

Consequences of plant ingredients in fish feed

The fast growing aquaculture sector demands increased inclusion of plant ingredients in the feed due to a shortage of marine ingredients such as fish meal. With his PhD thesis at The Norwegian University of Life Sciences Olav Fjeld Kraugerud investigated the implications. He found interesting news when it comes to starch gelatinisation during extrusion and the effect of non-starch polysaccharides on physical properties of the feed.

More and more countries throughout the world are putting their money into aquaculture for covering their need for future food supply. This leads to increased pressure on diminishing marine resources, and the need to spare them by introducing more plant ingredients in the fish feed.

Olav Fjeld Kraugerud earned on [August 28th](#) his PhD degree at the Norwegian University of Life Sciences with a work contributing to this necessary change in diet composition. The thesis was entitled “[Physical and nutritional properties of polysaccharides in extruded fish feed](#)”. Kraugerud investigated the interactions between the chemical components in the feed and the feed processing, a field demanding substantial research.

Plant ingredients show unique extrusion responses

Kraugerud saw that the different plant ingredients responded uniquely during extrusion, such as sunflower meal increasing breaking force of the pellets.

- Factors like these should be taken into account to achieve the best possible feed, both regarding nutritional and physical properties, Kraugerud says.

The thesis work showed that starch is not always completely gelatinised in commercial diets to salmonids, an essential factor when it comes to utilising the binding properties of the starch and to increase its digestibility. Kraugerud saw that soybean induced gut health problems often seen in salmonids, was not caused by the non-starch polysaccharides present in soybean.

Ingredients and processing must work together

The versatile although complex extrusion process induces physicochemical changes in the different plant ingredients, giving the feed its necessarily binding characteristic. Hence knowledge on the interactions between ingredients and processing parameters is essential.

- Plant ingredients such as rape seed, sunflower, soy, bean, and pea, are being more and more utilised in aquaculture. These findings could therefore give a substantial contribution to the challenge in adapting the processing to the new ingredients, Kraugerud further points out.

[Olav Fjeld Kraugerud](#), (aged 32) from Hokksund, Norway, earned in 2002 his MSc in [Biotechnology](#) at [The Norwegian University of Science and Technology \(NTNU\)](#). The PhD thesis work was performed at [Aquaculture Protein Centre \(APC\)](#) through the [Norwegian Centre of Excellence](#) program financed by [The Research Council of Norway](#).

Professor Dr. [Birger Svihus](#), [Dept. of Animal and Aquacultural Sciences](#), was main supervisor for Kraugerud. Assistant supervisor was Professor Dr. [Trond Storebakken](#), [APC](#).