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| Fish as trophic ontogenesis model for studying the impact mechanisms of ecofriendly sorbents modified with nanocomposites  Fellowship supervisor: Dr. Živilė Jurgelėnė  Postdoctoral fellow: Dr. Sergej Šemčuk  Duration of fellowship: 2024 – 2026  Funding: Research Council of Lithuania (RCL)  Project Nr.: P-PD-23-187 |
| The anthropogenic impact on the environment has been increasing over the last two decades due to the increased population and industrial production. At the same time this leads to generation of a huge amounts of various environmental waste, including industrial wastewater which is saturated with various organic and inorganic toxins that are especially dangerous for ecosystems and subsequently for people. To purify contaminated waters the most efficient method is based on adsorption using various (nano-) sorbents. The sorption potential of different nanosorbents and their modifications is widely studied to achieve better efficiency and selectivity. Moreover, it is known that nanosorbents also can negatively affect the environment and human health, thus ecotoxicity studies of nanosorbents are needed. Therefore, in this study we plan to explore the potential of eco-friendly sorbent modified with nanocomposites (ENC) to give them magnetic abilities so that they can be easily removed from purified water and, using batch sorption methods, find the optimal possible combination of modification of magnetism and nanocomposites and to study the efficiency of sorption and their direct impact on fish. For this, we will synthesize and modify chitosan-based composites and characterize them using XRD, FTIR, Raman, SEM/TEM, AFM, TGA methods. Their sorption efficiency in a model aquatic ecosystem will be assessed to remove organic and inorganic pollutants. For the first time, the interactions, and effects of ENC in fish will be investigated, assessing the potential for nanosorbent ecotoxicity, and the possibility of improving the health of fish using ENC for the delivery of probiotics into the body. |