

Effect of Potato Peel Powder With *Bacillus* On Growth And Biochemical Changes Of Fish *Etroplus Suratensis*

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Abstract

To evaluate the efficiency of different feed additive (Potato peel powder) with probionts (*Bacillus*) on *Etroplus suratensis*, two different pelleted diets were formulated with 40% protein and in which DietA was supplemented with probionts such as 1% *Bacillus*+2% Potato peel powder and a (DietB) with 2% CMC without probionts was used as control. The specific growth rate of *E.suratensis* was higher in probionts supplemented diet fed groups than control diet during 91 days experimental period.

Keywords: Probionts, *Bacillus*, Potato peel powder, *E. suratensis*.

Introduction

Aquaculture is one of the fastest growing food production systems in the world, which has emerged as an industry possible to supply protein rich food throughout the world (Prasad, 1996). Presently, aquaculture is facing heavy production loss both in hatcheries and grows out systems due to disease outbreak. Use of probionts has been proposed as a measure to maintain healthy environment in aquaculture and to prevent occurrence of disease (Lipton, 1998).

Fish feed is the most expensive input in aquaculture operation. The shortage and high cost of pelleted feed severely constrained the development of low cost aquaculture systems suitable for small scale farmers in the developing countries. It would therefore be more economical to utilize plant protein in fish feeding than high cost animal protein materials. Cellulose is the major complex carbohydrate in plant cell walls. Coverings, potato peelings carry most of the cellulose. Potato peelings are, more often than not, just treated as unnecessary wastes. Use of Potato peelings will partly solve the problem of waste disposal at the same time maximize its use (Annadurai *et al.*, 2002; Essien *et al.*, 2005). Hence, the present study was taken up to investigate the effect of probionts, *Bacillus* and Potato peel powder on growth response and food utilization in pearl spot, *Etroplus suratensis*.

Methodology

The branded feed ingredients such as fish meal, groundnut oilcake, wheat bran, soyameal, tapioca powder, vitamin, mineral mix and cod liver oil were purchased from commercial merchants. In addition to this, probiotics, *Bacillus* was isolated from the gut of

Estuarine Pearl spot *Etroplus suratensis*. Based on the suitability, different ingredients were selected for feed formulation. Three different types of diets (Diet A and Diet B) with 40% protein were compounded separately by mixing different ingredients with 2% potato peel powder (experimental Diets A) and 2% CMC (control Diet B) at various proportions. Then the probiotics *Bacillus* was added as feed additives at 1% in Diet A. Diet C was used as the control, without addition of probiotics.

Results and Discussion

After acclimatization, the healthy fishes were weighted individually (15.00±0.20g). They were reared at the rate of 3 numbers/ 12L water and fed ad libitum. The leftover food and fecal matters were removed and dried at 800°C in an oven. Four replicates were maintained for each feed randomly. During the experiment, which lasted 91 days, water quality was maintained. During the experimental period of 91 days, the Specific Growth Rate (SGR) of *E.suratensis* fed on Diet A was high (0.73±0.27%) and low in control diet (Diet C). The consumption rate of *E.suratensis* fed on control diet was maximum (38.62±0.86mg/g/day) and minimum (29.70±0.56mg/g/day) in Diet A (Table 1). The production rate of *E.suratensis* was high in probiotics Diet A fed group (14.2±0.17mg/g/day) whereas; it was low in control Diet B fed group (10.8±0.26mg/g/day). The present observation is in congruence with the findings of Paulmony (1996). He reported that the probiont yeast supplemented diet significantly influenced the growth, food conversion ratio and specific growth rate of *Cyprinus carpio*.

Parameters	Growth responses	
	Diet A	Diet B
Initial wt(g)	15.0±0.60	15.00±0.20
Final wt(g)	29.2±0.45	25.8±0.75
Production(g)	14.2±0.17	10.8±0.26
Food consumed(g)	29.70.83	38.62±0.86
FCE (%)	30.96±0.76	27.96±0.65
SGR (%)	0.73±0.27	0.59±0.32
FCR	2.09±0.45 ^{ab}	3.53±0.23 ^a

Table 1. Overall growth responses of *E. suratensis* fed on experimental diets (Diet A) and control diet (Diet B) during 91 days of feeding experiment.

The biochemical composition of muscle of experimental fishes such as protein, carbohydrate and lipid were analysed following the method of Lowry *et al.*, 1951; Roe, 1955 and Folch *et al.*, 1957 respectively. The muscle, gill and gut of *E.suratensis* after the termination of the experiment are given in Fig 1, 2 and 3. After experimental period of 91 days, the biochemical components such as protein, carbohydrate and lipid contents in the muscle, gill and gut samples of experimental fish were higher than control diet fed fishes. Only limited number of studies has been carried out on the influence of probiotics on fish.

Addition of probionts and feed additives in the diet increased the growth rate by accelerating the secretion of certain enzymes in fishes (Das, 1975).

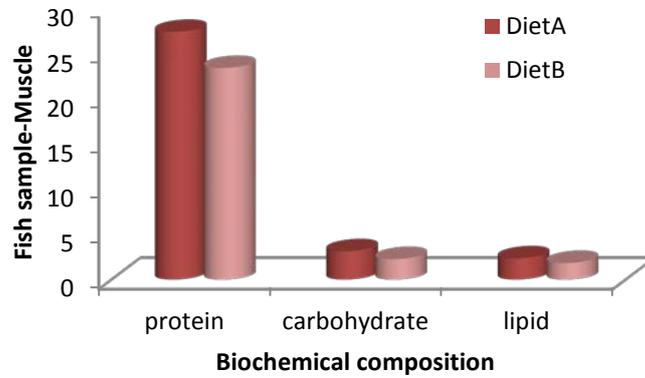


Fig 1. Biochemical composition of muscle of *E.suratensis* fed on DietA and DietB

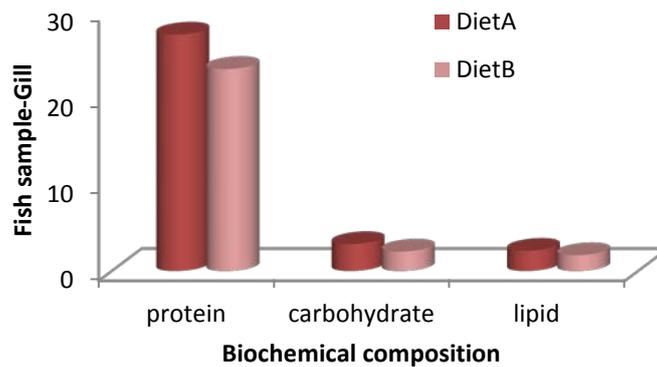


Fig 2. Biochemical composition of gill of *E.suratensis* fed on DietA and DietB

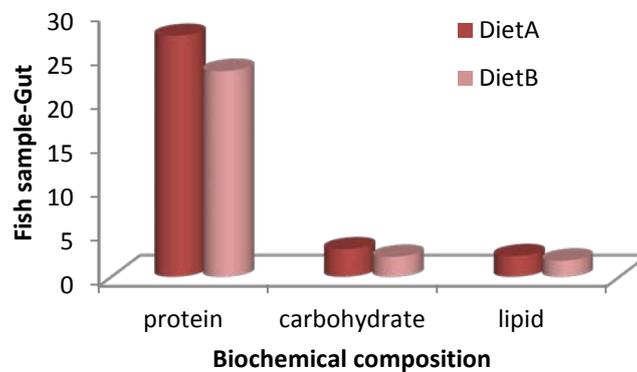


Fig 3. Biochemical composition of gut of *E.suratensis* fed on DietA and DietB

The gut samples of experimental fish fed with *Bacillus* with potato peel powder recorded the maximum bacterial population than control diet fed fishes. The bacterial population further increased on the 91st day in the gut of probiotic supplemented diet fed fishes than control diet fed fishes (Fig 4).

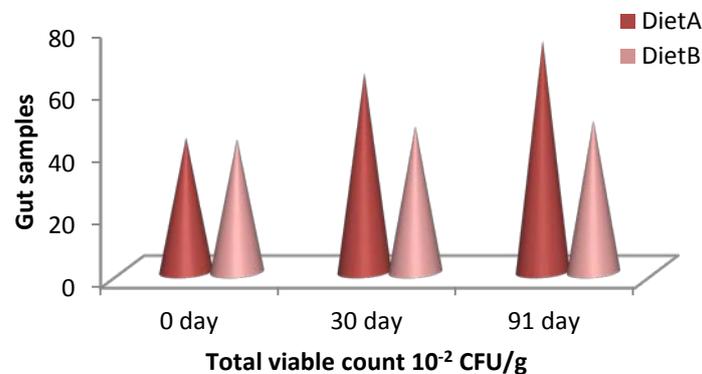


Fig 4. Total viable count of probiotic bacterium in gut samples of *E.suratensis* fed on Diet A and Diet B

The present study shows considerable weight gain in *E.suratensis* fed with probiont supplemented diets than control diet. The consumption rate of experimental groups did not vary much, but the rate of production varied significantly in fishes fed with these diets. The probionts administrated through diet might choose binding sites in the intestine, preventing colonization by pathogens. So far results with probiotics to reduce disease prevalence among commercially produced finfish, have been disappointing. However, the principles behind their use remain sound and their full potential needs to be explored further.

Conclusion

The present work proved the effect of varoius bacterial probionts and vegetable waste on increased growth of *E.suratensis*. The results will be further used in aquaculture industry for large scale production of *E.suratensis* under controlled environmental conditions. Furthermore this work can be extended in aspect of application in various other fishes also using different sources of food waste.

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