

ANALYSIS OF MUTAGEN EFFECT OF FOOD COLORINGS BY ALLIUM TEST METHOD

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The analysis of mutagen effect of food colorings on living cells with use of the Allium Test method. Assessment of mutagen, toxic effects of dyes. Research objective is definition toxic and the genotoxic of effects of synthetic food dyes by Allium test method.

Keywords: Allium test, genotoxic effect, cytogenetic monitoring, mutagens.

In the food industry various dyes were widely adopted. They are used everywhere for improvement of appearance of food.

The used dyes: a flavin source – a turmeric (E-100), are roots of the plant of a turmeric growing in China on Sunda Islands etc. While studies have shown that food colorings with number E damage the brain of children, they lead to a significant reduction in IQ.

Materials and methods

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).

For studying of effect of food colorings Allium test which is recommended by experts of World Health Organization as the standard in cytogenetic monitoring of a surrounding medium was chosen.

Research object in this test is the meristem of sprouts of backs of an onion sowing - grade Allium cepa Shtutgarten-Rizen.

1. Seeds were germinated in appropriate dye solutions in 3 concentrations (0,25, 0,5, and 1 %). Once the roots reaches a length of 8–10 mm, they fixed (Carnoy's fixative).

2. Carried out a maceration of fabrics by solution of the hydrochloric acid.

3. Subsequently stained with acetaminomine and prepared temporary suppressed preparations.

4. Microscopy and counted the cells, took photographs.

As a result of the conducted studies it was shown that all the studied types of synthetic food colorants inhibit the growth of rootlets, which indicates the toxic activity of all the investigated dyes. When analyzing the cytotoxicity of the dyes, the following results were obtained: the lowest germination energy was observed during seed germination on a solution of dyes with high concentrations (1 % and 0,5 %). This indicates a toxic effect of these dyes. The highest levels of EP were detected using the dyes with the lowest concentrations.

When assessing the genotoxic of food dyes, aberrations such as chromosome lag, lead, bridge, and microkernel were identified. The frequency of AA in the sample of dyes with higher concentrations and statistically significantly higher than the control. In this connection, it is possible to assume the presence of mutagenesis factors in this solution, which affect the occurrence of aberrations of various types. The smallest statistically significant indicator of GE occurrence is observed in the sample with the lowest concentration of dye (0,25 %). It follows that the mutagenic effect directly depends on the concentration of the dye. Analysis of the obtained data indicated that:

1. All studied types of synthetic food colorants reduce MI, which demonstrates the mitotoxic activity of these dyes.

2. Level of observed effects increases at increase in concentration of dyes in solution – the effect depends on a dose.

3. Cause chromosomal mutations or have mutagen activity and, therefore, products with such additive can constitute health hazard of the person, and especially children.

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