

## THE FERTILIZATION INFLUENCE ON THE BEANS CHEMICAL COMPOSITIONS OF SOME CULTIVATED HYBRIDS MAIZE IN BANAT AREA

### INFLUENȚA FERTILIZĂRII ASUPRA COMPOZITIEI CHIMICE A BOABELOR LA UNII HIBRIZI DE PORUMB CULTIVATI IN ZONA BANATULUI

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**Abstract:** In this paper it has been studied the influence of different culture technologies of the beans quality to the most cultivated 6 maize hybrids (*Zea mays L.*) in the Banat area. In this purpose we have cultivated 7 of the main hybrids used in this region into the next culture versions: conventional technology (fertilization with N,P,K), organic technology and ecological technology. The nitrogen is considered to be the most important input for the increasing productivity of the cultured plants. The changes applied in optimum certain moments to the nitrogen quantities produce cost efficiency and increase productivity and quality.

**Rezumat:** În această lucrare s-a studiat influența diferitelor tehnologii de cultură asupra calității boabelor la 6 dintre cei mai cultivați hibrizi de porumb (*Zea mays L.*) în zona Banatului. În acest scop am cultivat 7 dintre principalii hibrizi utilizați în această regiune în următoarele variante de cultură: tehnologie convențională (cu aplicarea fertilizării N,P,K), tehnologie organică și tehnologie ecologică. Azotul este considerat unul dintre cele mai importante inputuri pentru creșterea productivității plantelor de cultură. Schimbările în cantitățile de N aplicate în anumite momente optime produc eficientizarea costurilor și creșterea productivității și a calității.

**Key words:** maize, quality, fertilization  
**Cuvinte cheie:** porumb, calitate, fertilizare

#### INTRODUCTION

Yield formation of maize is determined by interaction between varieties of vegetative factors, as far as by the crop adaptation ability to unfavourable environmental conditions. If a particular factor is not in an optimal quantity (SCHELFORD, 1964), the crop adaptation ability decrease as regards to the other factors.

The maize occupies the 3<sup>rd</sup> place, as importance, on the globe, between the cultivated plants.

This position, from agricultural point of view, is motivated through some particularities, such as:

- present a great capacity of production, with about 50% more than the other cereals;
- has a great ecological plasticity, that allows him a large area of spreading, making great harvest and constant relatively, less influenced by the climatic deviations (TOMOV N. et. al, 1979, ALDRICH R.S. și col. 1975, SAHA A., H.A. LOVE and R. SCHWART, 1994).

#### MATERIAL AND METHOD

The experiment was conducted in three experimental variant: V<sub>1</sub> – with conventional technology by application fertilization N<sub>27</sub> P<sub>13,5</sub> K<sub>13,5</sub>; V<sub>2</sub> – organic fertilization by application of 30/t ha rather (soil); V<sub>3</sub> – ecologic technology (only manual weeding). In our experiment we

cultivated the principal 7 maize hybrids from Banat region: PR37M34, PR36D79, LG-2306, PR37Y12, MONSANTO DKC5143, MONSANTO DKC 4626, KITTY.

Data was collected with cereal analyzer omega and we followed: protein content, oil content and starch content. The seed humidity was 18%.

### RESULTS AND DISCUSSION

According to R. J. MARTIN and al. (1970), the beans contain: water 13.5%; protein 10.0%; glucyd 70.7% (whom starch 61.0%); grease 4.0%; mineral salts 1.4%; acid organic matters 0.4%.

The starch is formed by amylopectin (72 - 77%) and amylose (21 - 28%). The starch distribution on the bean components bring out that 98% is laid out in endosperm, 1.3% in embryo and 0.75 in pericarp.

Table 1

Chemical composition of maize seed in studied genotypes in conventional variant

Hybrid	Protein content (%)	Oil (%)	Starch (%)
PR36D79	8.30	3.60	72.60
LG2306	10.00	4.20	71.10
DKC5143	8.50	3.80	72.20
PR37M34	9.90	3.50	71.60
PR37Y12	8.50	3.60	72.60
DKC4626	6.90	4.20	73.00
KITTY	8.20	3.70	72.50

From the data obtained we can observe that the results showed differences between genotypes regarding the protein content (6.90% DKC 4626 – 10.00 LG2306). Regarding the oil and starch content the results are not so different (3.50% - 4.20% oil and 71.10% - 73% starch content).

Table 2

Chemical composition of maize seed in studied genotypes in organic variant

Hybrid	Protein content (%)	Oil (%)	Starch (%)
PR36D79	7.15	3.30	72.53
LG2306	9.09	4.05	71.07
DKC5143	7.64	3.35	72.34
PR37M34	8.87	3.46	71.48
PR37Y12	7.70	3.37	72.57
DKC4626	5.83	4.00	72.65
KITTY	7.33	3.56	72.37

The rother (fermented) containe: organic material 17%, total nitrogen 0.54%, phosphor 0.25%, potassium 0.70% and calcium 0.60%.

The nitrogen is the one of the most important compounds of amino acids and also of the proteins. So by the decreasing of the nitrogen fertilization in organic variant, we observed a decreasing of protein content between 5.83% - 9.09%. Also a deceasing of nutrient substance produced a decrease of the oil and starch content but not so higher than the protein content.

The ecological agriculture appeared as an alternative to intensive industrialized agriculture, being an accomplishment of agriculturists affectionate by nature, based on efficient methods and meanings for production, especially from the economic perspective. According to

2092/1991 regulation, revised and completed through 834/2007 regulation, approved by Economic European Community Council, the community countries use with the same meaning the following terms: *organic agriculture* (England), *biological agriculture* (Greece, France, Italy, Netherlands and Portugal) and *ecological agriculture* (Denmark, Germany, Spain and Romania).

Table 3

Chemical composition of maize seed in studied genotypes in ecological variant

Hybrid	Protein content (%)	Oil (%)	Starch (%)
PR36D79	7.03	3.63	72.58
LG2306	9.21	4.31	71.12
DKC5143	7.98	3.92	72.17
PR37M34	8.94	3.62	71.56
PR37Y12	7.75	3.75	72.54
DKC4626	6.74	4.34	72.75
KITTY	7.80	3.78	72.42

Regarding the chemical composition of maize seed obtained in ecological variant we observed a decrease of protein content between (6.74% DKC4626 and 9.21% LG2306). Comparative with protein content the maize hybrids showed an increase of oil percentage (between 3.62% PR37M34 and 4.34% DKC4626), the starch content doesn't present substantial modification comparative with conventional and organic variant.

### CONCLUSIONS

- From the results obtained in conventional variant (N<sub>27</sub> P<sub>13,5</sub> K<sub>13,5</sub>) regarding the protein content the maize hybrids showed differences between genotypes regarding the protein content, the higher level was noted in LG2306 (10,00%) while the lower level was observed in DKC 4626 (6.90%); the oil and starch content the results are not so different (3.50% - 4.20% oil and 71.10% - 73% starch );
- Regarding the data obtained in organic variant we observed a decrease of protein content in concordance with the input (rother soil which contains 0.54% total nitrogen). Also a deceasing of nutrient substance produced a decrease of the oil and starch content but not so higher than the protein content;
- The ecological variant showed a decrease of protein content because the reduced input, wile the oil content presented a higher level between 3.62% PR37M34 and 4.34% DKC4626. The starch level remains in the same level like in the other variant (conventional and organic).

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### ACNOWLEDGEMENT

We would like to thank to Ministry of Development Public Works and Housing and European Union, which finance the PHARE program: "The founding of the Centre for Consultancy and Euro-Regional Rural Co-operation (CC&EU) to improve the ecological and conventional management regarding agricultural yield quality and quantity".