

M.S. 86. MANOHAR SIVARAM CHANDGE—Studies on lipid nutrition larvae and juveniles of the Indian white prawn *penaeus indicus*—1987—Dr. R. Paul Raj

Experimental studies were conducted in larvae and juveniles of one of the most suitable cultured species of Indian penaeid prawns, *Penaeus indicus*. For most of the experiments diets were prepared by using purified ingredients like casein, amino acids, sucrose, glucose, starch, soyabean oil, cod-liver oil, lecithin, cholesterol, vitamin mixture, mineral mixture and agar-agar or carrageenan as binder.

A completely randomised block design was selected for conducting the feeding experiments, with three replicates for each treatment and control. Data on various environmental parameters like salinity, temperature, dissolved oxygen, ammonia etc. were gathered regularly from the aquaria for each experiment.

Four sets of experiments were conducted to determine the dietary lipid requirements of larvae, post larvae 1-10 and 11-25, and juvenile prawns.

The results showed that the optimal lipid requirement of juvenile *P. indicus* may lie within the range of 9 to 12% of the diet.

Survival and growth data indicate that deletion of lecithin from the diet significantly affect larval survival and growth, thus indicating the essentiality of lecithin in the diet of larval *P. indicus* for normal survival. The optimal lecithin requirements for larval *P. indicus* appears to be about 2% in the diet.

To determine the essentiality and dietary requirement of lecithin by post larvae an experiment was conducted using graded levels of lecithin ranging from zero to 1.75% in the diet. The experiment, which was conducted with post larvae 11-25, showed that lecithin is an essential nutrient for proper survival, growth and utilization of food and protein. The deletion of lecithin from the diet significantly affect the growth, food conversion ratio, and protein efficiency ratio, thus demonstrating the essentiality of lecithin in the diet of juvenile prawns.

Dietary requirement of fatty acids:

Four sets of laboratory experiments were conducted to study the effect of selected levels of fatty acids in the diets on the larvae, post larvae and juveniles of *P. indicus*.

All the larvae fed diets with purified linolenic acid died on the third day at protozoa 1 stage; whereas, larvae fed on the control diet (phytoplankton) metamorphosed and grew to post larvae 1 within 9 days. The larvae cannot

survive on a diet with only linolenic acid, as essential fatty acid.

Experiments conducted to determine the linolenic acid requirements of post larvae 1-10 and 11-25 showed that survival and growth of post larvae are significantly influenced by the diets. The studies indicate that the fatty acids of the control diet lipids are superior to linolenic acid as fatty acid source in the diet of post larvae. Although growth of post larvae and juvenile prawns increase in dietary cholesterol, this increase in growth was not statistically significant.

Evaluation of the nutritive value of lipid sources:

With a view to identifying suitable plant and animal lipid sources for formulation of practical diets for larvae, post larvae and juvenile prawns, the nutritive value of 13 naturally occurring lipids were evaluated. The fatty acids profile of dietary lipid source was compared with the fatty acids pattern of juvenile prawns to know the effect of dietary lipids on fatty acids composition of prawns.

Among the lipid sources, sardine oil, and a mixture of prawn head oil and sunflower were found to be relatively superior as lipid sources for better survival and growth of larvae of *P. indicus*.