

**Phytase stimulates appetite in Atlantic salmon (*Salmo salar* L.) parr fed soybean meal**

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We are currently investigating the utilisation of potential protein replacements by Atlantic salmon (*Salmo salar* L.). Soybean meal has several advantages as a replacement for fish meal however its use is limited by a number of anti-nutritional factors. Phytate is the main store of phosphorous in soybean meal and has been found to cause deleterious performance in chinook salmon (1). In the present study with Atlantic salmon parr, supplementation of diets containing soybean meal with microbial phytase resulted in significantly higher weight gain ( $P < 0.01$ ), however there was no significant difference in food conversion efficiency ( $P > 0.05$ ) (2). These results prompted further investigation into the food consumption data.

Six tanks of Atlantic salmon parr (mean weight 6.0 g) were fed to satiation twice daily (1000 h and 1600 h). The diet had 50 % of the fish meal protein replaced by dehulled, fat extracted soybean meal. Phytase (EC 3.1.3.8; Sigma) was added to the diet at 2000 U/kg and an equivalent weight of fish meal for the controls. The diet was fed for 42 d during which time the fish were weighed at 28 and 42 d. Morning and afternoon consumption was recorded from 8 to 42 d.

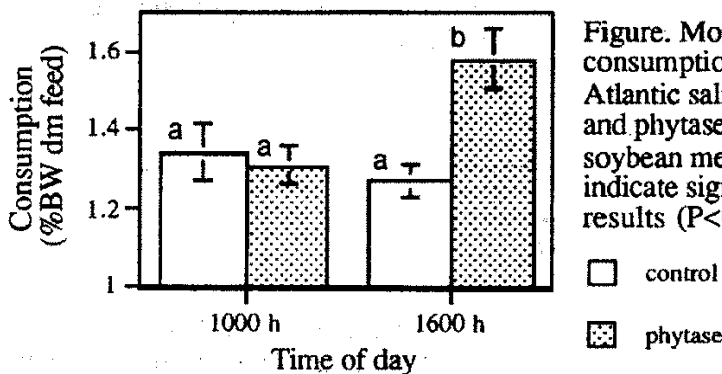


Figure. Morning and afternoon food consumption (%BW dm feed) of Atlantic salmon parr fed a control and phytase treated diet containing soybean meal. Different letters indicate significantly different results ( $P < 0.01$ ,  $n=3$ ).

Food consumption is expressed as an average of the morning and afternoon feeds for the days from 8 d (Figure). There was no significant difference ( $P > 0.05$ ) in food consumed in the morning feed, whereas in the afternoon the parr fed the phytase treated diet consumed 0.3 %BW dm feed greater than the control ( $P < 0.01$ ). This equates to a 10.4 % increase in weight specific consumption each day.

Results show that the inclusion of phytase in a diet which contains a 50 % protein replacement by soybean stimulates appetite in Atlantic salmon parr. As the enzyme did not promote improved food conversion efficiency, the higher weight gain in phytase fed parr is attributed to the increased consumption in the afternoon feed. This may suggest phytase increases the rate that feeds are processed through the digestive tract. Therefore, the use of phytase as a feed stimulant increases the potential for the use of soybean at high inclusion levels in Atlantic salmon feeds.

1. Richardson NL, Higgs DA, Beames RM, McBride JR. Influence of dietary calcium, phosphorous, zinc, and sodium phytate level on cataract incidence, growth and histopathology in juvenile chinook salmon (*Onchorhynchus tshawytscha*) J Nutr 1985;115:553-567

2. Carter CG, Seeto GS, Hauler RC. Evaluation of four supplementary enzymes preparations for Atlantic salmon, *Salmo salar* L., feeds. In preparation.