

Study of residual concentrations of malachite green and leucomalachite green under various conditions of storage and processing of fish

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The presented master's thesis is devoted to the study of the dynamics of residual concentrations of triphenylmethane group dyes - Malachite Green (MG) and its main metabolite Leucomalachite Green (LMG) - in food fish under various storage and processing conditions. The relevance of the study is due to the fact that these compounds are classified as genotoxic and potentially carcinogenic substances, the use of which is prohibited in aquaculture, although in practice their residues are still recorded in fish products.

The study was conducted at the State Laboratory of Agriculture of the LEPL and was based on an experimental design that included storing trout samples in frozen conditions (-20°C) and their subsequent thermal treatment using different temperature-time regimes of boiling and frying. The quantitative determination of malachite green and leuco malachite green was carried out using the LC-MS/MS method with high sensitivity and selectivity. The calibration of the analytical method showed high linearity and reliability at the nanogram level, which ensured the accuracy of the obtained data.

The analysis of the experimental results showed that under freezing conditions, malachite green practically maintains stability in fish tissue, while heat treatment leads to only partial and non-uniform changes in residual concentrations. During boiling, a tendency for concentrations to decrease was observed, while under frying conditions, an increase in residual quantities was noted in some cases, which is associated with moisture loss and the dynamics of chemical transformations. Comparison with the regulatory limit showed that part of the samples did not comply with the RPA/MMPR criteria established by the European Union, which indicates a potential risk to food safety.

The results of the study confirm that malachite green and leuco malachite green are characterized by high chemical and thermal stability and their elimination is impossible under normal storage and processing conditions. This circumstance emphasizes the need for preventive control, strict monitoring and complete elimination of the use of prohibited substances at the stage of aquaculture production in order to ensure food safety.

Keywords: malachite green, leuco malachite green, fish products, heat treatment, food safety