



## Effect of bile salt supplementation on the fat digestibility of non-starch polysaccharide containing diets in rainbow trout (*Oncorhynchus mykiss*)

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A previous study (unpublished) with rainbow trout showed that fat digestibility of a fish meal-based diet fed ad libitum decreased with increasing non-starch polysaccharide (NSP) level. This decrease in fat digestibility was negatively correlated with faecal bile salt loss, which led to the hypothesis that endogenous bile salt synthesis might become limiting for the replenishment of the total bile salt pool in high NSP diets fed ad libitum. This study investigated the effect of bile salt supplementation on fat digestibility under both restricted and ad libitum feeding conditions. It hypothesised that reduced fat digestibility, caused by a reduction of the total bile salt pool, can be remediated with dietary bile salt supplementation. The experiment was setup in a 2x2 factorial design, with NSP level and emulsifier level as independent factors. The bile salt taurocholate was chosen as emulsifier. Four isolipidic diets were formulated; diet 1: fish meal-based diet 0% NSP + 0% emulsifier, diet 2: fish meal-based diet 0% NSP + 0.2% emulsifier, diet 3: fish meal-based diet 16% NSP + 0% emulsifier and diet 4: fish meal-based diet 16% NSP + 0.2% emulsifier. Fish were fed one of the experimental diet for 4 weeks restrictively (1.2% BW/d), followed by 3 week of ad libitum feeding. The apparent digestibility of fat and the faecal bile salt loss were calculated. For the non-emulsified diets, the NSP level significantly ( $P < 0.05$ ) reduced fat digestibility in fish for both feeding periods, although numerically much less for restricted feeding. A negative correlation (Pearson: -0.908;  $P < 0.05$ ) between fat digestibility and faecal bile salt loss was found only for ad libitum feeding of the non-emulsified diets. This could indicate that only during restricted feeding, fish are able to replenish the bile salt pool for the loss with endogenous synthesis. For restricted feeding, fat digestibility of both emulsified diets was similar to that of diet 1. For ad libitum feeding, fat digestibility was higher compared to diet 1. From this study, it can be concluded that bile salt supplementation is an effective solution to restore or even increase fat digestibility hampered by presence of NSP in rainbow trout.