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Amino Acids Composition In Irrigated And Typical Grey Soils

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Annotation: In our republic, large-scale theoretical and practical research is being carried out on restoring and preserving the fertility of protected, fallow and irrigated soils, improving soil processes, and achieving certain results. The Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030 states that "... Of the 20.2 million hectares of land intended for agriculture, only 20.7 percent are irrigated lands. Over the past 15 years, the area of irrigated land per capita has decreased by 24 percent (from 0.23 to 0.16 ha), rational use of natural resources, including rational use of land and water resources, forest resources, and improvement of the environmental protection system" are identified as important strategic tasks [1]. Based on these tasks, it is important to determine the current ecological and reclamation status of irrigated lands, apply resource-saving agrotechnologies aimed at improving their humus content and biological activity, compile maps of soil salinity and biological activity of the soil, and implement agrotechnical measures based on this.

Key words:

Introduction. In our republic, large-scale theoretical and practical research is being carried out on restoring and preserving the fertility of protected, fallow and irrigated soils, improving soil processes, and achieving certain results. The Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030 states that "... Of the 20.2 million hectares of land intended for agriculture, only 20.7 percent are irrigated lands. Over the past 15 years, the area of irrigated land per capita has decreased by 24 percent (from 0.23 to 0.16 ha), rational use of natural resources, including rational use of land and water resources, forest resources, and improvement of the environmental protection system" are identified as important strategic tasks [2]. Based on these tasks, it is important to determine the current ecological and reclamation status of irrigated lands, apply resource-saving agrotechnologies aimed at improving their humus content and biological activity, compile maps of soil salinity and biological activity of the soil, and implement agrotechnical measures based on this.

Study of the problem . Extensive research has been carried out in Uzbekistan and foreign countries on the agrochemical, agrophysical and biogeochemical properties of soils, problems of maintaining, restoring and increasing their fertility. The morphological structure, geographical distribution, agrophysical and agrochemical properties, humus content of soils in Uzbekistan and foreign countries have been studied by BGRozhanov, SAAliyev, LAGrishina, MMAliyeva, MPAranbayev, ONBiryukova, DSOrlov, OSBezuglova, VPVolobuyev, MGMerkusheva, MYChang, FSRodriguez, TA Sokolova, and in our republic by SNRijov, NVKimberg, JSSattorov, KhTRiskiyeva, S.Abdullayev, AXAbdullayev, RQQo'ziyev , LAGa fu rova, MMToshko'ziyev, R. Kurvantayev, G'. Yuldashev, N. Yu. Abdurakhmonov, V. Yu. Isakov, M. T. Isag'aliyev, Z. A. Jabbarov, H. T. Artikova, G. T. Parpiyev, U. B. Mirzayev, D. M. Kholdarov, N. Shadiyeva, N. B. Raupova, soil amino acids and energy status have been studied by O. V. Myachina, L. E. Mamasalieva, R. N. Kim, G. Sh. Raimbayeva, M. M. Khaydarov and others. However, the modern agrochemical and agrophysical properties of irrigated and loamy gray soils, in particular, the content and energy status of amino acids, and their role in increasing their productivity have not been sufficiently studied.

[1] https://lex.uz . Decree of the President of the Republic of Uzbekistan dated October 23, 2019 No. PF-5853 " On approval of the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030 " .
[2] https://lex.uz . Decree of the President of the Republic of Uzbekistan dated October 23, 2019 No. PF-5853 " On approval of the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030 " .

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Therefore, **the purpose of the research is** to determine the morphological, agrophysical, agrochemical properties of irrigated and loamy gray soils, the amount of humus and its humus content, the amount of amino acids in the soil, their energetic state, and to develop scientific and practical solutions aimed at increasing soil fertility.

Research methods . The dissertation work was carried out using ArcGIS 10.6.1 software , the methodological manual of the Ministry of Agriculture of the Republic of Uzbekistan "Methodological instructions for conducting soil agrochemical research in irrigated areas and compiling agrochemical cartograms and developing scientific requirements for mineral fertilizers", microbiological analyzes by ENMishustin and D.Zvyagensev, enzymatic activity of soils by A.Galstyan, group and fractional composition of humus by T.A.Plotnikova, B.B.Ponomaryova, soil free amino acids by Gilbert and Altman methods , mathematical and statistical analysis of the results by B.A.Dospekhov's manual and Performed using Microsoft Excel.

Research results

On irrigated and loamy typical gray soil When amino acids were studied, 16 amino acids were detected and identified in their composition. A decrease in free soil amino acids is observed in irrigated soils. In typical gray soils, free soil amino acids average 26.56 mg/kg, and in different layers this indicator varies from 5.83 to 64.24 mg/kg. Monoaminocarboxylic acids: glycine, alanine, serine, threonine, methionine, valine, leucine, isoleucine, making up 35.5-46.11% of the total, with a total mass of 10.4 mg/kg, and in different layers this indicator varies from 2.55-22.84 mg/kg. Monoaminodicarboxylic acids: aspartic acid, asparagine, glutamic acid, glutamine, in the case of 35.53-45.04% of the total mass, it is 11.09 mg/kg, and in different layers it varies between 2.62-27.92 mg/kg. Diaminomonocarboxylic acids: lysine, arginine, are 3.6-9.65%, and the total mass is 1.26 mg/kg. Monoaminocarboxylic acids: glycine, serine, threonine, methionine, valine, leucine, isoleucine, their amounts are 43.92-60.04% of the total, with a total mass of 12.23 mg/kg, varying from 7.02 to 21.42 in different layers. mg/kg. Monoamine dicarboxylic acids: asparagine, Glutamine is 24.45-45.62%, which is 10.01 mg/kg, soil in the layers fluctuates between 3.82-20.64 mg/kg. Diaminemonocarbon acids: lysine, arginine amounts 2.58-5.86% of the total, The total mass is 1.16 mg/kg, and the amount in soil layers is It ranges from 0.47 mg/kg to 2.62 mg/kg. Aromatic amino acids: phenylalanine, tyrosine, tryptophan 6.18-8.64%, total mass 1.76 mg/kg is 0.82-3.01 mg/kg in different soil layers, from imino acid to proline in the upper layers of the total number of amino acids It is 2.19% of the total amount.

It is worth noting that okay, monoaminocarbon, monoaminodicarbon, diaminomonocarbon, Aromatic and imino acids are more abundant in irrigated gray soils than in dry soils. The quantitative and qualitative changes in amino acids in the genetic layers of dry and irrigated dark gray soils are presented in Tables 1-2 , according to which the quantity and quality of amino acids in these soils are not uniform. Free soil amino acid levels are lower than the topsoil decreases sharply towards the end. For example, when the 0-7 cm layer is 111.6 mg/kg, the 43-73 cm, it decreases sharply to 12.47 mg/kg. Such a sharp As mentioned above, the change is due to the properties of the soil and amino acids. It is evident that in the studied soils Irrigated dark-colored soils stand out. Dark-colored gray In the irrigated group of soils, the tillage layer is clearly distinguished. and the glycine content is 2.51 mg/kg, which is higher than that of the protected soils. almost twice as much. These soils are characterized by alanine, serine, cysteine, threonine, methionine, valine are absent, but in amounts of 0.26-0.28 mg/kg leucine and isoleucine were detected. Alanine, cysteine, aspartic acid, Amino acids such as glutamine, arginine, and histidine were not detected, i.e., they are absent.

The total amount of amino acids in irrigated soils is almost 8.5 times less, fluctuating in the range of 3.33-13.44 mg/kg. Changes in amino acids of irrigated dark gray soils are due to a decrease in the amount of humus and humic acids in the initial stages of development and irrigation of gray soils. and the formation of amino acids during the process of humus mineralization. In irrigated dark gray soils, phenylalanine is 0.39-2.64 mg/kg, that is, almost the same as in dry soils, and asparagine is 0.41-2.36 mg/kg, which is more than in dry soils. Similar changes are also observed in dry and irrigated typical gray soils, but their intensity is somewhat slower. For example, histidine is 0.79-1.56 mg/kg, in dark gray soils 0.81-1.61 mg/kg, etc. Alanine and cysteine were not detected in typical gray soils. Leucine, isoleucine, and histidine show significant differences between soils. In typical light gray soils, the sum of amino acids ranges from 10.13-44.15 mg/kg, and in dark gray soils it ranges from 12.47-111.6

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Table 1
of typical irrigated gray soil , %

Cross section t/r	Soil name, erosion rate	Depth, cm	Amino acids															
			Asparagine	Threonine	Serene	Glutamine	Proline	Glycine	Alanine	Valine	Methionine	Isoleucine	Leucine	Tyrosine	Phenylalanine	Histidine	Lysine	Arginine
Section 12	Weakly eroded soil	0-28	1.23	13.5	0.34	0.85	2.31	2.32	0.68	0.109	1.57	3.75	4.11	2.34	2.28	8.01	1.22	3.34
		2 8 - 4 4	0.9	13.0	0.27	0.76	1.55	1.61	0.76	0.325	0.65	2.14	3.14	3.09	1.10	7.34	0.76	1.86
		44-62	0.3	7.4	0.18	0.44,	0.87	1.29	0	0.185	0.005	0.46	1.17	1.87	0.78	2.33	0.74	0.56
		62-68	0	6.03	0.06	0.23	0	0.67	0	0.344	0	0.18	0.67	0.08	0.02	0.92	0.16	0.12
		86 - 110	0	6.6	0.02	0.09	0	0.45	0	0.222	0	0	0.09	0.02	0	0.11	0.08	0.07

2 - table
of typical gray soil of Lalmi , %

Cross section t/r	Soil name, erosion rate	Depth, cm	Amino acids															
			Asparagine	Threonine	Serene	Glutamine	Proline	Glycine	Alanine	Valine	Methionine	Isoleucine	Leucine	Tyrosine	Phenylalanine	Histidine	Lysine	Arginine
Section 9	Weakly eroded soil	0-22	3.03	1 5 .5	0.97	1.55	2.71	0.32	1,08	0.99	1.64	2,9 5	5,08	3,2 4	2.78	8,56	2.42	3,57
		22-38	2.55	14.0	0.84	0.79	1.65	0.54	0.66	0.65	0.79	2.56	2.14	3,12	1.53	6.44	1,3 6	1.27
		38-60	0.89	7.72	0.67	0.23	0.57	0.29	0.07	0,3 5	0.15	1,3 6	1,34	1.67	0.88	1.63	1,03	1.53
		60-86	0.40	6.43	0.11	0.12	0.10	0,3 7	0.04	0.06	0.13	0.66	0,11	0.68	0.12	1,11	0.46	1.04
		86-120	0.11	5.66	0.07	0.06	0.03	0	0.003	0.02	0.06	0.13	0.05	0,2 2	0.04	0.07	0.18	0.08

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mg/kg. One of the characteristic features of these soils is that while glutamic acid in typical irrigated gray soils is 0.18-0.55 mg/kg, histidine was not detected in irrigated light gray soils, i.e., none.

Conclusions

In irrigated soils, a decrease in free soil amino acids is observed. In the upper layer of dark gray soils, monoaminocarboxylic acids, according to the amount of their potential energy, obey the following sequence law : ***threonine > leucine . The reason is that in these soil conditions, isoleucine > glycine > methionine > alanine > cysteine > valine > serine In the lower layers, the energy decreases, and this decrease is associated with the energy*** of glycine, alanine, valine, leucine, etc.

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