

**Lipid nutrition and metabolism in yellow perch
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Major Goals and Objectives of the Project

The goal of this project was to develop significant new information for the culture of yellow perch (*Perca flavescens*). Specifically, the objectives were to develop a growth curve for yellow perch fed purified and practical diets, evaluate the effects of dietary lipids on growth, feed efficiency, and nutritional composition of fillets, and provide an indication of the essential fatty acid needs of yellow perch.

Summary of Progress toward Project Goals and Objectives

All objectives have been completed, including development of a M.S. thesis (Dietary Lipid Studies with Yellow Perch, D.D. Cartwright, December 1998). Growth curves were developed for perch fed 24 different diets, appropriate dietary lipids were identified for scientific and practical use, and long chain polyunsaturated fatty acids were identified as essential for perch. See thesis for details.

Accomplishments

These data provided the basis of business plan development demonstrating the time to market size for yellow perch, the appropriate dietary formulation strategy for perch, and the basis for lipid metabolism studies by identifying the essential fatty acid. Preliminary data were presented at the 1998 World Aquaculture Society Annual Meeting in a Special Symposium on perch aquaculture. During that meeting, data were transferred to private producers and feed manufacturers.

Keywords

Perch, growth, nutrition, lipid, essential fatty acid

Narrative Report

Two separate studies were conducted with all-female perch. In the first study, perch were fed one of 5 lipid sources at one of 3 levels in purified diets. Weight gain, feed efficiency, survival, tissues nutritional composition and tissue fatty acid composition indicated that menhaden fish oil, cold-pressed soybean oil, or a 1:1 mixture of both lipid sources were better for perch than coconut oil or tallow. In the second study, fish oil, cold-pressed soybean oil and a 1:1 mixture of the two were fed to perch in practical diets. As in the first study, all three lipid sources at the levels evaluated led to positive growth.

The results across experiments were consistent and indicate controlled laboratory studies provide useful practical information for developing new industries. In both studies, lower dietary lipid concentrations resulted in higher growth; practical recommendations will be 6-8% dietary lipid. Muscle lipid concentrations were typically less than 1.0% (dry matter basis) confirming previous studies indicating exceptionally low fat concentrations in perch fillets. Sensory evaluations indicated perch fed all lipid sources exhibited the fresh, mild taste consumers prefer. Liver and muscle fatty acid analyses indicated the long chain polyunsaturated fatty acids were essential for perch.

International Implications

As stated in previous correspondence to Illinois-Indiana Sea Grant, the groups working on perch culture in the Great Lakes states have counterparts in Europe and are actively collaborating on a number of projects. The two groups met formally on two previous occasions and are planning future events. There are benefits to these collaborations for scientists and private producers on both continents.

Partnerships with Other Institutions

This project was one component of a larger multi-state, multi-institutional perch project that continued collaborative efforts with colleagues from the University of Wisconsin and Illinois State University, as well as the Department of Agricultural Economics, Purdue University. Additionally, this project stimulated the initial collaboration between the PI and colleagues in the Departments of Food Science and Foods and Nutrition, Purdue.

Publications

Cartwright, D.D., B. Watkins, J. Burgess, K. Warner, R. White Y. Jonker and P.B. Brown, 1998. Dietary lipid requirements of juvenile yellow perch. World Aquaculture '98. Las Vegas, NV.

Cartwright, D.D., Dietary Lipid Studies with Yellow Perch, M.S. thesis, Purdue University, December 1998.