ABSTRACT

Oreochromis niloticus fingerlings size ranging from 16 to 17 g were fed two diets containing 25% and 30% protein. The fish meal content of each diet was reduced from 25% (control) to 10% and replaced with graded levels of P. aureus (green gram)and V.catiang (undudhal) seperately upto an inclusion level of 50%, for each protein level. Each experiment lasted for 10 weeks, and growth was measured in terms of percentage weight gain (PWG) and specific growth rate (SGR). Total, protein and lipid digestibilities, as well as carcass protein, lipid and energy deposition were also measured.

After 10 weeks it was revealed that, both PWG and SGR at both dietary crude protein levels increased upto an inclusion level of 20% and thereafter tended to decrease with increasing inclusion levels of P. aureus and V. catiang. The overall best PWG and SGR values were recorded for 20% and 30% inclusion levels of these two ingredients. At the 30% dietary crude protein level, V. catiang substituted diets performed better than the corresponding P. aureus substituted diets, where as at the 25% protein level, both P. aureus and V. catiang performed equally well.

The protein and lipid digestibilities were high for all the substitution levels of the two diets (25% and 30%), and did not show a defenite trend in variation. However, the total, protein and lipid digestibilities tended to increase at a dietary protein

level of 25% at all inclusion levels of P. aureus and V. catiang. Considering the FCR, PER and the growth data of each substitution level of the two dietary protein levels as a whole, it is concluded that, both P. aureus and V. catiang were equally good as partial substitutes for fish meal upto an inclusion level of 30% and that a dietary protein level of 25% would suffice for optimum growth for O. niloticus of size ranging 16 to 17 g.

Purified casein based diets supplemented with graded levels of pyridoxine hydrochloride (to supply 0, 2.5, 5.0, 10.0,20.0 and 40.0 mg pyridoxine/kg of diet) were fed to young Atlantic salmon for 12 weeks. From the results it was seen that the dietary pyridoxine level required for maximum growth was in the range of 5 to 10 mg/kg of diet. Liver alanine amino transferase activity increased with dietary pyridoxine intake up to a level of 5 mg/kg of diet. It was also revealed that liver and kidney deposition of vitamin C was influenced by dietary pyridoxine intake. The Vitamin C deposition in the liver of the dietary pyridoxine deficient groups was minimal, whereas the deposition of vitamin C in the kidney was elevated.

There were no apperent changes in the haematocrit and haemoglobin value of the dietary deficient groups. The immuno response studies indicated higher antibody formation in the dietary pyridoxine deficient groups. Fish fed unsupplemented diets showed anorexia, poor growth, hyperirritability, lethargy and erratic swimming behaviour. Histopathological examination of deficient groups showed degenerative changes in liver, kidney, gill lamellae and disintegration of erythrocytes. These deficiency signes were prevented by 2.5 mg pyridoxine/kg of diet.

Sixteen practical diets containing graded levels of vitamin C and E (to supply 0, 100, 1000 and 3000 mg of vitamin C/kg of diet and 0, 30, 300 and 900 IU of vitamin E/kg of diet), were fed to young Atlantic salmon of size ranging from 4.4 g to 4.8 g for 30 weeks. The tissue deposition of vitamin C in the liver was depressed in the liver and kidney of the dietary deficient groups only after 30 weeks had elapsed. In the fish of the rest of the dietary vitamin C and E groups, the vitamin C deposition in the liver and kidney increased with increasing dietary vitamin C and E content. Dietary vitamin E had no visible effect on the tissue deposition of vitamin C in liver and kidney of the experimental fish.

Tissue deposition of vitamin E in liver and muscle of the experimental fish of the dietary vitamin E deficient groups was depressed at dietary vitamin C levels of 0, 100 and 1000 mg/kg of diet. However, at a dietary vitamin C level of 3000 mg/kg of diet, tissue deposition of vitamin E in liver and muscle was significantly elevated , indicating probable synergistic action of vitamin C.

The final mean weight tended to decrease in fish fed the unsupplemented vitamin C diets, but there was no definite trend in the variation. The study also revealed that there was a significant change in variation of haematocrit levels after 30 weeks of the trial. Haematocrit values were lower in fish fed diets unsupplemented with dietary vitamin C and E. In fish fed diets unsupplemented with dietary vitamin C, but supplemented with vitamin E, the haematocrit values were comparatively lower than fish of the rest of the diety groups.

Finally there was no definite trend in the variation of antibody formation in the experimental fish fed the various diets. However, there was a tendency for a comparative reduction in the antibody formation in fish fed vitamin C unsupplemented diets.

From this study it could be concluded that, the minimum dietary requirements of vitamin C and E were 100 mg of vitamin C/kg of diet and 30 IU of vitamin E/kg of diet. It also demonstrated the probable synergistic action of vitamin C.

The experiments with O. niloticus was carried out at the Fish Feed Experimental Center and Nutrition Laboratory, Ministry of Fisheries, Sri Lanka and the experiments with S. salar was carried out at the Halifax Fisheries Research Laboratory, Halifax, N.S, Canada