

## Effects of Diet Composition on Digestive Activities of Enzyme in Lensky Sturgeon

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Experiments were conducted to determine the activities of protease and carbohydrase in growing lensky sturgeon fed with three different diets containing various concentrations of protein and carbohydrate. Neutral protease activity from growing lensky sturgeon the protein diet (predominary, almost 100% protein) was lower than those from fish fed the other diets during the experimental period. The results may indicate that the level of protease activity is inversely related to the level of protein in the diets.

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Key words : Diet composition, Hydrolytic enzyme, Lensky sturgeon

### Introduction

Lensky sturgeon is one of the most perspective species in sturgeon breeding industry, because it is able to ensure high production efficiency in fresh water at low temperatures. The most significant difficulties for rearing this fish are to take care of larvae fish at the early post-embryoic developmental stage and to feed them with high-grade and quality starting food.

At present it is well known that, in the most of vertebrate animals, the changing quality of feed can result in the functional enzymatic adaptation especially in the digestive enzyme system. Physiological response and adaptation (control) process to the dietary manipulations can be took place by means of repression or induction of various enzymes (Ugolev, 1978).

Besides, the mode of adaptation by different enzymes may not be identical: some adapt fast, others adapt slow.

It was reported that the evaluation of diets by using various biochemical tests can give reasonably good indications, including data on a level of activity of digestive enzymes (Kuzmina et al., 1983). Therefore, the purpose of this work was to determine the

effects of different concentrations of dietary protein and carbohydrate on hydrolytic enzyme activities in growing lensky sturgeon young.

### Materials and Methods

Growing lensky sturgeon were adapted to the experimental diets and kept in pools for three weeks. Fish were divided into three groups and fed with three experimental diets containing as followings: the first (diet A) with almost 100% protein of the animal origin, the second (diet B) with 75% of protein and 25% of carbohydrate, and the third (diet C) with 50% of protein, 35% of carbohydrate and 15% of fats. Activity of enzymes was determined on 3rd, 14th and 21st day of the feeding trial.

For analysis of enzyme activity, fish were frozen under laboratory conditions and homogenized at 2-4°C in a Ringer solution for 2 minutes, which was followed the reagent preparations for cold-blooded animals (pH 7.4). Neutral protease activity was defined as the quantity of enzyme that catalyze reaction and gain tyrosine by using casein as substrate according to the method of Dahlqvist (Dahlqvist, 1964). The total carbohydrase

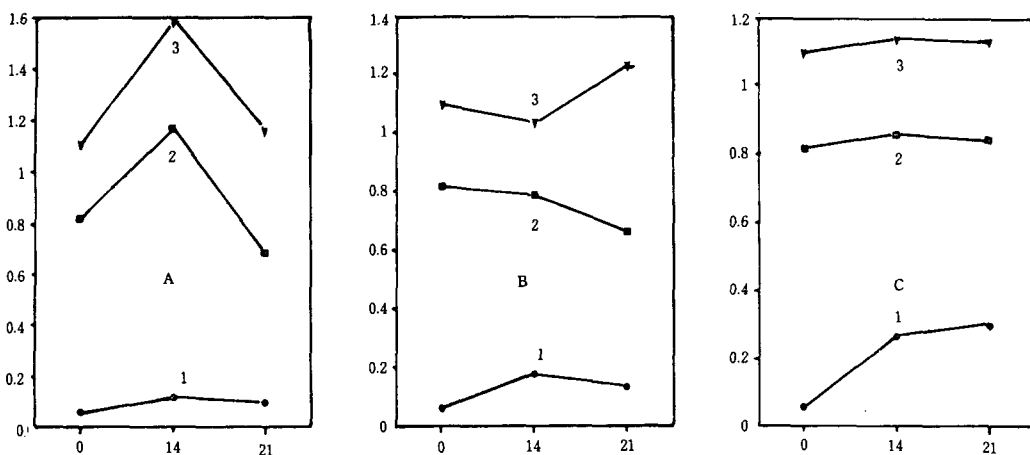


Fig. 1. Effects of diet composition on enzyme activities in growing lensky sturgeon fed experimental diets for 3 weeks. (A) predominant protein. (B) 75% of protein and 25% of carbohydrate. (C) 50% of protein, 35% of carbohydrate and 15% fats. 1 : neutral protease. 2 : complex carbohydrase. 3 : maltase.

activity was determined by the method of Nelson, updated by the A. M. Ugolev and N. N. Iesuitova (1969). The level of enzyme activity was expressed in mM of substrate per 1g of wet weight of a fabric after 1 minutes of incubation.

## Results and Discussions

The effects of different diets on enzyme activities in growing lensky sturgeon are shown in Fig. 1. As the results are shown in Fig. 1, neutral protease activity from growing lensky sturgeon fed diet A was lower than those from fish fed the other diets (B & C). The level of protease activity seems to rise as the level of dietary protein increased, but then reached a plateau after 14 days of feeding. The activities of complex and maltase carbohydrase have reached to it's a maximum from fish fed diet A and C after 14 day of feeding.

The total activities of carbohydrase and maltase from fish fed diet B and C were not changed during the experimental period.

The results of this study suggested that the level of neutral protease activity could be inversely related to the level of dietary protein in growing lensky sturgeon. The pattern of carbohydrate enzyme activities from fish

fed diet A was different from that of fish fed diet C containing 35% of carbohydrate.

The reason may be due to one of compensatory reactions of enzyme to the absence of appropriate substrate.

These results demonstrated that the changes of digestive enzyme systems are responsible for the dietary composition in lensky sturgeon.

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