ABSTRACT

Daily changes in the activity of the key digestive enzymes in response to different feeding frequencies have been studied in Senegal sole (Solea senegalensis) juveniles. According to our findings, total activities and their patterns vary significantly under different feeding schedules.

INTRODUCTION

• Improvement in diet formulation is a major challenge in fish farming. Feeding frequency is an important factor influencing nutrient intake and retention, and consequently, growth of the animal.
• In vitro experiments are considered as an easy and quick tool for improving feed formulation. Nevertheless, it is first necessary to define realistic digestion conditions in the target species.
• To advance in the knowledge of the digestive function in Senegal sole, the activity pattern of key digestive enzymes was analyzed during a 24 hours period with different daily feeding frequencies.

MATERIALS AND METHODS

Sampling
5 individuals
Every 4 hours
in a 24 hours cycle

Protocol 1:
One meal/day
08:30 (h)

Protocol 2:
6 Diurnal meals/day
08:30 - 10:00 - 12:00
14:00 - 16:00 - 18:00

Protocol 3:
6 Nocturnal meals/Day
20:00 - 22:00 - 24:00
02:00 - 04:00 - 06:00

Protocol 4:
Continuous feeding
All the above-mentioned times

Enzymatic activity [1]
Relative Fluorescence Units (RFU)/mg gut protein content

RESULTS

Enzyme Activity (RFU mg P)

Trypsin

Chymotrypsin

Amylase

Trypsin activity was highest during the light period.

DISCUSSION

• Activity patterns of different digestive enzymes showed evident changes during the 24-h cycle.
• Interestingly, trypsin and chymotrypsin activity showed inverted patterns, increasing successively during day and night time, respectively.
• Trypsin, chymotrypsin and alkaline phosphatase activities were lower and amylase activity was higher when juveniles were fed only once a day.
• High feeding frequency has been reported to lead in high growth. This might be due to improved digestibility and a more continuous absorption of nutrients [2].

CONCLUSIONS

• Results from this study confirm that feeding frequency has a clear effect on daily digestion in fish. Although the daily amount of the offered food was proportionally equal in the four protocols, the more frequent the food supply, the higher proteolytic activity was detected. This consequently, resulted in a better nutrient utilization.


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