

The effectiveness of using the complex fertilizers on crops of a high-lysine corn variety named Uzbekistan 420 vl

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Abstract: In this article given information and discuss about the effect of the rates of mixed fertilizers on grain yield and the total content of protein and lysine in protein, fertilizer rates and plant density per hectare.

Key Words: High-lysine maize, planting density, nitrogen application rate, vegetation length, grain yield, protein, lysine.

INTRODUCTION

The relevance of the article: As you know, corn is an important grain and forage crop. In the composition of any concentrated feed, the leading place belongs to corn due to its high energy value. The grain protein of most corn hybrids is mainly represented by nutritionally low value zein, which practically does not contain such essential amino acids as lysine and tryptophan. For this reason, breeders in many countries are working to create new corn hybrids with improved grain biochemical composition. The discovery by American scientists of the action of the Oraque-2 gene led to the creation of a new direction in the selection of corn. Uzbek breeders, together with the Krasnodar Institute of Agriculture, bred the first high-lysine hybrid named Uzbekistan 420 VL was tested and zoned since 2001. Based on the studies carried out, it can be seen that the introduction of mixed mineral fertilizers without nitrogen affects the total protein content, especially in the 3rd option. As for the lysine content, it is practically at the same level for all four options for applying mixed fertilizers (table-

1). Changing in the content of total protein and lysine in the grain of the hybrid named Uzbekistan 420 VL.

1. Table-1

Application rates and norms of mixed mineral fertilizers			Total protein content (%)			Lysine content in protein (%)		
Nitrogen	Phosphorus	Potassium	2015	2016	average	2015	2016	average
1.-	85	60	9,2	10,8	10,0	2,40	2,32	2,36
2.-	85	60	11,0	12,1	11,55	2,6	2,48	2,54
3.-	125	90	12,2	15,0	13,6	2,0	2,10	2,05
4.-	125	90	9,8	10,9	10,35	2,24	2,12	2,18
5. 120	85	60	12,4	13,2	12,8	3,6	3,2	3,4
6. 120	85	60	10,8	11,5	11,15	4,1	4,01	4,05
7. 180	125	90	9,1	10,7	9,9	3,9	3,6	3,75
8. 180	125	90	10,0	10,4	10,2	4,2	4,12	4,16
9. 240	170	170	10,2	11,5	10,85	2,3	2,42	2,36
10. 240	170	150	11,4	12,0	11,7	2,14	2,26	2,2
11. 300	210	150	11,1	12,8	11,95	2,0	2,14	2,07
12. 300	210	150	9,6	10,7	10,15	2,32	2,62	2,47

2. In the 5-12th variants, nitrogen was added as a nutritional element to the mixed fertilizer at an application rate of 120 to 300 kg. As can be seen from the data in Table 1, when applying mixed fertilizers, in which with an increase in the nitrogen rate from 180 to 300 kg /hec phosphorus from 125 kg /hec to 210 kg /hec. and potassium from 90 kg /hec to 150 kg /hec, the content of total protein (protein) in corn grain

increased due to an increase in the quantitative content of low-value zein, while the lysine content remained practically unchanged. However, in the case of an increase in the 5-8th variants of applying mixed fertilization of nitrogen from 120 to 180 kg / hec, phosphorus from 85 to 125 kg /hec. and potassium from 60 to 90 kg / hec. leads to a change in protein quality, which is reflected in quantitative protein content. A high index for lysine was manifested in the samples of corn grain when mixed (120: 85: 60) mineral fertilizers were applied in the 6th variant. At the same time, the planting density in the first variant was 60 thousand plants per hectare, in the second case - 70 thousand. I would like to draw attention to the results for the total protein content (13.2%) and the content of a rather high lysine of 3.6% in the 5th variant.

The identification of new high-lysine forms of maize is of great importance for the breeding of maize.

There are different types of nutrient differences between high-lysine and regular corn. Both types provide an equal yield of feed units, but high-lysine corn has slightly higher levels of fat and fiber and lower carotene. High-lysine corn has a higher content of phosphorus, magnesium, and especially potassium.

In many countries in Latin America, Africa, and Asia, corn is a staple food. In addition, it was found that a high percentage of protein is accompanied by a strong increase in the most low-value protein zein and, as a consequence, leads to a decrease in the biological value of the total protein. But in glutelin and in fractions of albumin and globulin, the level of lysine is quite sufficient.

It was found that high-lysine mutants of OPAK-2 maize have an amino acid composition in which the level of lysine is almost 2 times, tryptophan is 40-60% higher, and arginine is 10% higher than in the usual forms. Such changes occurred as a result of the redistribution of

protein fractions, the amount of product zein, which is of little value in lysine and tryptophan, decreased and the proportion of albumin, globulin and glutelin fractions increased. Changes in the fractional and amino acid composition were found in the domestic high-lysine hybrid variety Uzbekistan 420 VL zoned since 2001 in the Tashkent region.

It is known that mixed mineral fertilizers are highly effective fertilizers containing, in an assimilable form, the nutrients necessary for the growth and development of plants, potassium, phosphorus, and nitrogen. Where, mixed fertilizers are produced by dry mixing mechanically of different types of simple fertilizers in predetermined proportions.

The application of nitrogen fertilizers increases the protein content in the grain. Nitrogen plays an exceptionally large role in a living organism. Nitrogen as a nutritional element has a great influence on the speed and nature of physiological and biochemical processes, on plant growth, the timing of individual phases of development, the size, structure and quality of the crop. It is this nutritional element that is most often found in the soil in insufficient quantities, which is the reason for the low yield.

At the same time, it is known that increased doses of nitrogen cause oppression of young plants, and this can also lead to a decrease in yield and the effectiveness of nitrogen fertilization.

Our studies have previously established that the best options where plants receive optimal nutritional areas are those, in which the planting density was 70 thousand plants per 1 hec, and the level of applied nitrogen should be limited within 180 kg / hec.

In the experiments of the Uzbek Scientific Research Institute, corn stations continued to study the effect of plant density and backgrounds of nitrogen, potassium and phosphorus nutrition

on the quality of high-lysine corn Uzbekistan 420 VL under irrigation conditions.

Taking into account the increasing costs of nitrogen fertilizers, the task was to select a combination and dose of mixed mineral fertilizers and the density of corn standing per hectare.

Analyzes of 12 variants of high-lysine corn grain samples obtained in our experiment with different combinations (backgrounds) of provision with mixed mineral fertilizers and a standing density of 70-60 thousand per hectare were carried out at the Institute of Plant Chemistry of the Academy of Sciences of the Republic of Uzbekistan.

The task was set to determine the options for applying mixed mineral fertilizers, which will contribute not only to an increase in grain yield, but also to improve the quantity and quality of the obtained protein in terms of lysine.

Determination of the quantitative protein content was carried out by the Keldalya method and the determination of the lysine content was carried out on an amino acid analyzer. Acid hydrolysis with 5.7 N hydrochloric acid was carried out at a temperature of 110°C for 24 hours under vacuum conditions. The results obtained for the samples of 12 variants of the introduction of nitrogen, potassium and phosphate fertilizers in various combinations at different planting densities (60-70 thousand plants per 1 ha).

As you can see, from the results obtained when applying mixed mineral fertilizers without nitrogen in the 1st and 4th options, it affects the total protein content, especially in the 3rd option. As for the lysine content, it is almost the same for all four options for applying mixed fertilizers and in the third variant, the lowest value was 2.05% lysine.

In the 5-12th variants, nitrogen was added as a nutritional element to the mixed fertilizer at

an application rate of 120 to 300 kg/ha. As can be seen from the data in Table 1, when applying mixed fertilizers, in which, with an increase in the rate of nitrogen from 180 to 300 kg/ha, phosphorus from 125 kg/ha to 210 kg/ha and potassium from 90 to 150 kg/ha, the content of total protein (protein) in corn grain increased due to an increase in the quantitative content low-value zein, while the lysine content remained practically unchanged.

In the 5th and 8th options, where the increase in the application of mixed fertilizer for nitrogen from 120 to 180 kg/ha, for phosphorus from 85 to 125 kg/ha and for potassium from 60 to 90 kg/ha leads to a change in protein quality, which is reflected in the quantitative protein content. A high index for lysine was manifested in the samples of corn grain when mixed mineral fertilizers 120: 85: 60 were applied in the 6th variant. At the same time, in the first variant, the plant density is 60 thousand plants per 1 ha, in the second case it is 70 thousand.

I would like to draw attention to the results for the total protein content (12.8%) and the content of a rather high lysine of 3.4% in the 5th variant.

Spectral analyzes of proteins were obtained from corn samples according to the first and second cultivation options without nitrogen feeding and in the 5th and 6th cultivation options in the presence of nitrogen feeding. When comparing the IR spectra, a slight difference was observed in the intensity of the absorption bands in the regions of 1740-1640 cm⁻¹, responsible for stretching vibrations of aminocarbonyl (-CO-NH-) and carbonyl (-CO-) groups (peptide bond).

For that reason, the best options for applying mixed mineral fertilizers are options that where the level of applied nitrogen is from 120 to 180 kg/ha, phosphorus from 85-125 kg/ha, potassium from 60 to 90 kg/ha. Further increases in the annual rate of application of the

mixed mineral fertilizer reduce the quality of the total protein in terms of lysine.

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