

## TOTAL REPLACEMENT OF FISH MEAL WITH COMMERCIAL YEAST EXTRACT (NuPro®) AND SOYBEAN MEAL IN PRACTICAL ORGANIC DIETS FOR NILE TILAPIA *Oreochromis niloticus*

Kimberly A. Trosvik\*, Linda S. Metts, Kenneth R. Thompson and Carl D. Webster

Aquaculture Research Center  
Kentucky State University  
Frankfort, KY 40601 USA  
kimberly.trosvik@kysu.edu

Fish meal is the main protein source in most fish diets, and it also provides essential fatty acids, vitamins, and minerals necessary for growth. These attributes, added to the competition for its use in livestock and poultry feeds, increase its demand, making it the most expensive macro-ingredient of a fish diet. There are been many potential alternative protein sources, with both soybean meal and yeast being two favorable ingredients. Tilapia are one of the most-cultured finfish groups in the world. As there is a growing segment of consumers who desire organically-grown foods, tilapia fed an organic diet may allow producers to enter this rapidly-developing market. The objective of this study was to assess organically-certified yeast and soybean meal as a complete protein replacement for fish meal in organic tilapia diets.

A 6-week feeding trial was performed in a rack recirculating system comprised of 36, 10.0-L tanks was stocked with 20, 200 mg fish per tank. Water temperature was maintained at 28C. Fish were fed three times daily (0800, 1200, and 1600) all they could consume in thirty minutes. Five diets were formulated (Table 1) with 7 replicates per diet.

At the end of the feeding trial, tilapia fed Diet 1 had a significantly ( $P<0.05$ ) higher final weight and specific growth rate (SGR) than fish fed all other diets (Table 2). Fish fed Diet 1 also had a significantly lower feed conversion ratio (FCR) compared to fish fed the other diets. Results indicate that the diets which contained NuPro® and soybean meal as total replacements of fish meal were not adequate for optimal growth in small tilapia; however, further studies must be done as very little is known about the effects of NuPro® on fish.

Table 1. Formulation of five experimental diets fed to Nile tilapia. Percent protein and lipid are presented on dry matter basis.

	Diet				
	1	2	3	4	5
Menhaden FM	20.0	0.0	0.0	0.0	0.0
NuPro®	0.0	10.0	20.0	30.0	40.0
Soybean meal	37.7	59.7	49.7	40.0	40.0
Other	42.3	30.3	30.3	30.0	20.0
Protein (%)	41.6	38.4	37.7	37.3	40.6
Lipid (%)	9.0	14.0	13.8	13.1	13.2

Table 2. Final weight, specific growth rate (SGR), and feed conversion ratio (FCR) for Nile tilapia fed five diets. Different letters next to means denotes statistical differences within a row ( $P<0.05$ ).

	Diet				
	1	2	3	4	5
Final weight (g)	3.99a	1.26d	1.67c	1.68c	2.52b
SGR (%/d)	8.48a	5.48d	6.35c	6.37c	7.46b
FCR	1.40d	3.75a	2.90b	2.89b	2.30c