

# **Suitability of Plant Based Ingredients: Rice Bran, Coconut Poonac and Maize as Binders for Quality Improvement of Fish Feed Additive Made from Autolyzed Shrimp Waste**

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Discarded shrimp shells, a good source of natural astaxanthin, proteins and lipids can be used as a feed additive to enhance colouration and growth of ornamental fish. Temperature-induced autolysis of shrimp waste breaks the chitin-protein bonds and releases these nutrients. Hydrolysate extracted by autolysis is sticky and perishable at room temperature (30 °C). The main Objective of this study was to improve quality and shelf life of shellfish waste extract using plant-based ingredients as binders. Shellfish waste (100 g) was subjected to thermal autolysis at 55 °C for 15 minutes with continuous stirring. Resultant Hydrolysate was mixed with powdered rice bran, coconut poonac and maize separately in different ratios of hydrolysate: plant ingredient (1:1, 1:2 and 1:3) each in triplicates. Protein and moisture content were determined in oven-dried samples. Samples at room temperature were checked for changes in physical properties (colour, stickiness, odour) and fungal formation (clotting) once a week for one-month period. Highest crude protein percentage was observed in samples of 1:1 hydrolysate: plant ingredient ratio (rice bran: 38.13±8.20%, coconut poonac: 47.83±3.75% and maize: 36.76±5.74%) with significant differences (P=0.002) of treatments among three binders. Protein content and stickiness reduced with increasing binder content. Rancid odour, colour change and clotting were minimal during this time period with highest binder content (1:3). Moisture percentage was significantly different (P<0.05) among samples of 1:1, 1:2 and 1:3 ratios and lowest (9.54±1.79) in samples with 1:2 ratio prepared using coconut poonac. Coconut poonac with highest protein and lowest moisture content is advantageous than other two binders. As there is no difference observed in physical properties in three ingredients, maize and rice bran are also suitable as binders. Selection of plant ingredient and suitable ratio depend on protein level and storing period of additive as required by farmer.

**Keywords:** Fish feed, Feed binders, Feed additives, Temperature autolysis, Shellfish waste

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