Title of the project: Aqua and poultry feed from fish and shellfish wastes for employment generation of coastal women

Project team: Dr Tanuja S – PI, Dr Anil Kumar (Co-PI)

Objectives

- To prepare acid silage and fermented silage and meal from locally available fish and crustacean wastes.
- To study the growth of ornamental fishes and carps fed on fish/crustacean silage and meal.
- To study the growth and production performance of poultry fed on fish/crustacean silage and meal.
- To disseminate the technology of silage and silage based feeds preparation to farm women

Materials and methods used

- Fish Silage preparation and quality analysis
- Feed formulation of fishes and poultry and feeding trials
- Analysis of results
- Training farm women on the technology of silage preparation and preparation of feed using fish silage
- Publication of literature

Plan of action

- Preparing acid and fermented fish and crustacean silages from locally available fish and crustacean wastes
- Biochemical, nutritional and microbiological quality evaluation of silages on storage
- Formulation of feed with fish and crustacean silage as animal protein source according to nutritional requirement of fish and poultry
- Feeding trials in fish and poultry in controlled conditions with different concentrations of silage
- Analysis of results with respect to increase in growth parameters of fishes and poultry and carotenoid and mineral content in poultry egg
- On farm trials of fish silage based fish feed and poultry feed
- Analysis of results
- Training of rural women on the technology of silage production and the production of silage based feeds
- Publishing leaflets in local language

Objective wise achievements

- To prepare acid silage and fermented silage and meal from locally available fish and crustacean wastes.
  Standardised the methodology for preparing fish silage from visceral waste of freshwater carps by acidification and fermentation process. The acid added silage prepared had a CP of 38.97%, crude fat of 38.75% and ash content of 4.56%. Fermented silage had significantly lower CP content than that of acid added silage due to the addition of jaggery and Lactobacillus plantarum inoculum. During the storage period of 180 days, the pH, TVBN, TBA and TPC values in of acid added silage were within the acceptable limit which indicates the excellent keeping quality of the silage. In fermented silage, the pH dropped to <4.5 by the 2nd day which indicates the successful fermentation by L.plantarum. But fermented silage had a shelf life only upto 90 days evidenced by the increase in pH, TVBN and TPC counts.
To study the growth of ornamental fishes/ carps fed on fish/crustacean silage and meal.

Experiments with fish silage as fish meal supplement were conducted with rohu (Labeo rohita) fingerlings. The inclusion of fish silage at 5% level resulted in a 14.31% reduction in feed cost/kg weight gain in rohu fingerlings. The addition of silage in the diets of Labeo rohita fingerlings did not adversely affect its growth parameters. FCR was also not significantly affected even by 100% replacement of CP of fish meal. Treatment group fishes showed significantly higher crude protein and fat in their tissues when compared to the control which could be due to the better nutrient assimilation from the diet and higher fat content in their diets, respectively. Some abnormalities could be noticed in the heart, kidney, liver and gill tissues of treatment group fishes which could have been induced by the intake of acid added silage. But the higher rate of survival in the control and treatment groups indicates to a lesser degree of damage caused. The studies shows that fish silage could be used as an effective feed ingredient in carp diets.

To study the growth and production performance of poultry fed on fish/crustacean silage and meal.

The potent ial use of fish silage as low cost feed ingredient studied by conducting experiments in layer and broiler Japanese quail birds, Vanraja dual purpose poultry breed, Broiler poultry bird and Labeo rohita (rohu) fish fingerlings. There was an increase of 8% in egg production in Japanese quails (Coturnix coturnix japonica) when fed with acid added fish silage at 3% of the diet. Inclusion of fish silage upto 5% in the diet of broiler Japanese quails did not have a significant adverse effect on its growth. The cost of feed/kg gain in weight decreased by Rs 5/- when 10% of diet of broiler chicken was replaced with fish silage. Significant gain in weight, lowered feed conversion ratio and feed cost/kg gain in weight were observed in Vanraja birds fed with fish silage.

To disseminate the technology of silage and silage based feeds preparation to farm women

Production of by product like fish silage is a feasible solution for managing the fishery waste. The annual fish production of India is around 10 million metric tonnes. Quantum of waste generated through fish processing varies from 10% to 80% of the weight of the fish according to the processing activities. Around 80-85% of total fish produced is consumed fresh in India. So at the minimum 10% level of waste production, around 0.8-0.85 million tonnes of waste is being generated annually by domestic fish processing and marketing activities. Hence conversion of the fish waste to value added products like fish silage at a low cost is not only a feasible option for reducing the environmental pollution caused by the dumping of fish waste but also an alternate source of income for fisherwomen particularly who reside near landing centres or fish markets. The cost of production of acid treated and fermented fish silage was estimated to be Rs 6/kg and Rs 13/kg respectively. Fermented fish silage can be dried along with vermicompost in the ration of 1: 2 (Silage: vermicompost) to prepare manure. Cost benefit analysis of vermicompost fish silage manure. Cost benefit ratio of Vermicompost fish silage manure – 1:1.54. Cost benefit ratio of Vermicompost fish silage manure+earthworm – 1:4.35. An entrepreneurship model for employment generation of coastal women has been developed. 137 fisherwomen from Ganjam, Puri and Cuttack districts of Odisha have been trained in the fish silage and silage based feed and manure preparation.
Research papers published under the project


Popular articles/extension folders

8. Tanuja S, Anil Kumar, Sujit K. Nayak (2016). Extension folder on Macchli silage upadan: grameen mahilaon ke liye upayukth ek udyam

Outcome/implications/conclusions.
- Utilization of fish and shell waste
- Reduction in aquaculture, poultry and livestock feed cost
- Employment generation among coastal rural women through feed and fertilizer production and marketing
- Reduced environmental pollution