

Research Paper

The effects of hydrolyzed canola meal protein on growth, body composition and expression of growth genes, and appetite of beluga fish (*Huso huso*)

**M. R. Ebrahimnezhadarabi¹, S. M. Hosseinifard^{2*}, R. Changizi¹,
S. Vatandoost¹, Sh. Ghobadi¹**

1 - Department of Aquaculture, Babol Branch, Islamic Azad University, Babol, Iran

2- Department of Veterinary, Babol Branch, Islamic Azad University, Babol, Iran * Corresponding Author: Email: sm_hosseinifard@yahoo.com

Received: 19.1.2021

Accepted: 29.6.2021

Introduction

Beluga (*Huso huso*) is one of the most important species of the large sturgeon family, which is very important for culture because of the valuable meat and caviar. Fish feeding with a profitable diet is one of the important principles in aquaculture. Protein is the most important and expensive nutrients in the diet, which plays an important role in growth factors.

During the period of fish Rearing, determining the amount of protein required for obtaining the highest amount of fish yield and reducing nitrogen entry into the aquatic ecosystem, which is one of the most important factors in aquaculture management.

Recently using canola meal as an inexpensive protein supplement has attended compared to other plant protein sources such as soybean. In recent years, the use of biotechnology has led to the production of healthier and higher quality food products such as hydrolyzed proteins with low molecular weight peptides with high absorption capacity. Hydrolyzed protein causes the production of peptides that have different molecular weights and they are more absorbable and soluble in water, so they can improve growth performance and increase the immune system. Ghrelin is an appetite-stimulating peptide in the stomach that has been identified and added to the list of gastrointestinal regulatory peptides. This hormone is a stimulus for the releasing growth hormone, the production and release IGF-I and increasing appetite. IGF-I

participates in the regulation of protein, lipid, carbohydrate and mineral metabolism in cells also it causes to cell differentiation and reproduction and finally body growth.

The aim of this study investigated the effect of hydrolyzed canola meal protein on growth factors, body composition, and expression of GH, Ghrelin, and IGF genes in beluga fish.

Materials and Methods

In this study, 840 juvenile beluga fish were reared in 12 tanks. Each tank includes 70 pieces with an average weight of 5.30g. Feeding treatments including 0, 300, 400, and 500 mg hydrolyzed canola protein/kg were added to the commercial diet. After eight weeks, growth factors such as Body Weight(BW), Specific Growth Rate (SGR), Food conservation Rate (FCR), and Protein Efficiency Rate (PER) were calculated. At the end of the experimental period, 3 fish from each treatment were examined for body composition analysis. Also, for measuring the quantitative expression of IGF, Ghrelin, and GH genes, 3 fish were selected from each tank and transferred to the Genetics Laboratory. Data analysis including growth factors, body composition, and gene expression was conducted for eight weeks in the summer of 1398. Quantitative expression of IGF, Ghrelin and GH genes was done by using the formula $2^{-ct\Delta\Delta}$ in Excel software. Also, Data was analyzed for growth factors, body composition and gene expression in significant levels by using Duncan's statistical test with 95 percent confidence and One-Way ANOVA in SPSS 16 software.

Results and discussion

The results showed that the final weight, weight gain, specific growth rate and protein efficiency in fish fed a diet containing 500 mg/kg of hydrolyzed canola protein was higher, which was significantly different from other treatments and controls. The results obtained from body composition analysis did not show any significant differences in the experimental treatments. The results obtained from the expression of all three genes showed the highest expression of these genes with a significant difference in the treatment fed with 500mg/kg of hydrolyzed canola protein.

Conclusion

The current results showed that using 500 mg peptide from enzymatic hydrolysis of canola meal/kg in the makes the best levels of growth factors in comparing other treatments. Therefore, this product can be suggested as a suitable nutrient to fish culture and can be used as a suitable and cost-effective solution to achieve increased growth in fish.

Keywords: *growth factor, gene expression, hydrolyzed protein, body chemical composition, beluga fish*

Acknowledgement

The authors would like to acknowledge the Faculty of Veterinary, University of Babol for their support and contribution to this study.

Declaration of conflict of interest: *The authors declare that they have no conflicts of interest.*