

Increased nutrient digestibility and reduced phosphorus emissions due to enzyme phytase supplementation in plant based diets fed to trout (*Oncorhynchus mykiss*) and turbot (*Psetta maxima*)

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Introduction

Plant proteins are already a viable alternative for fish meal in fish nutrition (FAO 2012) but high amounts of phytic acid/ phytate as main storage form of phosphorus (P) in plant could limit utilisation (Reddy 2002). As phytate-P cannot be readily absorbed by fish (Vielma et al. 2004) the supplementation with inorganic phosphorus to plant based diets is necessary to fulfil the demand for P in fish nutrition. Therefore, enhancement of phytate P utilization in fish via enzymatic degradation could be the key for reduced inorganic P supplementation and emissions in fish farm effluents.

Material & Methods

Control diets (C) for trout and turbot based on fish meal and several diets based on plant proteins, supplemented with graded levels of enzyme phytase, were prepared. Digestibility and growth trials were conducted to determine potential differences in apparent digestibility coefficient (ADC) of nutrients and phosphorus retention in fish.

Results

ADC of phosphorus in diet increased due to phytase supplementation in both turbot (62%) and trout (41%). Also increased phosphorus retention was observed in turbot fed diets supplemented with phytase (+45%). Accordingly, a slight increased ADC of protein was observed.

Discussion and conclusion

ADC of nutrients and also P-retention could be improved by phytase supplementation due to degraded phytate-complexes whereby P was liberated (Vielma et al. 2004). As a consequence lower P-emissions and more efficient feed utilisation could be achieved.

FAO (2012). The State of World Fisheries and Aquaculture 2012. FAO Fisheries and Aquaculture Department, Food and Agriculture Organization of the United Nations, Rome, 2012.

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Vielma, J., K. Ruohonen, J. Gabaudan, K. Vogel (2004). Top-spraying soybean meal-based diets with phytase improves protein and mineral digestibilities but not lysine utilization in rainbow trout, *Oncorhynchus mykiss* (Walbaum).