

# OPTICAL METHODS FOR ASSESSING THE EFFECT OF DON-1R ON THE HISTOLOGICAL STRUCTURE OF FISH LIVER

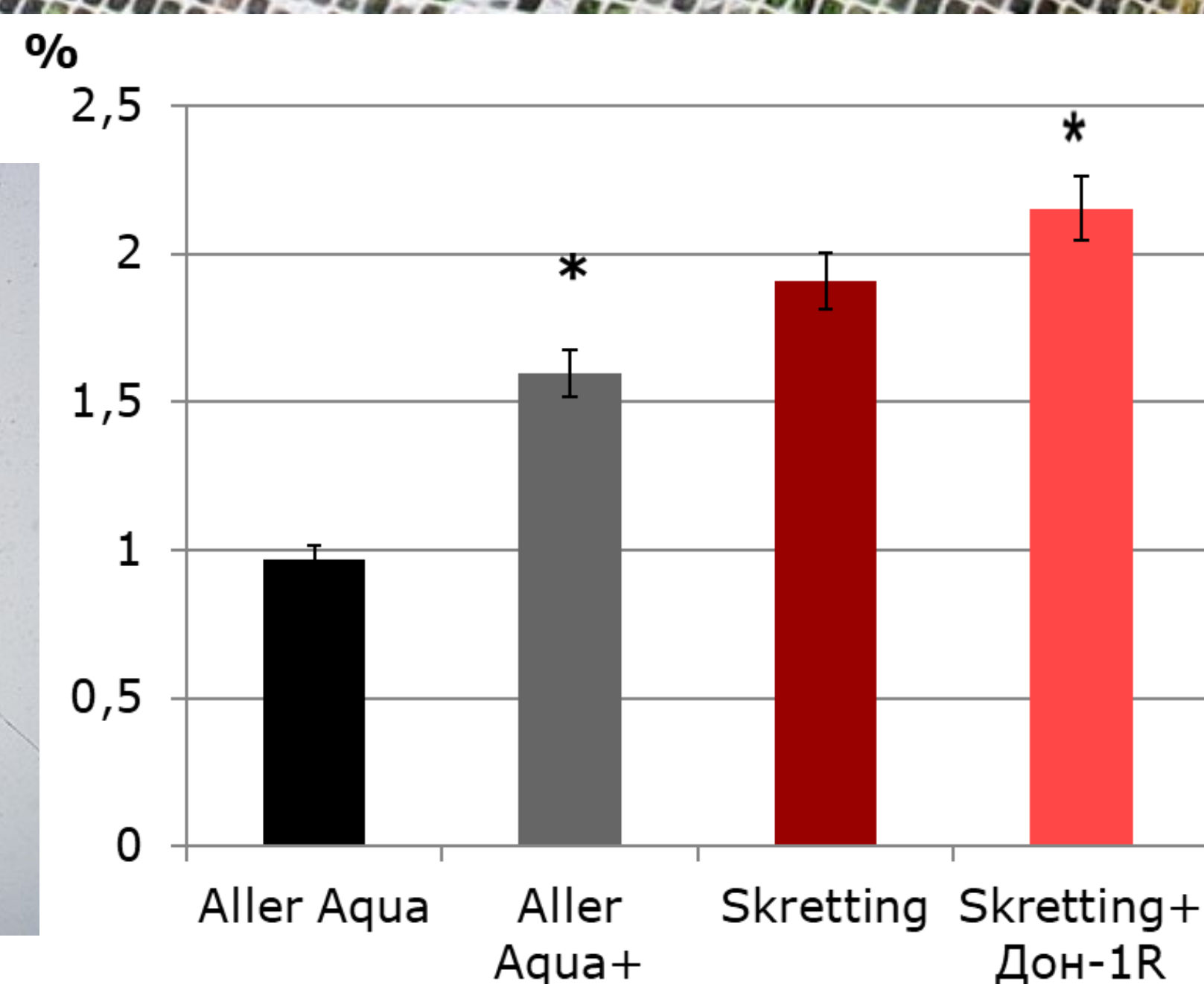
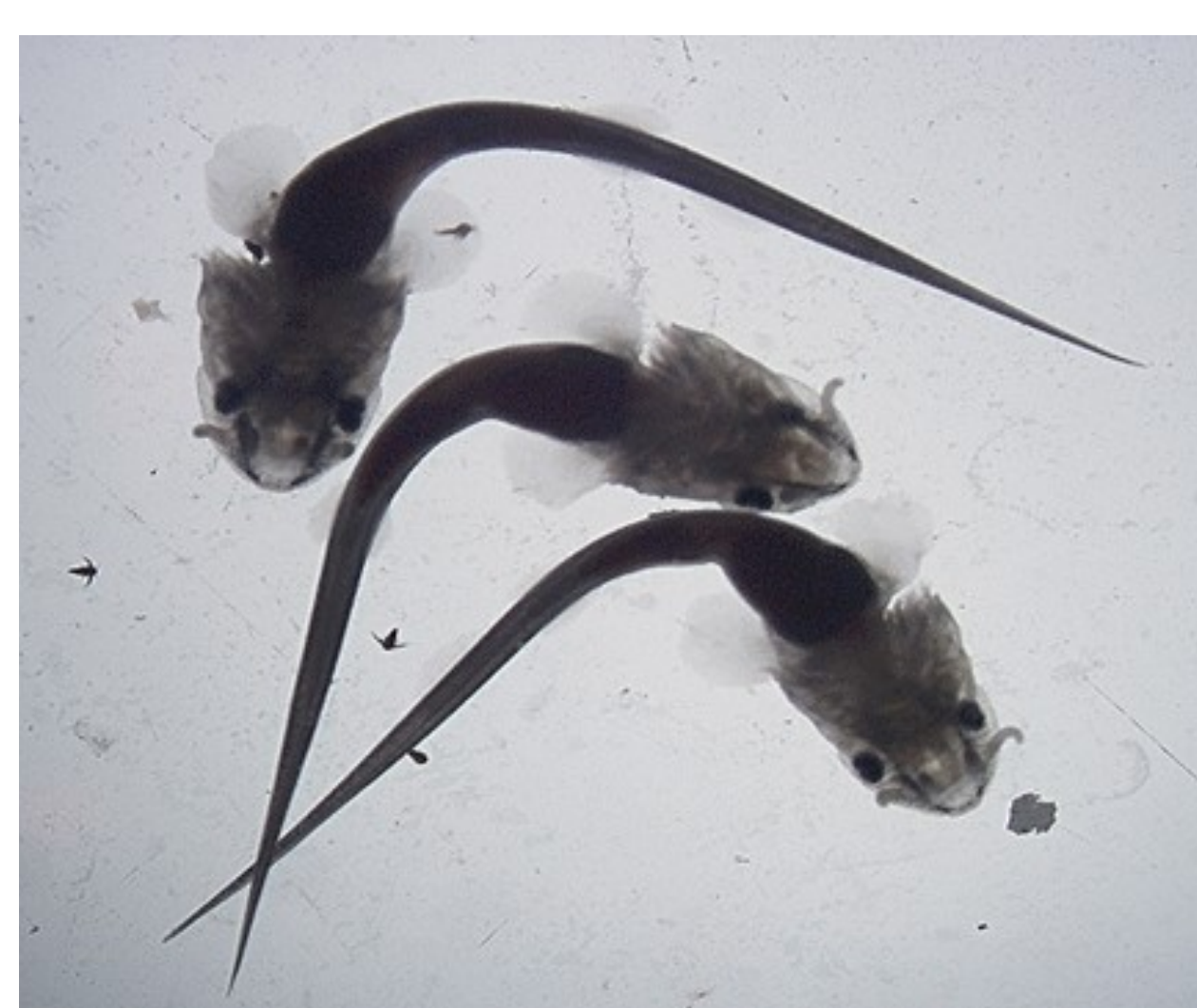
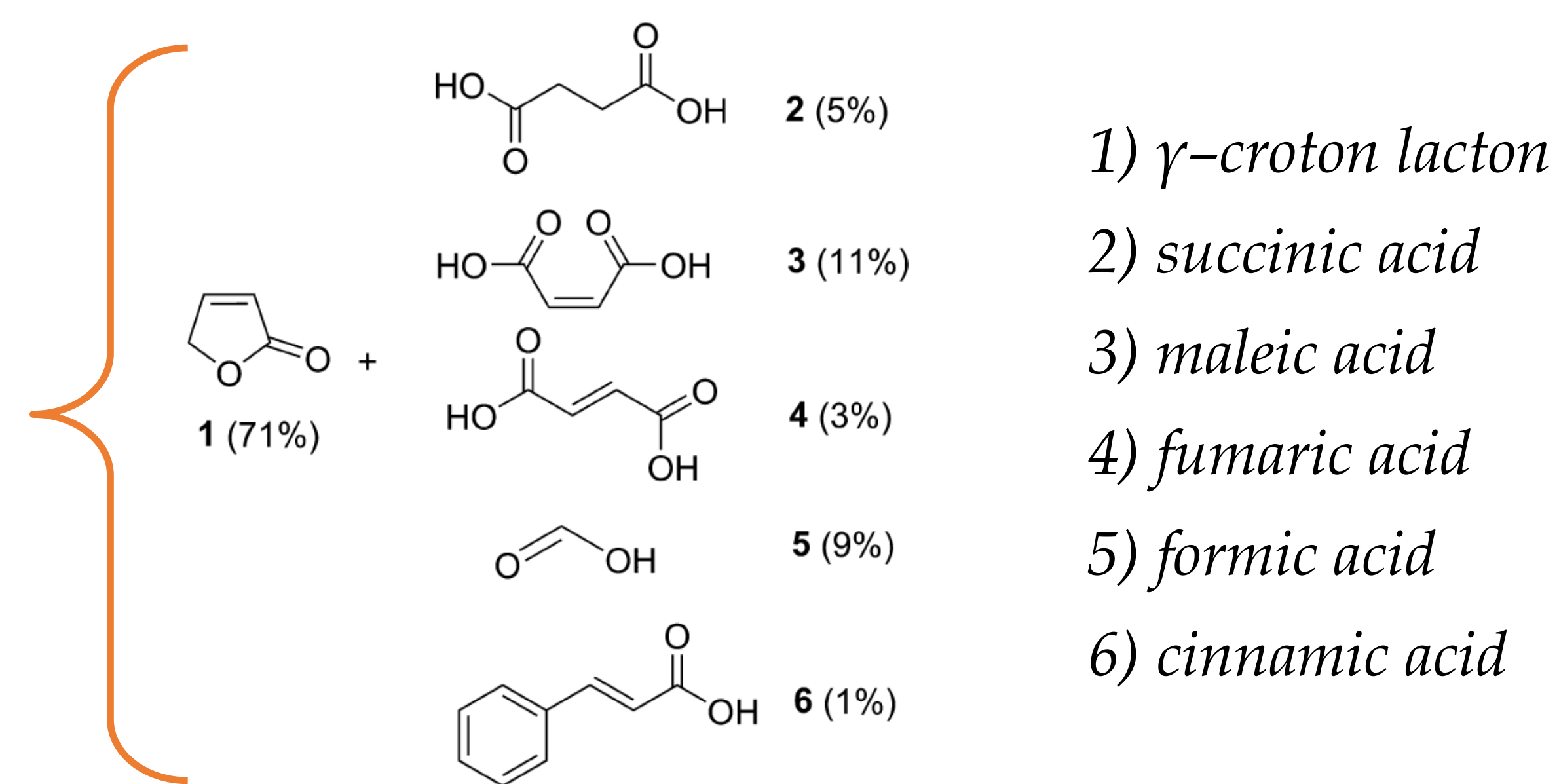
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Research on morphological and functional condition of biological tissues and biofluids' films allows to esteem pathological changes in optically thin layers on early stages of pathology development. It is utterly important for probation of new veterinary drugs and stimulating feed additives. One of directions to improve the biotechnology of rearing sturgeon fish is development and application of drugs that stimulate growth processes and increase the viability of fish. **DON-1R** is one of these. It is a complex drug that contains  $\gamma$ -croton lacton, a mixture of organic acids as well as cinnamic acid derivatives

**DON-1R**



The daily relative growth rate of *Acipenser ruthenus* fry

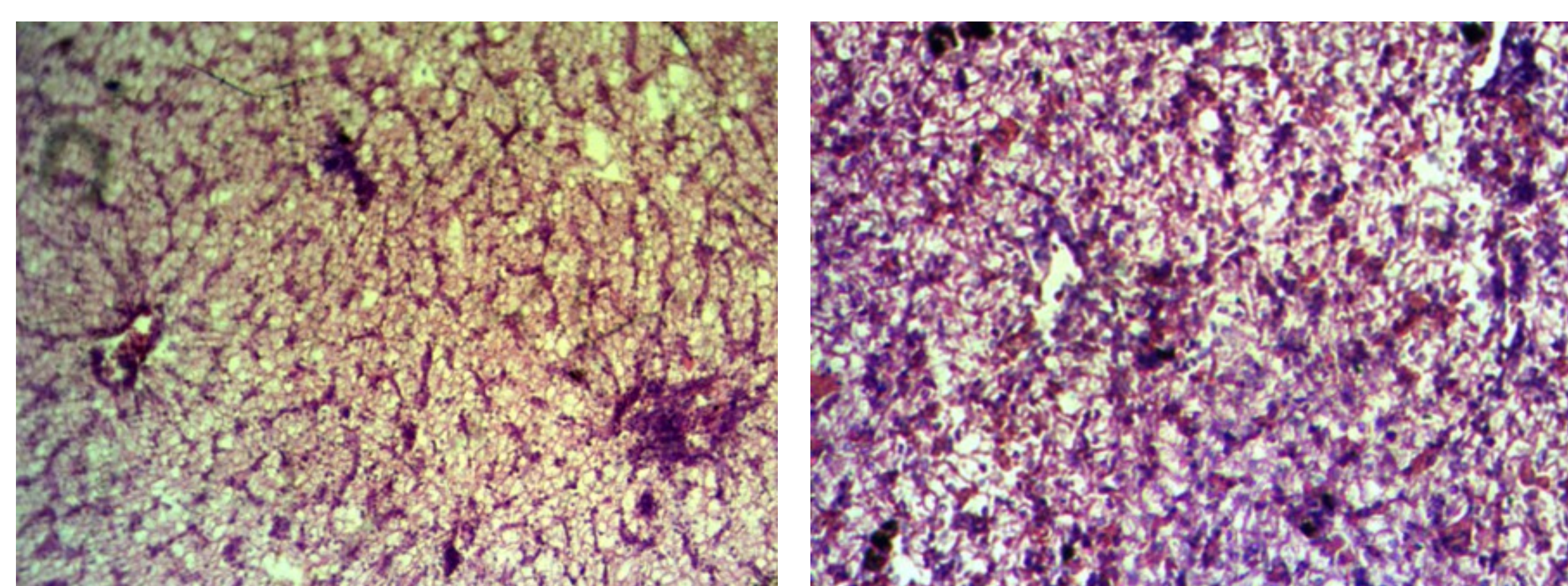
Performance of microscopic analysis of the liver histological structure has shown minor histopathologic changes. In particular, fish that received examined drug with the feed had partially inequable liver cytoarchitectonics, chaotic hepatocytes placement, radial character of liver channels and undefined sinusoids.

Both control and experimental fish had signs of fatty dystrophy. Photomicrographs showed that hepatocytes with traces of lipid metabolism deviation had nuclei being pressed on the periphery by lipid inclusions. Sturgeons that received DON-1R had more cells with signs of big-drop fat dystrophy in liver than control ones.

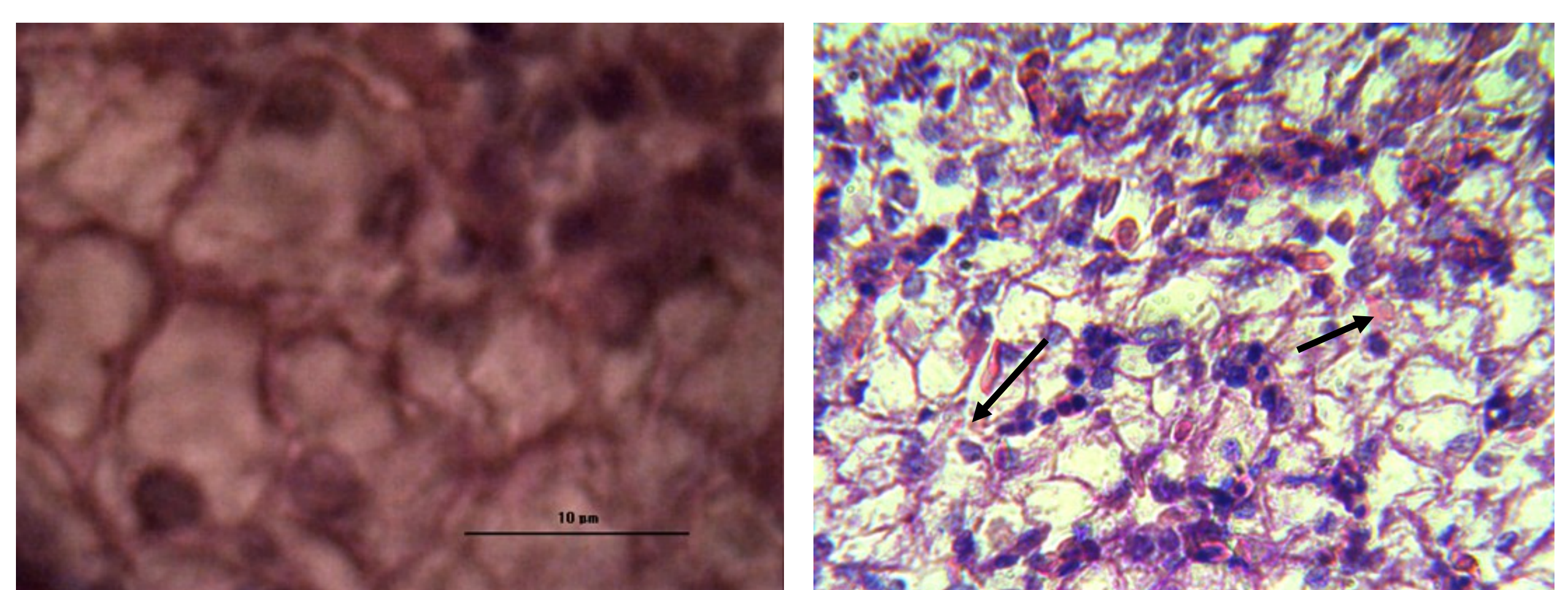
Hepatocytes of experimental fish had large hyperchromatic nuclei with 4,5  $\mu$ m diameter with multiple tiny defined nucleoli. Control fish's nuclei were 1,5 times smaller, had even coloring and 1-2 nucleoli. It is known that the increasing of hepatocytes' nuclei size and nucleoli amount can symbolize the intensification of regeneration processes. Despite the absence of necrotic areas, acidophilic dystrophy signs were present, which was followed by loss of normal basophiles in hepatocytes' cytoplasm. It becomes more dense, gets colored by eosine intensively and evenly, undergoing the nucleus pycnosis. Later cells like these are being pushed out of liver plates into extracellular space or sinusoids, where they create eosinophilic Councilman bodies. During partial acidophilic coagulation in attenuated cytoplasm of cells with no pycnosis there are homogenous pink lumps (Mallory bodies). Therefore, 40 days-long application of DON-1R does not lead to deep destructive changes in liver structure, like necrosis of fibrosis. But application of this drug does cause reactive changes in liver, which result in acidophilic coagulation of hepatocytes' cytoplasm. Some of them have features of big-drops fatty dystrophy. Despite that, short term application does not cause significant destruction that would cause deterioration in fish's general condition.

We tested the credibility of applying DON-1R in sturgeon development technologies, both on stage of receiving fish fry and marketable individuals rearing. Within the research drug was applied in a dose of 150  $\mu$ l per 1 kilogram of feed. European developers' feed, such as Aller Aqua and Skretting, as well as solely made feed base were used. Detailed analysis of histological cuts' photomicrographs combined with different approaches in contrasting received images allowed us to evaluate morphological changes of liver tissues under the influence of DON-1R more precisely.

It was established that adding DON-1R to granulated feed while feeding sturgeon stimulates increasing of mass gaining velocity. At the same time it is followed by reactive changes in liver. It is known that histological changes in fish liver are observed while using unbalanced feed, and while applying xenobiotics. The most widespread changes are hepatocyte's vacuolization, fatty liver dystrophy and necrosis-dependant changes in liver parenchyma.



General architectonics of fish liver in control (A) and experimental (B) groups



Hepatocytes with lipid inclusions and peripherally displaced nuclei

Outbreaks of acidophilic dystrophy in the liver tissue of sturgeons fed with the drug DON-1R

According to the results of the experiment, DON-1R is expedient for application for a succinct period of time in commercial sturgeon growing. Taking the availability of hepatotoxic effect into consideration, it is not recommended to use this drug to receive edible caviar or while fostering broodstock.