

NOTICE OF PUBLICATION



AQUAFISH COLLABORATIVE RESEARCH SUPPORT PROGRAM

RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

Title: Effects of pretreatment with microbial phytase on phosphorous utilization and growth performance of Nile tilapia (*Oreochromis niloticus*)

Author(s): L. Cao

College of Fishery, Key Lab of Agricultural Animal Genetics, Breeding & Reproduction of Ministry of Education, Huazhong Agricultural University, Wuhan, Hubei, China & Aquaculture & Aquatic Resources Management, School of Environment, Resources & Development, Asian Institute of Technology, Pathum Thani, Thailand

W.M. Wang

College of Aqua-Life Science & Technology, Shanghai Fisheries University, Shanghai, China & Aquaculture & Aquatic Resources Management, School of Environment, Resources and Development, Asian Institute of Technology, Pathum Thani, Thailand

A. Yakupitiyage and D.R. Yuan

Aquaculture & Aquatic Resources Management, School of Environment, Resources & Development, Asian Institute of Technology, Pathum Thani, Thailand

J.S. Diana

School of Natural Resources & Environment, University of Michigan, Ann Arbor, MI, USA

Date: August 19, 2008

Publication Number: CRSP Research Report 08-232

The CRSP will not be distributing this publication. Copies may be obtained by writing to the authors.

Abstract: This study was to assess effects of the pretreatment in all plant based diets with microbial phytase on phosphorous utilization and growth performance of Nile tilapia (*Oreochromis niloticus*). Pretreatment trials were conducted using phytase at graded doses to determine the optimal dose of phytase. Available phosphorus (P) levels increased significantly with the increased doses of phytase and the dose of 1000 U kg⁻¹ was most efficient. Based on the pretreatment trials, plant based diets for Nile tilapia were formulated by pretreating with phytase at 1000 U kg. Experimental diets were supplemented with graded levels of mono calcium phosphate (MCP) at 25, 18.75, 12.5, 6.25 and 0 g kg⁻¹ diet. In addition, there were three controls: one phytase control, one inorganic P control and one pretreatment control.

CRSP RESEARCH REPORTS are published as occasional papers by the Management Entity, AquaFish Collaborative Research Support Program, Oregon State University, 418 Snell Hall, Corvallis, Oregon 97331-1643 USA. The Aquaculture CRSP is supported by the US Agency for International Development under CRSP Grant No. EPP-A-00-06-00012-00. See the website at <aquafishcrsp.oregonstate.edu>.

Continued...

The results showed that diets pretreated with phytase gave better growth performance, feed conversion ratio and protein efficiency ratio of Nile tilapia compared with the phytase control diet and pretreatment control diet ($P < 0.05$). There were no significant differences in growth performance of Nile tilapia between the inorganic control diet and phytase pretreated diets supplemented with MCP at 25, 18.75 and 12.5 g kg⁻¹ ($P > 0.05$), which resulted in significantly better performance than those at 6.25 and 0 g kg⁻¹ ($P < 0.05$). Dietary interaction effects of phytase were observed for phosphorus retention efficiency and phosphorus load. Apparent digestibility coefficient of P (ADC_p) was improved significantly by phytase pretreatment ($P < 0.05$). No significant difference was detected on ADC of crude protein among all experimental diets ($P > 0.05$).

This abstract is excerpted from the original paper, which was published in *Aquaculture Nutrition* 14:99-109.

CRSP RESEARCH REPORTS are published as occasional papers by the Management Entity, AquaFish Collaborative Research Support Program, Oregon State University, 418 Snell Hall, Corvallis, Oregon 97331-1643 USA. The Aquaculture CRSP is supported by the US Agency for International Development under CRSP Grant No. EPP-A-00-06-00012-00. See the website at <aquafishcrsp.oregonstate.edu>.