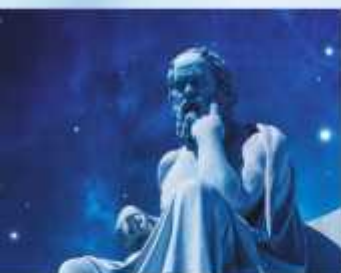




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THE EFFECT OF SYNTHETIC DETERGENT «FAIRY» ON THE HISTOLOGICAL AND MORPHOLOGICAL STRUCTURE GILLS AND KIDNEYS OF DANIO RERIO

*This article contains the data of experiment about the chronic changes gills and kidneys of *D. Rerio* that was induced by synthetic detergent «Fairy» in concentration 35 mg/L.*

Keywords: *experiment, detergents.*

The population growth and global urbanization of massive territory are one of the main reasons growing anthropogenic influence on natural reservoirs and the excess discharge of detergents into the water [1]. Intensive human activity in current world stimulates to appearing wide variety of synthetic detergents (SD). SD consist of anionic, cationic, amphoteric (ampholytic) and non-ionic surfactants which are accumulating in waste-water, where to have a toxic effect on the hydrofauna [2].

Fishes are one of the latest stage of trophic levels of reservoirs and they are more susceptible to toxic substances than other members of hydrofauna. The organs and tissues of fishes accumulate changes under influencing toxic substances, after that it displaying in the form of external and internal organ damages. That's why fishes are the quite good as the test-objects of environmental conditions [3-4].

First of all, the pollutants influence on respiratory and excretory systems because respiratory and secretions organs perform a number of vital functions in the body and interact with substances from external environment.

The goal of this research was to find out the influence of detergent «Fairy» on gills and kidneys of fish *D. Rerio*.

OBJECTS AND METHODS. The experimental fishes were contained for 25 individuals in 30L aquariums with water temperature of 18-20° C during 3 months. The detergent «Fairy green apple» (manufactured by Procter & Gamble) in concentrations of 35 mg/L was used for imitating chronic conditions. The detergent consist of 5-15 anionic surfactants, <5% non-ionic surfactants, aromatic additives and other substances. The concentration of detergent was determined empirically. The detergent was dissolved in 0.5 liters of warm standing water (40-60°C), after that, it was added to the aquarium. Water and detergent concentration in aquariums renewed each 3-4 days. Fishes were fixed in a 10% neutral formalin solution after experiment and were processed according to the standard treatment scheme for the histological material. The gills and kidneys of *D. Rerio* was chosen for studying, because they are primarily exposed to pollutants. Slices were made from each organ and then it was stained by classic dyes – hematoxylin and eosin.

RESULTS. As a result of the action synthetic detergent «Fairy» for 3 months, in the gills was noted a pronounced form of edema primary gills epithelium, a separation of the basal epithelium plate was observed. Intensive hyperplasia was noted in the primary gills epithelium. Hyperplasia of the secondary epithelium

appeared haphazardly, randomly, at different lamellar levels, located between the gill sections. Most often on the tops of the lamellas, the sprouting was in the form of «drumsticks», numerous curvatures of lamellae were noted. The appearance of mucous cells was observed in the secondary branchial epithelium. There were necrosis of respiratory cells along the entire length of the lamellas, as well as an increase in the length of the lamellas. Exfoliation of the respiratory epithelium from the lamellar surface was observed. Parenchyma was marked between the tubules by a sharp puffiness. The predominance of a large number erythrocytes, as well as a plasma blood was noted.

The glomeruli had a loose consistency, there was a strong and not uniform narrowing of the urinary cavity. The glomeruli lobularity he was noted.

In the proximal tubules was a partial destruction of the brush border. As in the proximal and distal tubules, there were marked necrotic changes. There was a strong form of peritubular edema. The cytoplasm of the tubular epithelial cells was coarse-grained. The nuclei varied in size, the shape remained rounded. The chromatin condensations in the nuclei was noted. There was also a violation of desmosomal and semidesmosomal contacts. In the cells of the tubular epithelium, several large vacuoles were noted.

The separation of epithelial cells from the basal membrane was noted in the Bellinis ducts. There were foci of necrosis. The lumens of the collecting tubes were narrowed.

As a result of the synthetic detergent on the body of fish current dystrophic and necrobiotic tissue changes. In the gills, the respiratory epithelium is destroyed, often until complete separation from the filaments of the gill plates, intense hyperplasia of both the primary and secondary epithelium, an increase in the number of mucous cells in the respiratory epithelium, necrosis of respiratory cells.

The prolonged impact of the detergent on the fishes kidneys revealed hemorrhages in the interchannel tissue of the kidney, a disturbance of the glomeruli of the kidney, an increase in the volume of the renal corpuscle. In the tubules of the nephron were observed, exfoliation, swelling of the epithelial cells, and their necrosis, vacuolation, up to balloon dystrophy, destruction of the brush border in the proximal areas.

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