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**Formulation and evaluation of a feed ingredient from co-drying of fish silage
and rice bran**

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There is an increasing interest to substitute expensive fishmeal component in aquatic and animal feed with locally available low cost ingredient such as fish by-products. Annual discard of fish by-products from the Sri Lankan fisheries industry is approximately 10,000 t, creating a potential for its value addition. The objective of this study was to formulate a feed ingredient using fish silage mixed with rice bran.

In the first experiment, five mixtures of silage / rice bran (1:2, 1:1, 2:1, 3:1 and 4:1) were produced by drying in a mechanical dryer at 50 °C for 12h and subsequently proximate compositions were determined. In the second experiment, drying pattern of the selected 2:1 (silage: rice) ratio was studied by subjecting to a higher temperature (60 °C). The proximate composition, total volatile nitrogen (TVN), water soluble protein (WSP), amino acid composition, and contents of biogenic amines of silage, rice bran and the mixture were determined. Protein and fat digestibility values were determined with mink. Degree of hydrolysis, pH, and peptide distribution of fish silage were also determined.

Higher protein content ($37.81 \pm 0.18\%$) could be achieved by increasing levels of fish silage in the mixture. In the selected mix, dry matter content (24.4%) and crude protein level (16%) was similar to lean fish materials. More than 95% of the protein present in fish silage was water-soluble. Low values of TVN (0.06 mg N/100g) and biogenic amines (0.04 g/kg) indicated high storage stability. Low levels of tryptophan in silage and higher lysine in rice bran substituted each other, thus a balanced amino acid composition was achieved in the mix. The digestibility of protein in the mix was $70.1 \pm 2.0\%$, lies in-between that of silage ($87.4 \pm 2.3\%$) and rice bran ($64.0 \pm 3.0\%$).

Fish silage – rice bran dry mix is proved to be a good substitute for expensive feed ingredients. The mixture is a dry powder and can be easily mixed with other ingredients to develop aquatic and animal feed.