Effects of Diet Differentiation on the Fatty Acid Content of White Perch

Fatty acids are used as tracers and health indicators in aquatic systems, providing a means of investigating the effects of ecosystem disturbances on food webs. This study focused on the trophic interactions in Missisquoi Bay, a shallow, eutrophic bay in Lake Champlain that has been subjected to disturbances such as fish invasions and large cyanobacterial blooms. It is thought that climate change will lead to an increase in cyanobacterial blooms, creating a food base with lower nutritional quality and thus negatively impacting the health and resiliency of other species in the food web. To test the effects of alterations in dietary fatty acid content on the growth and fatty acid content of planktivorous fish, we devised a laboratory experiment assessing the flow of fatty acids from different primary sources (phytoplankton and yeast, with yeast serving as a low nutrition substitute for cyanobacteria) through Daphnia to juvenile white perch. Fish were divided into two dietary treatment groups, being fed phytoplankton-fed Daphnia or yeast-fed Daphnia. Fish from each group were sampled and analyzed for fatty acid content after 1, 2 and 4 weeks, allowing us to observe differences in fatty acid content between groups as well as trends within each group over time.