

EFFECT OF COMPONENT APPLICATION OF ORGANIC AND BIOLOGICAL FERTILIZERS ON HEAVY METALS AND PESTICIDE RESIDUES IN SOIL

Утамурадова Нигора Абдурахмановна

ассистент Самаркандского государственного медицинского университета

Эльмуродова Матлюба Абдурахманова

ассистент Самаркандского государственного медицинского университета

Abstract

The use of biological preparations against the background of organic fertilizers (green manure and manure) provides a reduction in the amount of heavy metals in the mobile form in the soil compared to the background (control) agrocenosis N250P175K125. Organic fertilizers improve the ecological condition of the soil and increase the amount of humus, as a result of which heavy metals entering the soil are adsorbed by organic substances, at the same time residues of pesticides such as HCH and DDT are reduced, and the ecological stability of the soil is ensured.

Keywords. Agrocenosis, humus, HCH, DDT, RARE EARTH METALS, adsorption, Rizocom-1, organic fertilizers, biopreparation, heavy metals, hydroxides, carbonates, phosphates, environmental sustainability.

Introduction

The experiment studied the effect of the use of mineral and organic fertilizers and biological preparations on the amount of mobile heavy metals in the soil. The mobility of heavy metals in the soil depends on environmental factors, such as the soil environment, mechanical composition, and humus content in the soil [3; p. 238, 1; pp. 238-239]. Changing the soil environment to the alkaline side reduces the mobility of heavy metals in the soil. Heavy metal damage is mostly observed in soils with light mechanical composition and low humus content [2; pp. 213-238]. As a result of the enrichment of the soil with organic matter and the increase in absorption capacity, heavy metals are adsorbed (absorbed) by organic substances and form insoluble salts with various ions in the soil.

According to S. E. Vitkovskaya [4; 47-b.] Heavy metals contained in organic fertilizers can persist in soil organic matter for more than 5 years, and they are not absorbed by plants during this period. As a result of mineralization of organic substances, heavy metals combine with soil anions (hydroxides, carbonates, phosphates) in an alkaline soil environment, forming poorly soluble in salt in water.

At the beginning of the study, the amount of Pb, Cd, Cu, Zn, Co in mobile form in the soil where the experiment was carried out was 1.2, 0.5, 0.9, 2.6, 1.5 mg/kg, respectively, and a sharp change in the amount of heavy metals in the mobile form in the soil as a result of the use of organic





fertilizers and biological preparations was not observed for 3 years. In agrocnoses where Background + green manure was used - 10 t/ha, Background + manure - 10 t/ha, compared to the background (control) agrocnosis N250P175K125, the amount of Pb and Co decreased, and the amount of Cu and Zn slightly increased. The amount of Cd has not changed. The reason for this is that manure and green manure contain a small amount of Pb and So and a slightly higher amount of Cu and Zn. However, these amounts were within the MPC (Figure 3.5).

In the agrocnosis, where organic fertilizers and biological preparations were used, a decrease in the amount of all heavy metals was observed. Since organic fertilizers and biological preparations are used in small quantities, they contain a small amount of heavy metals (Table 1).

Table 1 Effect of organic fertilizers and Rizokom-1 on the amount of heavy metals in mobile form in soil (2019-2021), mg/kg

№	Agrocnoses	Pb	Cd	With	Zn	Co
1	N250R175K125- background (control)	1,3	0,5	1,5	5,4	1,6
2	Phone+Rizocom-1	1,1	0,5	1,3	4,8	1,4
3	Background+siderat - 10 t/a	1,2	0,4	1,0	3,0	1,3
4	Background+Green Manure+Rizokom-1	1,3	0,3	0,8	2,7	1,0
5	Фон+ навоз - 10 т/га	1,2	0,5	0,9	2,3	1,5
6	Фон+ навоз +Rizokom-1	1,2	0,3	0,7	2,4	1,0
MACS		10,0	1,0	3,0	23,0	5,0

Trace elements (heavy metals) in the soil are also absorbed by plants in certain amounts. In the agrocnosis where the biological preparation Fon+Rizocom-1 was used, the mobile amount of heavy metals was less than in other agrocnoses.

When using biological preparations against the background of organic fertilizers (green manure and manure), a decrease in the amount of heavy metals in the mobile form was observed compared to the background (control) agrocnosis N250P175K125. In general, organic fertilizers improve soil properties and increase humus content.

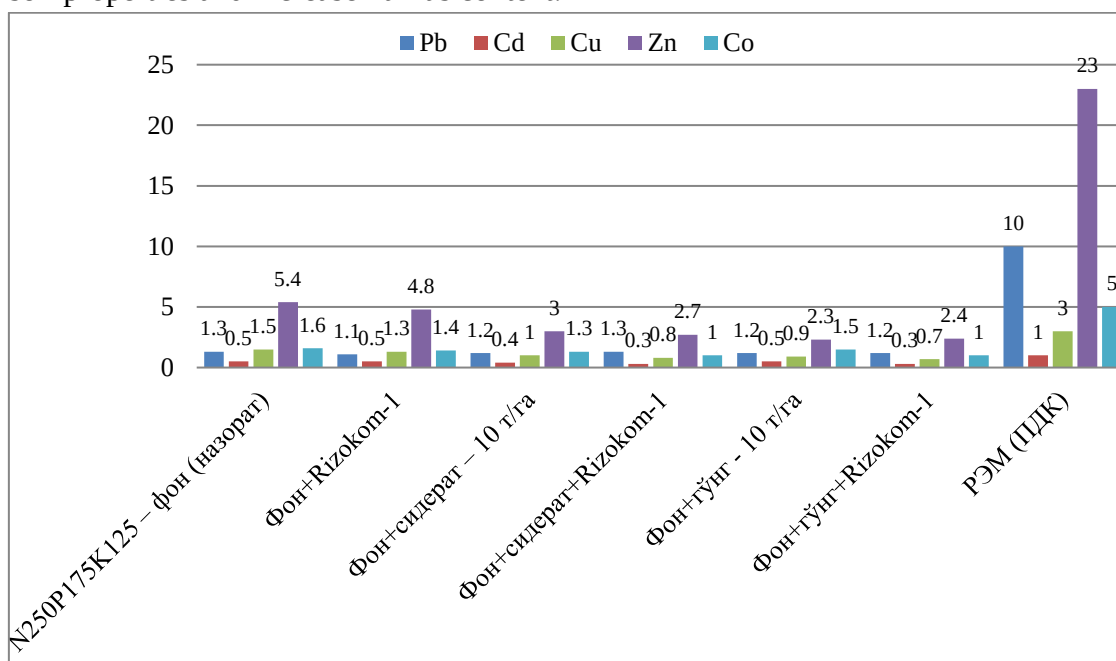


Figure 1. Effect of organic fertilizers and Rizokom-1 on the amount of heavy metals in mobile form in soil (2019-2021), mg/kg

The most important pesticides include organochlorine and organophosphate compounds, carbamic acid derivatives, plant extracts (pyrethroids), and triazines. Compounds of copper, sulfur and other elements can be isolated from inorganic pesticides.

Organochlorine pesticides are preferred because of their versatility. They destroy many types of pests, the effectiveness is maintained for a long time and the risk to warm-blooded animals is small. The disadvantage of organochlorine pesticides is their chemical resistance in the external environment, soil, plants and water, that is, they are stored for a long time without decomposition. This can lead to the accumulation of drug residues in plant foods and animal organisms. The use of very stable drugs such as DDT is prohibited. The organophosphate pesticide has a high biological activity. These compounds differ from others in their ability to be absorbed into the plant and retain their poisonous power for a long time.

Analysis of the data obtained in the experiment shows that before the experiment, HCH residues in all studied agroecosystems were 0.02-0.05 mg/kg, and DDT residues were about 0.05-0.06 mg/kg (Table 2).

Table 2 Effect of organic fertilizers and Rizocom-1 on pesticide residues in soil, 0-30 cm (2019-2021), mg/kg

№	Agroecosystems	Before the experiment		Year 3 at the end of the season	
		GHCG	DDT	GHCG	DDT
1	N250R175K125 – background (control)	0,03	0,06	0,02	0,04
2	Phone+Rizocom-1	0,05	0,05	0,04	0,03
3	Background+siderat – 10 t/a	0,05	0,06	-	-
4	Background+Green Manure+Rizocom-1	0,04	0,05	-	-
5	Фон+навоз - 10 т/га	0,02	0,05	-	-
6	Фон+навоз+Rizocom-1	0,03	0,06	-	-
MACS		0,1	0,5	0,1	0,5

In the analysis carried out at the end of the third year of the experiment, at the end of the season, the presence of HCH and DDT residues was revealed in agroecosystems N250P175K125 – background (control) and Fon+Rizocom-1 and, in turn, partially decreased. In agroecosystems, where the biological preparation was used together with organic fertilizers (green manure and manure), these pesticides were not preserved, as noted (Table 2). This situation is explained by the integration of pesticide residues into the organic mass.

In general, in the conditions of irrigated typical gray soils of the Kashkadarya region, the use of various green manure crops, the use of manure, as a result of the use of biological preparations in order to increase soil fertility, leads to a decrease in the content of heavy metals in the soil and residues of pesticides such as HCH and DDT, and the preservation of the environmental stability of the soil is ensured. From this point of view, in order to prevent the negative impact of pesticides on humans, animals, plants, water and the environment as a whole, it is necessary to take into account the impact in advance, that is, the consequences, and not only on the pest, but also on the biocenosis. Pesticides should be transformed from pest control to pest control.



**References**

1. Askarova N.K., Rakhimova D.Zh. EFFECTIVENESS OF SPECIFIC TREATMENT OF METABOLIC DISORDERS CAUSING CONVULSIONS DURING THE NEWBORN PERIOD //SCIENTIFIC RESEARCH. – P. 68.
2. Akhmedzhanova N.I. et al. Assessment of the functional state of the kidneys during renal complications in children during the COVID-19 pandemic: an observational cohort retrospective clinical study // Kuban Scientific Medical Bulletin. – 2023. – T. 30. – No. 3. – pp. 25-33.
3. Andarmonovich K. A. et al. EFFECTS OF CONTAMINATED ATMOSPHERIC AIR ON PLANTS AND ANIMAL ORGANISMS &Journal of new century innovations. – 2023. – T. 42. – No. 1. – pp. 176-181.
4. Abdujabbarova Z., qizi Ziyodabegim M., Karimov A. A. WAYS OF HUMAN BODY DAMAGE BY HEAVY METALS //GOLDEN BRAIN. – 2023. – T. 1. – №. 6. – C. 63-65.
5. Amangildievna S. M. Informational Educational Programs on Adolescent Health //Eurasian Research Bulletin. – 2023. – T. 17. – C. 210-214.
6. Baratova R. S. The Importance Of A Healthy Lifestyle In Maintaining The Health Of The Population //Eurasian Research Bulletin. – 2023. – T. 17. – C. 236-240.
7. Bakhriyevich U. U., Amankeldievna S. M. IMPACT OF ECOLOGICAL PROBLEMS ON SOCIETY AND ECOLOGICAL PROBLEMS OF THE PRESENT TIME. – 2023. – T. 1. – №. 9. P. 1000-1008.
8. Boysin K. et al. Influence of Xenobiotics on Organisms and Methods of their Detoxification //Web of Scholars: Multidimensional Research Journal. – 2022. – T. 1. – №. 7. – C. 81-84.
9. Bulyaev Z.K. Prevalence of Hepatitis A Among Children in Central Asia //Research Journal of Trauma and Disability Studies. – 2023. – T. 2. – No. 5. – pp. 7-12.
10. Gapparova G., Akhmedjanova N. CLINICAL AND LABORATORY FEATURES, DIAGNOSIS AND TREATMENT OF PYELONEPHRITIS IN CHILDREN DURING THE COVID-19 PANDEMIC. – 2022. – T. 1. – №. 17. P. 186-187.
11. Guli S. et al. PRINCIPLES OF FOOD ORGANIZATION FOR PRIMARY SCHOOL STUDENTS IN GENERAL EDUCATIONAL ORGANIZATIONS.
12. Gapparova G. N., Akhmedzhanova N. I. CLINICAL-LABORATORY CHARACTERISTICS, DIAGNOSTICS AND TREATMENT OF PIELONEFRITIS IN CHILDREN DURING THE COVID-19 PANDEMIC / JOURNAL OF REPRODUCTIVE HEALTH AND URO-NEPHROLOGICAL STUDIES. – 2022. – T. 3. – No. 4.
13. Erugina M. V. et al. The population health in The Russian Federation and the Republic of Uzbekistan: a comparative analysis //Problemy Sotsial'noi Gigieny, Zdravookhraneniia i Istorii Meditsiny. – 2023. – T. 31. – №. 2. – C. 206-209.
14. Eshnazarovich T. B., Usmonovna V. M., Chorshanbievich K. N. Some Indicators of Protein Security of Professional Athletes-Young Men Engaged in Kurash Wrestling //Eurasian Research Bulletin. – 2023. – T. 17. – C. 241-245.
15. Fayzibayev P.N., Bulyaev Z.K., Uralov Sh.M. SAMARKAND REGION RESIDENTS OF RATIONAL OVKATATION PRINCIPLES / Education news: research in the 21st century. – 2023. – T. 1. – No. 11. – pp. 501-510.
16. Islamovna S. G., Jurakulovna R. D., Gulistan K. Current state of the problem of rationalization of schoolchildren's nutrition. – 2022.



17. Ibragimov P. S., Tukhtarov B. E., Valieva M. U. BRUCELLOSIS CASALLIGINING ETIOLOGY AND EPIDEMIOLOGY //PROSPECTS OF DEVELOPMENT OF SCIENCE AND EDUCATION. – 2022. – T. 1. – No. 5. – pp. 50-53.
18. Jurakulovna R. D. Analysis Of Distribution Of Vitamins, Macro And Micro Elements Deficiency Among Children And Adolescents In Samarkand Region, According To Clinical Symptoms //Eurasian Research Bulletin. – 2023. – T. 17. – C. 229-235.
19. Karimov A. A. ECOLOGICAL EVALUATION OF THE EFFECTS OF HEAVY METALS ON THE HUMAN BODY AS A RESULT OF ENVIRONMENTAL POLLUTION .Results of National Scientific Research International Journal. – 2023. – T. 2. – No. 4. – C. 205-215.
20. Karimovich B. Z. Prevalence of Hepatitis a in Central Asian Regions //INTERNATIONAL JOURNAL OF HEALTH SYSTEMS AND MEDICAL SCIENCES. – 2023. – T. 2. – №. 5. – C. 28-32.
21. Karimov A. A. ACCUMULATION OF HEAVY METALS IN PLANTS //GOLDEN BRAIN. – 2023. – T. 1. – №. 5. – C. 148-157.
22. Khitaev B. A. et al. Hematological Indicators under the Influence of Zinc Sulfate in the Experiment //Web of Scholars: Multidimensional Research Journal. – 2022. – T. 1. – №. 7. – C. 77-80.
23. Khidirov N. Ch., Tukhtarov B. E., Valieva M. U. ASSESSMENT OF THE AVERAGE DAILY DIETS OF PROFESSIONAL ATHLETES ON ACTUAL AND ALTERED DIETARY BACKGROUNDS //Galaxy International Interdisciplinary Research Journal. – 2023. – T. 11. – №. 4. – C. 433-441.
24. Mallaeva M. M. DEVELOPMENT OF HEALTHY LIFESTYLE //INTERDISCIPLINARY INNOVATIONS AND SCIENTIFIC RESEARCH JOURNAL IN UZBEKISTAN. – 2023. – T. 2. – No. 16. - pp. 753-760.
25. Muhammedjan M., Mavludakhon M. THE EFFECT OF CERTAIN POLYPHENOLS IN EXPERIMENTAL TOXIC HEPATITIS //International Journal of Contemporary Scientific and Technical Research. - 2023. - S. 283-286.
26. Maxramovna M. M. et al. PEDAGOGICAL ESSENCE OF DEVELOPING A CULTURE OF HEALTHY LIFESTYLE FOR YOUNG PEOPLE //Web of Scientist: International Scientific Research Journal. – 2022. – T. 3. – №. 10. – C. 1234-1238.
27. Mallaeva M. B. ECOLOGY OF THE BIBLE'S VIEWPOINT OF THE BIBLE'S VIEWPOINT
28. Mallaeva M. M. DEVELOPMENT OF HEALTHY LIFESTYLES IN UZBEKISTAN – 2023. – T. 2. – No. 16. – pp. 753-760.
29. Naimova Z. S. INFLUENCE OF FAMILY ECOLOGY AND LIFESTYLE ON THE HEALTH OF SCHOOL-AGE CHILDREN // Journal of new century innovations. – 2023. – T. 31. – No. 3. – pp. 107-113.
30. Naimova Z. S. et al. The Impact of Chemical Production Emissions on the Health of Children and Adolescents //AMALIY VA TIBBIYOT FANLARI ILMIY JURNALI. – 2022. – P. 288-292.
31. ANTHROPOMETRIC INDICATORS IN CHILDREN AND ADOLESCENTS LIVING IN AREAS CLOSE TO NAIMOVA Z. S., ShaykulOV H. S. KIMYO ZAVOD & GOLDEN BRAIN. – 2023. – T. 1. – No. 5. – C. 59-64.
32. Naimova Z. S. Xenobiotics as a Risk Factor for Kidney and Urinary Diseases in Children and Adolescents in Modern Conditions //Eurasian Research Bulletin. – 2023. – T. 17. – C. 215-219.



33. Narbuvayevna A. R., Murodulloyevna Q. L., Abduraxmanovna U. N. Environmentally friendly product is a Pledge of our health!. – 2022.
34. Nurmamatovich F. P., Jurakulovna R. D. The importance of the international hassp system in the production of quality and safe confectionery products //ACADEMICIA: An International Multidisciplinary Research Journal. – 2021. – T. 11. – №. 10. – C. 1184-1186.
35. Nurmuminovna G. G., Abdurakhmanovna U. N. CLINICAL AND LABORATORY FEATURES OF NEPHROPATHY IN CHILDREN WITH DIABETES MELLITUS //Open Access Repository. – 2023. – T. 9. – №. 2. – C. 116-122.
36. Nurmuminovna G. G. CLINICAL AND LABORATORY FEATURES, DIAGNOSIS AND TREATMENT OF PYELONEPHRITIS IN CHILDREN DURING THE COVID-19 PANDEMIC //JOURNAL OF BIOMEDICINE AND PRACTICE. – 2023. – T. 8. – №. 2.
37. Nurmuminovna G. G. Assessment of Partial Renal Function in Children with Pyelonephritis During the Covid-19 Pandemic //Eurasian Research Bulletin. – 2023. – T. 17. – C. 220-228.
38. Norbuvaevna A. R. The importance of nitrates in food safety //Conference Zone. – 2022. – C. 148-150.
39. Daughter Zulfiqorova M. Y. et al. VITAMIN D DEFICIENCY, CONSEQUENCES, PREVENTION WAYS IN PREGNANT WOMEN – 2024. – T. 3. – No. 3. – C. 46-49.
40. Rakhimova D. D., Shaykhova G. I. 7-17 YEAR-OLD SCHOOL STUDENTS / Journal of Reproductive Health and Urogenital Research. – 2022. – T. 3. – No. 4.
41. Rakimova D. J., Naimova Z. S., Halimova S. A. 7-14 YEARS OLD AND THE ROLE OF VITAMINS AND MINERALS IN PREVENTING THEM :Innovative, educational, natural and social sciences. – 2022. – T. 2. – No.
42. Ra A. et al. Investigate soil contamination with heavy metals while community health. – 2022.
43. Sattorovna N. Z. Family Ecology and Way of Life as a Factor Shaping the State of Health of School Children //Global Scientific Review. – 2023. – T. 14. – C. 60-67.
44. Sanayeva S. B. et al. ABOUT PESTS OF GOURDS IN THE SAMARKAND REGION //GOLDEN BRAIN. – 2023. – T. 1. – №. 6. – C. 66-68.
45. Sh B. R. et al. THE SIGNIFICANCE OF GIAMBLIASIS IN THE ETIOPATOGENESIS OF DISEASES IN CHILDREN //EPRA International Journal of Multidisciplinary Research (IJMR). – 2022. – T. 8. – №. 6. – C. 62-65.
46. Sh B. R. et al. Environmentally Friendly Product is a Pledge of Our Health //Texas Journal of Multidisciplinary Studies. – 2022. – T. 9. – C. 48-50.
47. Tukhtarov B. E., Valiyeva M. U., Ch K. N. ESTIMATION OF THE IMPORTANCE OF BIOLOGICAL VALUE OF NUTRITION ALLOWANCES OF SPORTSMEN OF WEIGHTLIFTING IN THE CONDITIONS OF THE HOT CLIMATE //World Bulletin of Public Health. – 2023. – T. 19. – C. 149-152.
48. Uralov U., Baratova R., Radzhabov Z. IMPROVING THE SANITATION OF DRINKING WATER //Eurasian Journal of Academic Research. – 2023. – T. 3. – No. 2 Part 2. – pp. 176-179.
49. Uralov Sh. M., Bulyaev Z. K. ON THE INFLUENCE OF ENVIRONMENTAL FACTORS ON THE QUALITY OF LIFE AND HEALTH OF STUDENTS (BRIEF REVIEW) // Education News: Research in the 21st Century. – 2023. – T. 1. – No. 11. – pp. 518-525.
50. Uralov Sh. M., Bulyaev Z. K. STUDYING THE INFLUENCE OF PHYSICAL EDUCATION CLASSES ON THE HEALTH AND LEVEL OF PHYSICAL CONDITION OF STUDENTS // Education News: Research in the 21st Century. – 2023. – T. 1. – No. 11. – pp. 511-517.



51. Valieva M. U., Tukhtarov B. E. TO THE EXPERIENCE OF USING A BIOLOGICALLY ACTIVE FOOD ADDITIVE NOGLUKIN IN THE NUTRITION OF ATHLETES //Galaxy International Interdisciplinary Research Journal. – 2023. – T. 11. – No. 4. – pp. 425-432.
52. Zhurakulovna R. D., Abdurakhmanovna U. N. Current State of the Problem of Rationalization of Schoolchildren's Nutrition //Eurasian Medical Research Periodical. – 2023. – T. 19. – C. 81-89.
53. Zhurakulovna R. D. ASSESSMENT OF THE ACTUAL NUTRITION OF CHILDREN AND ADOLESCENTS TAKING INTO ACCOUNT REGIONAL PECULIARITIES //E Conference Zone. – 2022. – C. 41-44.
54. Zhurakulovna R. D. NUTRITION OF CHILDREN AS A FACTOR DETERMINING THE HEALTH OF FUTURE GENERATIONS //Conferencea. – 2022. – C. 41-42.
55. Zhurakulovna R. D., Shomuratovna B. R., Narmuminovna G. G. HYGIENIC RECOMMENDATIONS FOR THE PREVENTION OF SCHOOL MYOPIA AND OTHER VISUAL IMPAIRMENTS IN CHILDREN OF PRIMARY SCHOOL AGE //American Journal of Interdisciplinary Research and Development. – 2022. – T. 6. – C. 29-38.