

These conclusions were approximately identical according to the results of both techniques of bioindication and proved to match with the data of IPW.

One of the tasks of our researches was to define the comparative efficiency of the methods of bioindication and also to compare them to the standard method, based on IPW. It is possible to establish reliability of the received results only by mathematical methods therefore we carried out statistical data processing. Correlation analyses were carried out to solve this problem. We compared the methods of bioindication between each other and also each of these methods with the water pollution index. As you can see, in all three cases, the correlation coefficient was as close as possible to 1.

The results of our work confirmed our hypothesis that it is possible to obtain reliable data on water pollution using several different methods of bioindication.

Thus, from the results of our work, we can make the following conclusions:

The carried out researches of the impurity of water objects of Belarus by methods of bioindication have shown, that the best situation is on the rivers Ol'sa and Drut'. The dirtiest river is the river Svisloch'. That confirms the dependence of water pollution on economic activities of man because the quality of water in Svisloch' obviously degrades downstream.

1. The Statistical correlation analysis has shown a high level of comparability of techniques of bioindication according to Mayer and Vassman and Xilander methods.

2. The comparison of the results of bioindication with the literary data on water objects pollution (IPW) confirms their high comparability.

According to the results of our work it can be concluded that both of the methods of bioindication - the method of Mayer and the method of Wassman and Xilander can be effectively used to monitor water objects and obtain reliable data on their environmental condition along with traditional chemical methods of analysis.

## **INVESTIGATION OF TOXIC AND GENOTOXIC EFFECTS OF SYNTHETIC FOOD DYES BY THE ALLIUM TEST METHOD**

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The study of the influence of food dyes using the method of Allium test. Evaluation of toxic, mitosis-modifying and mutagenic action of the factor.

**Keywords:** Allium test, ana-telophase analysis, food dyes, mitotic index, mutagens, chromosome aberrations.

The nutritional factor is one of the most important factors that influence the state of human health and its population as a whole. Food is not only a carrier of plastic and energy materials, but also a source of components of non-alimentary (non-food) character, among which there are many components of anthropogenic origin. The most important group of such foreign food substances is a huge amount of food additives. One of the most common types of food additives can be considered a group of dyes. In its composition, dyes contain components of animal and vegetable origin, as well as some minerals and salts. To give different shades to products, manufacturers use dyes both natural (of natural origin) and synthetic (of organic and inorganic nature).

The relevance of the study of food additives as one of the factors affecting humans, causes the prevalence of malignant diseases, allergies and other pathologies.

**Objective:** to study the toxic, mitosis-modifying and mutagenic effects of various synthetic food dyes using the Allium-test method.

The tasks that need to be addressed include:

- To study the spontaneous level of mitotic index and chromosomal aberrations, as well as the length of the roots in the Allium cepa meristem.
- To reveal the mitosis-modifying effect of food colorings.
- Evaluate the mutagenic effect of food dyes.

Material of a research were food dyes. Food dyes: orange (Yellow "Sunset" – E110), yellow (Tartrazin – E102), green (Green S – E142), blue (Diamond Blue FCF – E133).

The object of the study in this test is the meristems of seedlings of the roots of onion – Allium cepa of the Stuttgart-Riesen variety.

A study was made of the toxic, mitosis-modifying and mutagenic effects of food dyes: Tartrazine (E102), Green S (E142), Diamond Blue FCF (E133). The results obtained make it possible to draw the following conclusions:

The spontaneous MI level in the *Allium cepa* meristem is 20.75% and the frequency of CA is 1.03%. The length of the roots in the control was 11,75 mm. All the studied types of synthetic food dyes inhibit the growth of roots in *A. cepa*, which indicates the toxic activity of all the studied dyes.

Food dyes affect the proliferative activity of *A. cepa*, exerting both mitotoxic and mitostimulating effects.

All the studied types of synthetic food dyes cause chromosomal mutations or have mutagenic activity: they increase the frequency of chromosomal aberrations and backlogs to 7.2%, which is 7 times higher than the control level (1.03%). The level of mutagenic effect is classified as medium.

The investigated dyes possess toxic and genotoxic activity, and, consequently, products with such an additive may pose a danger to human health.

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## USE OF PLANTS IN THE SCALE AND CORROSION CONTROL

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We cannot do without water, neither we nor the industry, and therefore the question of how to deal with scum and corrosion will be relevant for a very long time. While conducting our research, we studied possible ways of using indoor and wild plants' juices to deal with the scale and corrosion, to identify the most effective and economically viable ones.

**Keywords:** hard water, scum, corrosion, anticorrosive properties, pH.

Technical progress, various chemical materials have made our water far from the ideal that is suitable for cooking and using in everyday life. Hard water is everywhere today. It forms a scum, which is deposited everywhere and affects everything on its way.

We cannot do without water, neither we nor the industry, and therefore the question of how to deal with scum and corrosion will be relevant for a very long time. Thereby, the study of possible ways of using plant juices to deal with the scale and corrosion of metal is an urgent task and has become the subject of our research.

A working hypothesis is the assumption that using the juice of certain plants can effectively fight the scum and corrosion of metal without causing harm to the environment and our health, while having economic benefits.

The purpose of the work: to study possible ways of using indoor and wild plants' juices to deal with the scale and corrosion, to identify the most effective and economically viable ones.

Objectives of the study:

1. To conduct a sociological survey to identify the relevance of this problem in the gymnasium students' families ;
2. To find out which plants can be used to deal with the scale and corrosion using literature ;
3. To check the effectiveness of the action of the juices of the selected plants in the course of the laboratory experiment;
4. To calculate the economic effect of using plant juices in comparison with traditional means;
5. To develop recommendations on the use of the results.

The research was conducted in 2017 on the basis of Gymnasium No. 1 and at the home of the authors of the work. For the laboratory experiment, the juice of plants of the biology study of Gymnasium No. 1 and the school