of maize plant as compared with the controls: non-fertilized watered control (V1) and fertilized watered control (V2). The phosphorus concentration for three variant (1% fertilizer solution) was higher that in V4 (0,5 % solution)and V5 (0,25% solution) variants.

Table 1

The nutrients contents in the foliar fertilizer with organic substances

No. crt	Components	U.M (%)	Concentration determined
1.	Total nitrogen	(%)	4,4
2.	Ammonia nitrogen	(%)	1,19
3.	N-nitric oxide	(%)	2,26
4.	Organic nitrogen	(%)	0,32
5.	Phosphorus (P_2O_5)	(%)	1,16
6.	Potasium (K_2O)	(%)	2,15
7.	Iron	(%)	0,052
8.	Zinc	(%)	0,027
9.	Copper	(%)	0,040
10.	Manganese	(%)	0,020

The figure 2 shows the variation of the yield increase of maize crop on variant depending of the foliar treatments. The yield increase ranged between 161.53-196.15 %/variant and compared with 1control and 136.95 and 166.30 %/variant for maize, compared to 2 control.

The exported phosphorus content (g) were higher in the foliar fertilized variants compared with the two controls at the maize crop (figure 3). The exported phosphorus content ranged between 0.25-0.51 g compared with the 1 control and 0.12-0.38 g compared with the 2 control. The higher exported phosphorus content was observed in variants fertilized with organic fertilizer (V3, V4, V5).

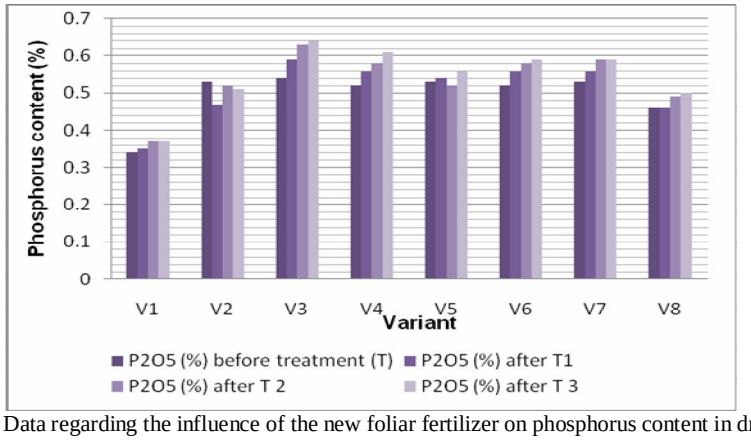

Figure 1: Data regarding the influence of the new foliar fertilizer on phosphorus content in dry mater

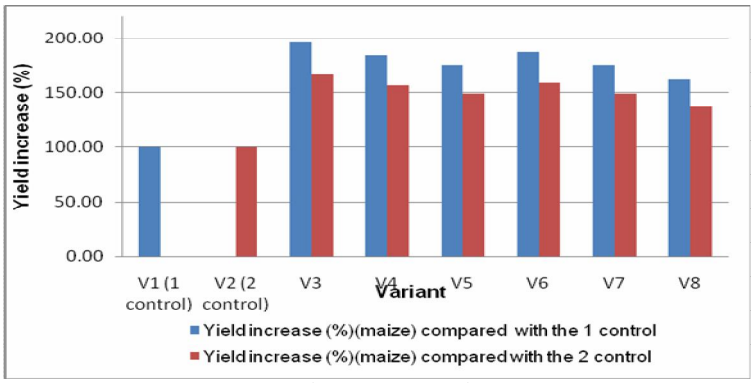

Figure 2: The variation of yield increase of maize crop on variant

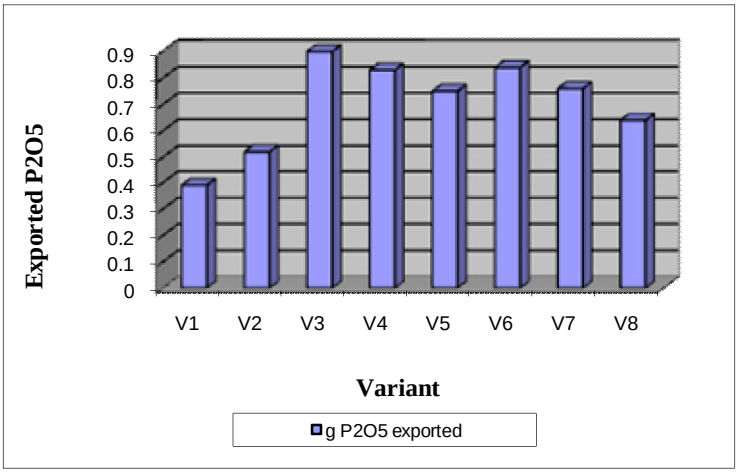

Figure 3: Data regarding exported phosphorus content (g)

Figure 4 shows variations the exported phosphorus content especially at low concentration of foliar solution applied to plant. The variants fertilized with foliar ferilizer with organic substances have a higher exported phosphorus content compared with the variants fertilized without organic substances, because the organic substances from foliar fertilizer have an additional contribution of nutrients. The organic substances favors the phosphorus uptake by the maize plant.

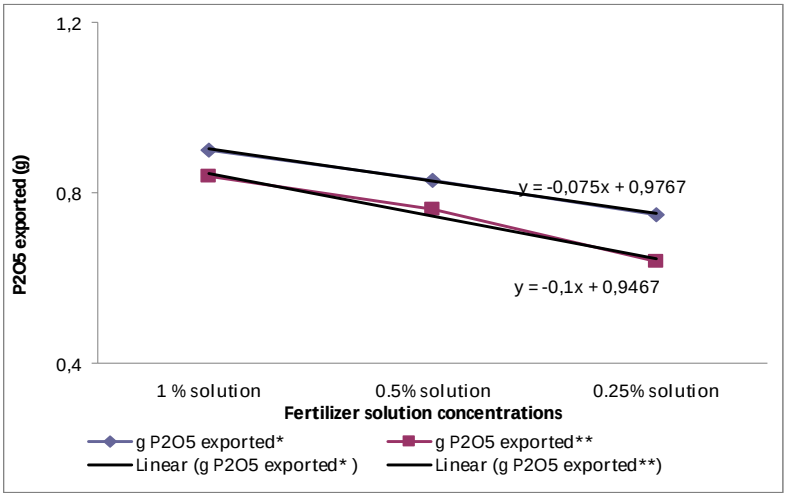

Figure 4: Variation the exported phosphorus content depending on the fertilizer solution concentration
*fertilizer with organic substances, NPK matrix and microelements
** fertilizer without organic substances, NPK matrix with microelements

CONCLUSIONS

The new foliar fertilizers with organic substances tested was determined a significant increase of the phosphorus content in dry matter of maize plant as compared with the controls.

The new foliar fertilizer have determined quantitative and qualitative increases of the yields, compared with the controls.

The organic substances was used in the foliar fertilizer as a source physiologically active witch stimulate the plant metabolism.

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