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TWO ESSENTIAL AMINOACIDS OBTAINED FROM THE TURDA 250L AND FUNDULEA 345L CORN SEEDS, RECOMMENDED FOR CONSUMPTION

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Abstract: *This paper is a continuation of studies made in 2011 [„Maize contains tryptophan and methionine – two acids essential for human health” Olimpia Pandia, I.Saracin, Magazine Metalurgia International, nr.5, 2013], to determine the amounts of protein in corn and especially some of the essential amino acid, necessary for the human body, and the establishment of hybrids in the study with high biological value to be used more in crops.*

Were included in the study 2 corn hybrids Turda 250 L and Fundulea 345 L, which were analyzed existing amino acids in grains, but especially content of lysine and threonine, as well their adaptation in hilly zone where were placed experiences; there is a temperate continental climate, where absolute maximum temperatures are 40 °C, and minimum -30°C and average annual precipitation about 600-700 mm/year.

Key words: *amino acids, threonine, proteins, lysine, hybrids.*

INTRODUCTION

For field crops, corn [Zea Mays], is one of the most common crops, with a rich dowry genetic and a wide use both for humans as well as food, medicine and pharmacy.

Corn, is an important source of energy used as human food, with a high content in kilocalories, include: proteins, vitamins, fats, carbohydrates [Banu C. (2009)].

Therefore, it is recommended to use the seeds of maize both for healthy individuals and especially for those with cardiovascular disease, those who are likely to get fat, diabetes, etc [Segal, R. Et al.(2010)].

Proteins are essential constituents of the body in their turn being formed of the essential amino acids, can not be produced by the organism and must be brought by food in various combinations and non-essential amino acids a body which can be produced, and caloric needs can be filled from vegetable or animal food with complete and incomplete biological values [Costin G.M. & Segal R. (2001)].

Lysine, is an essential amino acid that is found in almost all proteins in the body, having a major role in increasing the molecular weight and calcium absorption, hindering the elimination of urine, so, lysine prevents osteoporosis, positively influence the central nervous system, helps collagen production and participating in the production of enzymes, antibodies and proteins [Pandia Olimpia & I.Saracin & I. Bozga & F. Bogdan. (2013)].

By eating foods of plant and animal origin, those amino acids can be found naturally on corn seeds which are rich in lysine and can cover the daily requirement of lysine for the body [Frigiou A.D.et al. (2007)].

Threonine, is also an essential amino acid which is designed to maintain protein balance and it helps in the cleaning of the liver, being nesintetizabil by the body, must be acquired through food, and vegetable food is low in this amino acid and threonine requirement is higher in children than in adults, make this important study, to establish if in corn of the two hybrids can be found the amino acid threonine [Strmiska F. & Segal R. & Segal B].

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MATERIALS AND METHODS

Experiments were located in 2012-2013 with 2 corn hybrids: Turda 250 L and 345 L Fundulea, (with high content of lysine) belonging to the group 200 (middle) where the amount of thermal units is between 1200 - 1400⁰ C, in the N-V Oltenia, more precisely Greek village, Dolj County, at a reddish-brown soil (preluvisols redheads) covering platforms and hills, after a preliminary winter wheat, where due to higher temperatures two hybrids can adapt existing thermal requirements in the area of culture, existing natural conditions as well as the organization of production, and how mechanized harvesting work or in the form of ears and kernels.

Table 1 The chemical properties of the soil reddish brown [preluvisols redheads] from experimental lots Greek village of the hybrid Turda 250 L

Nr. Par	pH		N _t %		P ₂ O ₅ mg/100g		K ₂ O mg/100g		Ah m.e./100g		SB m.e./100g		Humus %		Depth (cm)	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
1	6,4	6,15	0,075	0,085	7,5	8,1	5,7	6,3	1,56	1,99	15,4	18,4	0,69	0,74	0-20	0-20
2	6,5	6,14	0,069	0,085	7,4	7,9	4,8	5,1	1,49	1,89	14,9	17,9	0,68	0,72	0-20	0-20
3	6,4	6,15	0,067	0,086	6,9	7,8	4,8	5,2	1,51	1,92	14,9	17,9	0,68	0,71	0-20	0-20
4	6,04	6,10	0,069	0,095	7,2	7,9	5,3	5,9	1,45	1,89	14,5	17,7	0,65	0,68	0-20	0-20
5	6,5	6,14	0,068	0,090	7,1	7,9	4,9	5,3	1,52	1,95	14,6	17,9	0,63	0,69	0-20	0-20
6	6,43	6,12	0,080	0,094	7,2	7,8	6,9	8,8	1,94	2,34	17,9	20,3	0,72	0,97	0-20	0-20

Under the conditions of observations in the two years, seeding density was 50,000 plants / ha in irrigated system, in 6 randomized plots with an area of 24 m², sowing was made in late April, with certified seed, distance between 70 cm rows and between grains of 28.5 cm at a depth of 4-5 cm with SPC8.

Before sowing on the surfaces taken in the study have been taken from the ground, and chemical analyzes were performed in the laboratory of the faculty.

RESULT AND DISCUSSIONS

For determining soil reaction in the two years of experimentation chemical soil analyzes were performed determining soil pH in aqueous suspension of the ground, these soils fall into the category of soil weak acid and neutral with pH values from 6.43 to 6.15, these soils are preferred by maize plants.

Table 2 The chemical properties of the soil reddish brown [preluvisols redheads] from experimental lots Greek village of the hybrid Fundulea 345 L

N r. P ar	pH		N _t %		P ₂ O ₅ mg/100g		K ₂ O mg/100g		Ah m.e./100g		SB m.e./100g		Humus %		Depth (cm)	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
1	6,5	6,15	0,073	0,084	7,5	8,1	5,8	6,3	1,53	1,98	15,3	18,3	0,68	0,72	0-20	0-20
2	6,4	6,13	0,068	0,085	7,3	7,9	4,8	5,2	1,48	1,89	14,9	17,9	0,67	0,71	0-20	0-20
3	6,4	6,13	0,067	0,084	6,9	7,7	4,8	5,2	1,50	1,91	14,8	17,8	0,68	0,71	0-20	0-20
4	6,03	6,10	0,068	0,093	7,1	7,8	5,2	5,8	1,45	1,89	14,5	17,5	0,63	0,66	0-20	0-20
5	6,4	6,13	0,069	0,090	7,0	7,9	4,9	5,3	1,51	1,93	14,7	17,9	0,61	0,69	0-20	0-20
6	6,45	6,11	0,080	0,095	7,2	7,9	6,8	8,7	1,93	2,31	17,6	20,1	0,71	0,98	0-20	0-20

In order to determine the level of nitrogen supply using the direct method of total nitrogen supply by the Kjeldahl method, N_t is existing between the values of 0.067 to 0.095, and for assessment of indirect soil nitrogen supply eas determined amount of exchangeable bases (SB) using Kappen method, SB with values between 14.5 to 20.1.

Humus was determined by the oximetry metod being 0.61 - 0.98. The level of phosphorus supply The spectrophotometric measurements were made, Where P₂O₅ has values between 6.9 to

7.9 and potassium supply was determined with means of photometry with K_2O existing between the values of 4.8 to 8.7 (Table 1).

Chemical analysis of the corn grain from the two hybrids hybrids were revealed by different amounts of amino acids existing in the grain.

Measurements analyzes was performed by means of spectrophotometry and chromatography. Among the acids monoaminomonocarboxilici - were determined: alanine, valine, leucine, isoleucine, aspartic acid, glutaminele, and derivatives oxidilați and sulphide of acids from group monoaminomonocarboxilici been studied: serine, threonine, cysteine, methionine.

Diaminomonocarboxilici acid group: arginine and lysine. A very important aromatic amino acid studied studied were tyrosine, and the amino heterocyclic afof studied: tryptophan, proline and histidine.

Table 3 The content of amino acids studied in corn hybrid Turda 250 L in 2012

Nr crt.	Amino acids determined	Non-irrigated system g/100g s.u.	The content of amino acids [kg/ha]
1. N	Aspartic	0,670	2,021
2. E	Treonina	0,423	1,241
3. N	Serina	0,484	1,452
4. N	Glutamina	1,30	3,885
5. N	Prolina	0,65	1,928
6. N	Cisteina	0,380	1,139
7. N	Glicozina	0,42	1,235
8. N	Alanina	0,795	2,389
9. E	Valina	0,492	1,479
10. E	Metionina	0,143	0,428
11. E	Izoleucina	0,330	0,991
12. E	Leucina	0,930	2,795
13. N	Tirosina	0,612	1,840
14. E	Fenialanina	0,632	1,901
15. E	Histidina	0,395	1,187
16. E	Lizina	0,615	1,250
17. N	Arginina	0,635	1,910
18. E	Triptofanul	0,116	0,150
	Total amino acids	10,022	29,221
	Total essential amino acids	4,076	11,422

Non-essential Aminoacidul Aspartic had values of 0,670 g/100 g s.u. ,and Glutamina of 1.30 , while essential amino acids reach their small values between 0,143 methionine Triptofanul bear the 0,116 and 0,632 [Table3].

Table 4 The content of amino acids studied in corn hybrid Fundulea 345 L în anul 2012

Nr crt.	Amino acids determined	Non-irrigated system g/100g s.u.	The content of amino acids [kg/ha]
1. N	Aspartic	0,670	2,025
2. E	Treonina	0,675	1,251
3. N	Serina	0,431	1,459
4. N	Glutamina	1,34	3,891
5. N	Prolina	0,69	1,933
6. N	Cisteina	0,384	1,145
7. N	Glicozina	0,46	1,241
8. N	Alanina	0,799	2,398
9. E	Valina	0,498	1,482
10. E	Metionina	0,149	0,434
11. E	Izoleucina	0,339	0,997
12. E	Leucina	0,935	2,803
13. N	Tirosina	0,619	1,847
14. E	Fenialanina	0,643	1,911
15. E	Histidina	0,402	1,193

16. E	Lizina	0,615	1,260
17. N	Arginina	0,644	1,919
18. E	Triptofanul	0,118	0,152
	Total amino acids	10,235	29,341
	Total essential amino acids	4,135	11,483

Table 5 The content of amino acids studied in corn hybrid Turda 250 L in 2013

Nr crt.	Amino acids determined	Non-irrigated system g/100g s.u.	The content of amino acids [kg/ha]
1. N	Aspartic	0,673	2,023
2. E	Treonina	0,428	1,248
3. N	Serina	0,487	1,457
4. N	Glutamina	1,31	3,887
5. N	Prolina	0,66	1,930
6. N	Cisteina	0,381	1,142
7. N	Glicozina	0,41	1,235
8. N	Alanina	0,796	2,397
9. E	Valina	0,495	1,479
10. E	Metionina	0,147	0,432
11. E	Izoleucina	0,334	0,997
12. E	Leucina	0,935	2,799
13. N	Tirosina	0,615	1,843
14. E	Fenialanina	0,637	1,906
15. E	Histidina	0,399	1,189
16. E	Lizina	0,613	1,253
17. N	Arginina	0,639	1,914
18. E	Triptofanul	0,118	0,152
	Total amino acids	10,077	29,283
	Total essential amino acids	4,106	11,455

In unirigated sistem maize crop Hybrid Turda 250 L, cultivated in 2012 significant values are observed the amino acid aspartic acid, proline, alanine, leucine, tyrosine, phenylalanine, arginine, [g/100g su] amounting to 10.22 and all the essential amino acids to 4,076 ratio [kg / ha] is 11.42.

Hybrid Fundulea 345 L, in year 2012 had better values than other hybrid that managed under irrigation to have appreciable values in reported amino acids [kg / ha] of 29.283 in which 11,455 are the values of the essential ones. [Table 5].

Table 6 The content of amino acids studied in corn hybrid Fundulea 345 L in 2013

Nr crt.	Amino acids determined	Non-irrigated system g/100g s.u.	The content of amino acids [kg/ha]
1. N	Aspartic	0,674	2,025
2. E	Treonina	0,427	1,246
3. N	Serina	0,488	1,456
4. N	Glutamina	1,34	3,889
5. N	Prolina	0,69	1,932
6. N	Cisteina	0,384	1,143
7. N	Glicozina	0,46	1,239
8. N	Alanina	0,798	2,392
9. E	Valina	0,495	1,482
10. E	Metionina	0,146	0,431
11. E	Izoleucina	0,333	0,994
12. E	Leucina	0,934	2,799
13. N	Tirosina	0,616	1,846
14. E	Fenialanina	0,635	1,907
15. E	Histidina	0,398	1,191
16. E	Lizina	0,619	1,254

17. N	Arginina	0,643	1,918
18. E	Triptofanul	0,117	0,151
	Total amino acids	10,197	29,295
	Total essential amino acids	4,104	11,455

2013 crop year the two hybrid experiment in the hilly area, results obtained the amount of the existing amino acids is present in the corn material, because 2013 was a year with favorable conditions for development of maize, there was thus obtained an increase of aminoacids at hybrid Turda 250 L of 17.84 kg / ha, and hybrid Fundulea 345 L of 17.858 kg / ha.

CONCLUSIONS

Importance of proteins necessary for human body makes it possible to select the most valuable vegetable products protein-rich to be studied and suitable living conditions.

Due to climate change to the high temperatures in this region, two hybrids behaved very well although they are part of the middle group, but their genetic heritage content in high lysine have been the subject of their experiment, obtaining significant results.

The influence of the difference of protein content of the corn is given by the hybrid and conditions necessary for its development.

Due to the rich in amino acids, recommended cultivation of these hybrids is in the N-V Oltenia.

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