FARM-RAISED, ON LAND & IN WATER

Purpose of study

TMAO Additive in Soybean Meal Decreases Chance of Enteritis

Exploring the Use of Trimethylamine Oxide as a Feed Additive to Combat Soy-Induced Enteritis in Farmed Rainbow Trout

University of Idaho, Madison S. Powell, Abigail Bockus and Gibson Gaylord

Purpose / Goals

In previous studies, the replacement of fishmeal with soybean meal (SBM) above 20% has created distal intestine complications with freshwater rainbow trout. This study will evaluate if adding TMAO (a small molecule that accumulates in many species and supports cell and membrane function) to an all soy-based diet can combat previously noted complications associated with high soybean meal inclusion rates. This research will also determine if marine fish solubles (rich in TMAO) can be used as a practical means of distributing this additive at a commercial scale.

Study Design

A 12-week feeding trial examining varying levels of TMAO and SBM in the diet of rainbow trout was conducted. Growth, feed performance, intestinal inflammation, and expression of important immune and 10 genes were measured.

Soybean efficiency

Increased soybean use

Results

- Fish consuming diets with 40% SBM alone showed signs of distal intestine inflammation (enteritis)
- Inclusion of TMAO in the diet helped suppress intestinal inflammation and increased growth when included at the right concentration
- SBM with TMAO slightly improved histological signs of distal enteritis
- SBM with TMAO significantly showed differences in serum proteins associated with stress and gene expression

The value of the research investment

- The addition of TMAO allows increased soybean meal inclusion rates in Rainbow Trout
- Research will be conducted to determine if TMAO will allow increased inclusion rates in other farm-raised aquaculture species

Next Steps

The study continued to analyze and examine sixteen additional indicators of stress and immunological function, allowing a second publication of additional insights which is currently in preparation.

From this study, the results show that TMAO has a positive effect on reducing stress and that inclusion of TMAO in a diet containing SBM may improve performance, ultimately allowing for increased use of SBM containing TMAO in fish diets.

It is expected that dietary TMAO will facilitate even better growth in marine fish than rainbow trout. Next steps include examining its use in marine fish species that are highly sensitive to SBM, such as Atlantic salmon.

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