

## CAN SILAGE FROM FISH AND SCALLOP BE USED IN FEEDS FOR PRAWNS?

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The black tiger prawn (*Penaeus monodon*) requires 35-40% crude protein for optimum growth (Pascual 1989). The main sources of protein in prawn feeds are fishmeal and squidmeal which are generally the most expensive feed components. Therefore, it is essential to identify cheaper and locally available protein sources which do not cause a reduction in overall performance of the feed. One possible alternative is fishery silage which is the liquefied product of minced or ground fishery waste when combined with an acid. The acid stops bacterial activity while endogenous enzymes break down the fish into smaller soluble units. This study examined the use of fish silage (FS) and scallop silage (SS) as alternative protein sources in prawn feeds. Samples of frozen whole whiting (*Sillago maculata*) and scallop (*Amusium balloti*) viscera were used for separate silage preparations. The samples were minced and combined with formic acid to a pH of 4. After 20 days of storage at ambient temperature (19-22°C), the silage samples were added to prawn feed at inclusion levels of 0, 5, 10, 20 and 40% of the total protein. Levels of fishmeal and squidmeal were reduced proportionately with increasing levels of silage. Black tiger prawns (average liveweight 4.30±0.3 lg) were distributed into 20 black 250L tanks, and dietary treatments randomly assigned. After an initial week of acclimatisation, the prawns were fed to satiation twice daily for 4 weeks.

The moisture content of both the FS and SS was high (86% and 73% respectively) and this caused problems in the preparation of those feeds with high silage inclusion levels. The pellets also had low water stability resulting in high dry matter loss after 4 hour immersion (control diets, 27.00±2.09%; silage diets, between 3.18±6.39% and 93.22±3.15%). Although growth rates of the prawns declined linearly with increasing silage inclusion level (Figure 1), the prawns fed diets containing 5% FS and 10% FS grew significantly faster ( $P<0.05$ ) than the control (0% silage). In addition, the growth of prawns fed the 20% FS diet was comparable to that of the control. While the intake of nutrients should be higher in silage diets, the palatability of the feed may be adversely affected by its acidity. Goncalves *et al.* (1989) noted that feeds with the pH corrected to that of the control diet showed greater attractiveness and growth performance than unneutralised diets from previous experiments. The feed conversion rates varied widely without any relationship to silage inclusion levels, probably a result of low pellet stability.

Results of this study indicate that inclusion of FS in prawn feeds at levels up to 20% of the protein, and SS at levels up to 10%, can give growth in prawns equal to or better than feeds presently used. Pelleted diets made with silage may be more suitable for fish feeds where stability of the pellet is less important.

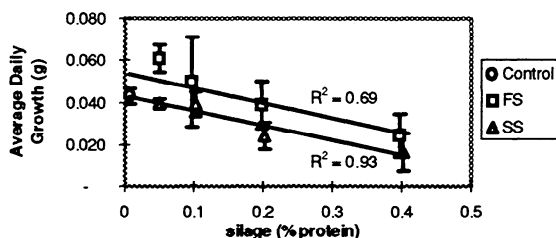


Fig. 1: Growth of Prawns Fed Experimental Diets

GONCALVES, J.F., SANTOS, S., PEREIRA, V.S., BAPTISTA, I. and COIMBRA, J. (1989). *Aquaculture* 80: 135-46.

PASCUAL, F.P. (1989). Nutrition and Feeding of *Penaeus monodon*. (Aqua Extension Manual), pp. 3.