World Journal of Fish and Marine Sciences 3 (4): 332-334, 2011
ISSN 2078-4589

Prebiotic Could Affect Fingerlings Rainbow Trout Meat Protein? (*Oncorhynchus mykiss*)

Ramin Salamatdoustnobar, Abolfazl Ghorbani,
Seyaed Saied Ghaem Maghami and Vail Motallebi

Department of Animal Science, Shabestar Branch, Islamic Azad University, Shabestar, Iran

Abstract: The present investigation was performed to study the Prebiotic effects on the rainbow trout meat protein content. Four levels of Prebiotic (0, 500, 1000, 1500 and 2000 g/ton) were used. Meat protein significantly affected by Prebiotic and 1000 gram/ ton prebiotic with 19.933 were higher compared with control group and other treatments and is best treatment. Using Prebiotic could help to improved meat of trout quality.

Key words: Prebiotic · A-max · Rainbow trout · Carcass protein

INTRODUCTION

The world aquaculture activities show a rapid increase (18% per year) in production and (17.8% per year) of the aquaculture business since 1997 to 2008 [1]. The main challenges in European turbot production is to improve feed formulation in order to optimize fish growth and fish resistance through the development of health promoting diets. Prebiotics include carbohydrates that are not digested in the upper part of the gastrointestinal tract, but selectively fermented by bacteria in the colon. The Prebiotic have several advantages, but the main advantage is that they are natural feed ingredients. Their incorporation in the diet does not require particular precautions and their authorization as feed additives may be more easily obtained, in spite of some concerns about their safety and efficacy. Originally, Prebiotic were chosen to stimulate bifidobacteria and lactobacilli in human microbiota [2]. This selective fermentation affects the composition of the intestinal microflora by stimulating bifidobacteria and Lactobacilli, both in humans and in animals, where these bacteria have health promoting properties [3-5]. The importance of the intestinal microbiota in fish has been better understood during the last decade, while lactic acid bacteria were detected in fish microbiota [6]. The present experiments were designed to study the effect of dietary a-max prebiotic rainbow trout meat protein content.

MATERIALS AND METHODS

Fish: Rearing Conditions and Calculations: The experiment was carried out in controlled conditions. During the experiment, the physico-chemical parameters of water were maintained on relatively constant optimal levels for rainbow rout include water temperature (12±0.35), oxygen solved in water (7.98±0.29) and pH (7.84±0.21). The growth test lasted 50 days. Rainbow trout fingerlings obtained from commercial farm with average individual weight of 40 g. The experiment was carried out in five treatments, each in four replicates, each replicate with 20 fingerlings of fishes. In twenty pools with a size of 1.30 × 1.30 × 0.8 m with six liters of water entry in the minutes was kept. This experiment was performed based on completely randomized design and biometric traits during four periods 10 days apart were measured and the data for analysis of split-plot experimental design based on CRD was used.

Statistical Analysis: The performance and analytical data obtained were analyzed by variance analysis using the procedure described by the SAS version 9.1 [7]. The Tukey mean separation test was used to determine significant differences between mean values.

$$Yikl = \mu + \sigma ik + \beta i + (\alpha\beta)kl + \varepsilon ikl$$

Where
$Yikl$ = All dependent variable
μ = Over all mean
σik = Effect of experimental diet
βi = Effect of biometric or period
$(\alpha\beta)kl$ = Interaction of experimental effect and period
εikl = The random effect of residua

Diet Preparation: Experimental diets were formulated with four levels of Prebiotic A-max 500, 1000, 1500 and 2000 g/ton, composition was shown in Table 1.

Corresponding Author: Ramin Salamatdoustnobar, Department of Animal Science, Shabestar Branch, Islamic Azad University, Shabestar, Iran. E-mail: r.salamatdoust@gmail.com.

Table 1: Composition of diet and Prebiotic.

Experimental diet composition		A-max Prebiotic composition (percent)	
	FFT2	Crude protein	25.77
Crude protein percent	40	Ether extract	3.44
Digestible protein percent	37	Crude fiber	10.44
Gross energy(Kcal/Kg)	4400	Ash	3.22
Digestible energy(Kcal/Kg)	3700	ADF	12.33
Ether extract percent	12	NDF	37
Crude fiber percent	4	TDN	83.77

ADF: acid detergent fiber; NDF: neutral detergent fiber; TDN: total digestible nutrients

Table 2: Least square means of rainbow trout meat protein percent

Control	15.760 b
500 gr/ton	18.880 b
1000 gr/ton	19.933 a
1500 gr/ton	16.213 b
2000 gr/ton	18.290 b
P value	0.0236
SEM	0.992

RESULTS AND DISCUSSION

Least square means of rainbow trout meat protein percent were shown in table1. Results show that application of Prebiotic could affect protein contents in rainbow trout fingerling fishes and 1000 g/ton Prebiotic significantly compared control group and other treatments were higher. Other levels of Prebiotic have not significance difference with control group but numerically were higher and in 500, 1500 and 2000 g/ton reached to 18.880, 16.213 and 18.290%, respectively. This results agree with the findings of Yilmaz *et al.* [8] and Genc *et al.* [9], they reported hybrid fish of tilapia and rainbow trout with application of mannan oligosaccharides increased meat protein concentration, this condition probably due to increased activity of digestive enzymes, especially protease and amylase which is better digested food in fish intestine [8, 9]. Bongers and Vander Huevel [10] reported red carp fed Prebiotic significantly increase protein digestibility compared with the basal diet [10].

CONCLUSION

However results show that Prebiotic could increase quality of meat and increase protein content, level of 1000 g/ton have best effects on the meat protein.

REFERENCES

1. FAO., 2007. The State of World Fisheries and Aquaculture 1998. Food and Agriculture Organization FAO, Rome., 112.
2. Gatesoupe, F.J., 2005. Probiotics and prebiotics for fish culture, at the parting of the ways, Aqua Feeds: Formulation and Beyond, 2: 3-5.
3. Gibson, G.R. and M.B. Roberfroid, 1995. Dietary modulation of the human colonic microbiota: introducing the concept of prebiotics. J. Nutr., 125: 1401-1412.
4. Van Loo, J., J. Cummings, N. Delzenne, A. Franck, M. Hopkins, G. MacFarlane, D. Newton, M. Quigely, M. Roberfroid, T.V. Vliet and E.V. Heuvel, 1999. Functional food properties of non-digestible oligosaccharide: a consensus report from the ENDO project (DGXII AIRII-CT94-1095). Brit. J. Nutr., 81: 121-132.
5. Flamm, G., W. Glinsmann, D. Kritchevsky, L. Prosky and M. Roberfroid, 2001. Inulin and oligofructose as dietary fiber: a review of the evidence. Critical Rev. Food Sci. Nutrition, 4: 353-362.
6. Ringø, E., E. Strøm and J.A. Tabachek, 1995. Intestinal microflora of salmonids: a review. Aquaculture Research, 26: 773-789.
7. SAS Institute, 2003. SAS User's Guide: Statistics. Version 5 Edition. SAS Institute, Inc., Cary, NC.

8. Yilmaz, E., M.A. Genc and E. Genc, 2007. Effects of dietary mannan oligosaccharides on growth, body composition and intestine and liver histology of rainbow trout, *Oncorhychus mykiss*, Isr, J. Aquac., 59: 182-188.
9. Genc, M.A., E. Yilmaz, E. Genc and M. Atas, 2007. Effect of dietary mannan oligosaccharides on growth, body composition and intestine and liver histology of the hybrid tilapia (*Orechromis niloticus*× *O. aureus*). Isr. J. Aquac., 59: 10-16.
10. Bongers, A. and E.G.H.M. Vander Huevel, 2003. Prebiotics and bioavailability of mineral and trace elements. Food Rev. Intl., 19: 397-422.