

LABORATORY STUDIES ON THE FOOD CONVERSION IN *ETROPLUS* *SURATENSIS*

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ABSTRACT

Experiments were carried out on the fish *E. suratensis* using four different types of pelleted foods. Three of them contained 40-60% protein whereas the last food had a high carbohydrate level. Conversion efficiency values, were low with all the test diets. The advantages of using these diets in natural systems have been discussed.

In growth experiment studies, the quality and quantity of food is of great importance. The advantages of using pelleted foods in various stocking density of fishes in brackish and freshwater tanks have been worked out by Murai Takeshi and Andrews (1972). Wurtsbaugh and Davis (1977) reported changes in efficiency values in fishes having different sizes when fed on different ration levels. The effects of pelleted foods having different levels of carbohydrate and protein have been reported earlier by Edward, Austreng, Risa and Gjedrem (1977). Recently, Sumitra-Vijayaraghavan, Wafar and Royan (1978) reported high conversion efficiency with the diets containing 60-87% protein based on the results obtained from the studies on food conversion efficiency in the fish *E. suratensis*. This communication presents further studies on conversion efficiencies in *E. suratensis* using the foods containing different levels of protein and carbohydrates.

Juvenile specimens of *E. suratensis* (0.8 to 4.4 gm) were obtained from the fish farm of the Goa State Fisheries Department and maintained in glass aquaria (40×20×30 cm) containing 7 litres of 15‰ sea water. Specimens were sorted into four groups and were acclimatized with four different types of foods as indicated in Table I. Prior to the commencement of the experiment, they were not fed for 24 hr. Other experimental details and method adopted to work out the energy balance are the same as given by Sumitra-Vijayaraghavan, Wafar and Royan (1978).

Table I gives the composition of the different feed used in the study and Table II shows the energy balance of *E. suratensis* fed on these feed. It is evident from Table II that the assimilation efficiency ranged from 59 to 81%. In group I, though the assimilation efficiency was low, the conversion efficiencies (K_1 and K_2) values were higher than in other groups. The (K_1 and K_2) values showed a decreasing trend from group I to III. In group IV, representing the smallest size, the conversion efficiency was higher than that of groups II and III.

In *E. suratensis* an optimum level of 60-80% protein in the diet resulted in higher conversion (Sumitra-Vijayaraghavan, Wafar and Royan, 1978). In the present

Table I. Composition of test diets used in the feeding experiments with *E. suratensis*.

Group I TNAU No. 6	Group II TNAU No. 8	Group III TNAU No. 13	Group IV TSF
Silkworm pupae 60%	Groundnut oil cake 60%	Groundnut oil cake 40%	Dry H ₂ O moisture 12.48%
Rice bran 30%	Rice bran 30%	Rice bran 30%	Crude protein 18.39%
Tapioca flour 10%	Tapioca flour 10%	Cowdung 20%	Ether extract 3.41%
		Tapioca flour 10%	Total carbo- hydrate 50.67%
			Total ash 20.01%
			Acid insoluble solution 17.48%

In addition salt, mineral and vitamins have been added in TNAU 6, 8 & 13.

TNAU - Tamil Nadu Agricultural University Pellet. TSF - Tamil Nadu State Fisheries Pellet.

Table II. Energy balance sheet (the values are in cal/animal).

Experiment No. and food given	No. of animals	Initial wet wt. in mg	Initial cal I ₁	Final cal I ₂	Production P = I ₂ - I ₁	Food consumption C	Faecal output F	Assimilation A C-F	Metabolism R A-P	Assimilation efficiency A/C (%)	Gross growth efficiency K ₁ = P/C (%)	Net growth efficiency K ₂ = P/A %
Group I Food No. 6	10	239	145.15	216.40	71.25	13319.5	5478.6	7841	7770	58.87	0.53	0.91
Group II Food No. 8	14	319	290.27	335.80	45.53	11911.0	4007.0	7904	7858	66.36	0.38	0.58
Group III Food No. 13	15	254	206.36	234.20	27.84	14009.0	2654.0	11355	11327	81.06	0.20	0.20
Group IV TSF	13	67.8	37.68	46.49	8.81	2514.0	831.0	1683	1674	66.95	0.35	0.52

work, though the protein level in the first three diets was between 40 and 60%, the conversion efficiencies were less than 1. Edward, Austreng, Risa and Gjedrem (1977) reported low conversion and growth rate with increasing levels of carbohydrates in the rainbow trouts. This is true with the results obtained with group IV specimens wherein, carbohydrate in the food was about 51%.

The results of the present study suggest that with all the test diets, the conversion efficiency was very low, compared with the reported values for other fishes (Keveren, 1966; Pandian, 1967; D'Silva and Balbontin, 1974; Mathavan, Vivekanandan and Pandian, in press). Hari Pada das (1976) reported good growth in the fingerlings of the grey mullet, *Mugil cephalus* when fed with groundnut oil cake, and groundnut oil cake mixed with rice bran.

The consistent low conversion efficiencies obtained in the laboratory in the present study are in contrast with the results in natural conditions, where good growth has been found to occur (Kutty, personal communication). The likely explanation for the good growth in the culture ponds may be an indirect effect of the food than their actual consumption. The feeds, rich in groundnut oil cake, rice bran, cowdung and tapioca flour act as manures in natural systems, thereby promoting algal and zooplankton growth, which in turn are consumed by the fishes. Manuring with cowdung and similar ingredients has been shown to promote phyto and zooplankton growth in ponds (Prabhavathy and Sreenivasan, 1977; Nandy, Das and Majumder, 1977).

ACKNOWLEDGEMENT

The authors wish to thank Shri P. Jeyachandran and Dr. M. N. Kutty of the Fisheries College, Tamilnadu Agricultural University, Tuticorin and Shri A. D. Isaac Rajendran of Tamilnadu Fisheries Corporation Limited, Madras, for the supply of foods used in this study. They are indebted to Dr. S. Z. Qasim and Dr. A. H. Parulekar of the National Institute of Oceanography, Goa, for going through the paper and offering suggestions and improvements.

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