

# Ronald Hardy

I am a Distinguished Professor at the University of Idaho and was Director of the Aquaculture Research Institute for 17 years. I stepped down from this position in 2019. My area of scientific expertise is fish nutrition. I received a PhD from the College of Fisheries, University of Washington in 1978 and since then I have conducted scientific research in the area of sustainable salmonid feeds. I have published over 300 scientific papers, proceedings, book chapters and popular articles and I am co-editor of a textbook on fish nutrition that is used all over the world. I was chair of international committee that wrote the National Academy of Sciences National Research Council's 2011 bulletin entitled "Nutrition of Fish and Shrimp."

I am writing in support of the application of Cooke Aquaculture to shift production from Atlantic salmon to triploid rainbow trout in net pens in Washington state. As far as feeds for these fish are concerned, those used to rear triploid rainbow trout are formulated to contain protein and lipid percentages that are slightly lower than values used in Atlantic salmon feeds. These trout feeds also contain lower percentages of ingredients sourced from marine resources, including fishmeal and fish oil. In fact, feeds used during the grow-out feeds typically do not contain fishmeal.

Portions of feeds that are not digested are excreted as fecal wastes. These portions are mainly comprised of plant constituents (fiber, carbohydrates) and indigestible components of fishmeal or land animal proteins (connective tissue, bone fragments or scales). Our research over many years has documented that the digestibility coefficients of alternate protein ingredients used in low fishmeal or zero fishmeal diets are equal to or higher than digestibility values measured for fishmeals. Overall feed digestibility is essentially equal between Atlantic salmon and triploid rainbow trout. This means that there will be negligible differences in the amount of fecal waste produced from a pen of triploid rainbow trout compared to an equivalent pen (and biomass) of Atlantic salmon. If there are differences, they would favor the trout.

In our research, we typically use rainbow trout as experimental subjects to evaluate feed ingredients and feeds that will be intended for use in Atlantic salmon. We do so because the two species have nearly identical digestive systems and digestive capacity, making rainbow trout a natural surrogate for salmon. We have found over the many years that nutritional research findings with rainbow trout are directly applicable to Atlantic salmon. I have personally formulated feeds for both species for commercial feed companies. My feeds have been used throughout the world with commercial success.

I would be happy to supply published scientific papers and other information to support my comments above if additional information on feeds and feed efficiencies would be helpful to those making decisions regarding this issue.

Sincerely,

Ronald Hardy, PhD.