Significance of Farm-made Feeds in the Indian Context

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The bulk of shrimp production comes from semi-intensive farming in the brackishwater systems. The nutritional requirements of shrimp along with their feeding in these systems is complex and poorly understood, primarily due to the difficulties encountered in quantifying the contribution of naturally available food organisms. There is an increasing tendency on the part of farmers to use nutritionally complete commercial feeds, designed for the intensive farming systems in their semi-intensive culture, which is a waste of resources.

Though India is endowed with an estimated brackishwater area of about 1.4 million ha, suitable for culture, however only 65,000 ha is actually under shrimp culture, producing about 35,500 m.t. of shrimp annually. In 75% of the area under culture, traditional farming is practised resulting in overall low productivity of cultured shrimp mainly due to the lack of quality feed and due to traditional technologies followed in most areas. However, with the necessary know-how for the formulation and manufacture of cost-effective and quality feed within the country, the prospects will brighten for India to attain a globally top position in shrimp production.

The development of indigenous shrimp feed is important, as our shrimp farmers can no longer depend on imported feed. Imported feed has concessions given by the Union Government and once these are withdrawn, shrimp farmers as well as the aquaculture industry will face a grave situation. The price of imported feed works out at Rs. 40/kg having a feed conversion ratio (FCR) of 1.1 to 1.8/kg of shrimp. If a feed can be formulated with a FCR of 1.5 to 2.0 at Rs. 20-25/kg with an optimum cost-benefit ratio, it would be a breakthrough saving considerable foreign exchange which is used to import feed.

The most efficient and convenient means of providing a balanced diet, which is essential for high shrimp output from pond culture and to maintain good water quality, is to utilize well formulated compounded feeds. With suitable raw materials these can be prepared at the farm. Since shrimp are slow to consume feed, unlike most of the fish, special care is needed to produce feeds which do not disintegrate rapidly in water, causing loss of nutrients and water pollution.

Farm-made feeds have been defined as "feeds in pellet or other forms, consisting of artificial and/or natural feed stuffs, produced for the exclusive use of a particular farming activity, not for commercial sale or project" (Csavas, I. and M.B.New, 1993, *FAO Aquaculture Newsletter).* Dissemination of technology related to on-farm feed production was launched by the Central Marine Fisheries Research Institute under a project, "Empowering rural women through extension education - An action research in a fishing village" at South Chellanam, Kochi. It involved training women in the preparation of on-farm shrimp feed which could be used for culture purposes in un-utilized water canals or coconut groves in and around their homesteads (Fig 1, 2 and 3). This training received good response and efforts are being made for disseminating this technology on a larger scale, so that more and more coastal women and small-scale farmers can take up this innovation and utilise the vast untapped areas in our coastal belt. Some guide lines for preparing on-farm feeds, are detailed below.

Fig 1: Training rural women in on-farm shrimp feed preparation.

Dry and Wet feeds

Simple farm-made moist feeds and sundried feeds derived from them, are practical especially when applied to semi-intensive culture. Large quantitites can be made and stored and the feed manufacturing process can be an intermittent rather than a daily activity if dry feeds are used.

Fig 2: Demonstration of feed pelletization on a household model mincer

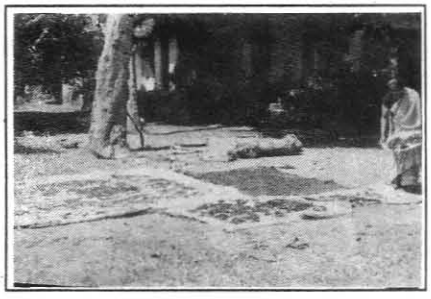

Fig 3: Sun drying of the pelleted feeds in the homestead backyards

Making Farm-made shrimp feeds

Farm-made feeds are not difficult to make and require care if they are to provide good results when fed. It may not be possible for farmers to make feeds which match the best commercially available feeds in terms of quality and performance but many produce better feeds than some of the less effective feeds offered for sale.

Equipment

The equipment required for the manufacture of aquaculture feeds on the farm site is relatively cheap to purchase and run and labour is normally already available from an underutilized farm source at no extra cost. A simple scale is necessary to weig out the ingredients. The ingredients can be mixed manually, but a mixer capable of mixing a moist dough (about 45% moisture) is preferable. First starch is gelatinized and mixed with other ingredients or after mixing, the ingredients are steam cooked and then pelleted in "noodle" form from a mincer. The resulting

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product can be of varying diameter according to the mincer die plate used, and breaks naturally into short lengths for feeding. One further piece of equipment which is necessary is a grinder for powedering the major dry ingredients. However, if moist ingredients such as trash fish, shrimp, clam and mussels are used, no extra machinery is required to reduce them to a suitable particle size before mixing them with other ingredients. A pass or two through the same mincer as would eventually be used for extruding the final diet will be sufficient. No provision is made for the mechanical transfer of ingredients or finished products from one piece of equipment to another, so as to make the technique labour intensive. However, feed manufacture, if the equipment is sized correctly need not take up much time allowing personnel time to undertake other farm duties such as feeding the diets made to meet the requirements of the stock being cultured. The feeds can be fed moist immediately or can be dried for storage and used later. Drying, where the climate is suitable, can be done by sunlight or by commercial or home-made forced air dryers.

Choice of ingredients

The major advantage of farm-made feeds apart from reduced feeding costs for small farms, is the ability to utilize local ingredients which may be readily available. The technique also enables the use of compounded feeds on farms in an area where no compounding industry yet exists.

Three major factors govern the choice of ingredients: suitability for shrimp feed, consistent availability and cost. The ingredients used should meet the requirements of shrimp for protein, lipid, carbohydrates, minerals and vitamins. the farm made feed composition can be varied according to seasonal ingredient availability and cost. Various additions including amino-acids, vitamins, binders, antioxidents, preservatives and chemo-attractants are used by commercial feedstuff manufacturers but it is inadvisable to those making their own feeds to add them as individual ingredients. Where used, they should be purchased in a premix.

Another option for small farmers is to buy a premix of the required dry ingredients from a manufacturer rather than buy and mix every ingredient themselves. These premixes can then be mixed with locally available wet ingredients such as trash fish, shrimp heads etc., by the farmers. Also, due to the cost and instability during storage of individual vitamins and other micro-ingredients, it is not recommended that these be made on the farm site, but can be purchased as standard items from commercial suppliers or made to specifications.

Conclusions

Farm-made feeds can be regarded as complementary to, rather than competing with commercial feeds. These feeds have significant environmental advantages as they facilitate the use of locally available ingredients viz., agricultural products and the wastes of agro-processing industries which otherwise have limited or no use. The feed manufacturing process can be an intermittent rather than a daily activity as large quantities can be made and stored. Proper use of these feeds can reduce the costs of aquaculture production and they fill an important need of the small scale farmers which is not covered by the commercial feed manufacturers. However, these feeds are suitable only for semi-intensive and a few specific intensive aquaculture production systems.

A.S.I. Built Trawlers - Problem of Spare Parts

The trawlers built by the Australian Ship Building Industries are having Hemidal gear box. The Indian owners are facing problems of obtaining spare parts for this.

The spare parts are available from M/s DECKMA Gmbh, 21224 Rosen Garten, Klecken, Bahnhotetonbe-79, Germany. This company has specifically mentioned that they would be able to supply following spare parts for HEMADAL system:-

1. Helical Gear & Piston Shaft
   Part-No. 04 - 522066, Ratio 5:1, S.No.20220 rotation to the right
2. Bearing with Spacer
   Part - No. 04 - 527 030

Those interested may like to contact the company at Fax No. 49 - 4105 - 76253.

Used Trawlers and seiners available

54m-Majakowaski - Type trawler and seiners (15 years old) with 412 cbm refrigerated hold and two horizontal freezers for 18 t/day are available at an indicative price of US$ 150,000. Good for catching cuttle fish, sprat, mackerel etc. Those interested may contact Mr. Conrad Birkhoff, Laufgraben 37, D-20146 Hamburg 13, Germany for details.