

DAILY PH FLUCTUATIONS IN THE GASTROINTESTINAL TRACT OF SENEGALESE SOLE AND GILTHEAD SEABREAM JUVENILES IN RELATION TO DIFFERENT FEEDING PROTOCOLS

ABSTRACT

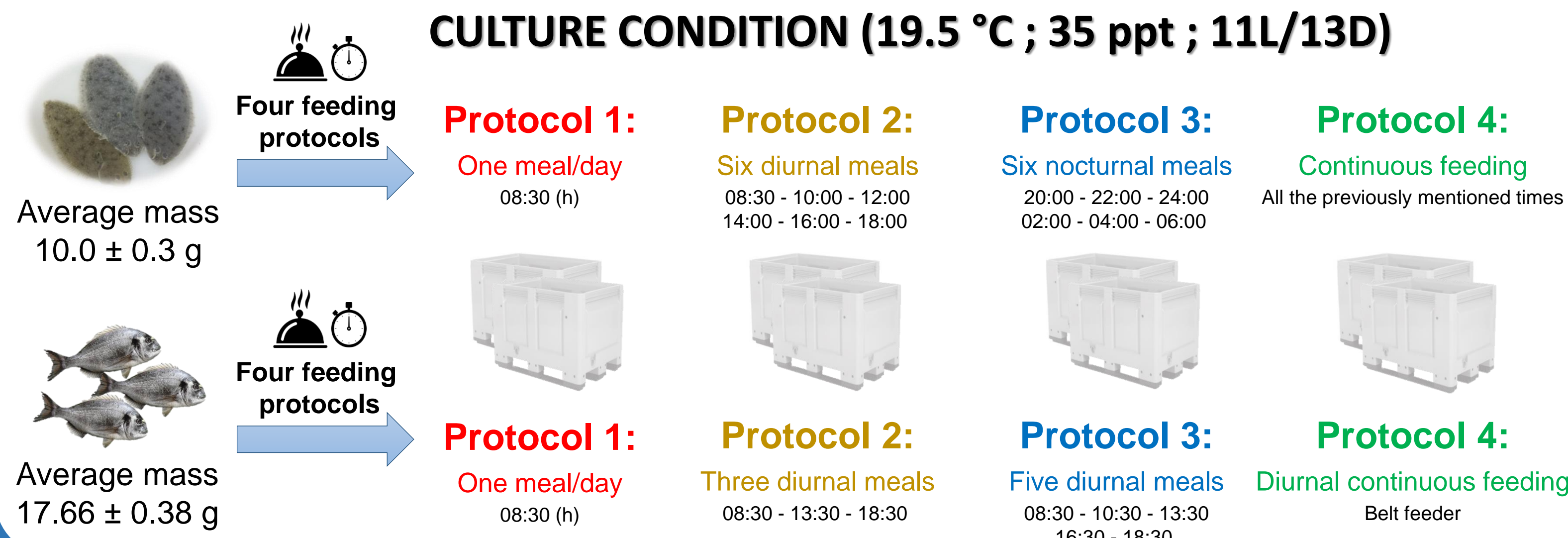
Daily changes of gut luminal pH in Senegalese sole (*Solea senegalensis*) and gilthead seabream (*Sparus aurata*) juveniles were studied in response to different feeding frequencies. Our results highlight the inter-specific variability in acidification strategies.

INTRODUCTION

- Gastrointestinal tract (GIT) pH is an important factor involved in enzymatic capacity and bioavailability of nutrients, solubilization of proteins and minerals, and modulation of the gut microbiota.
- GIT pH may be affected by several factors including age, feeding schedule, and food quality. Therefore, accurate knowledge of its postprandial pattern is needed to define efficient feeding protocols.
- In this work, the GI ionic luminal postprandial pattern of two farmed species, with different digestive anatomies, Senegalese sole and gilthead seabream, was studied under different feeding protocols.

MATERIALS AND METHODS

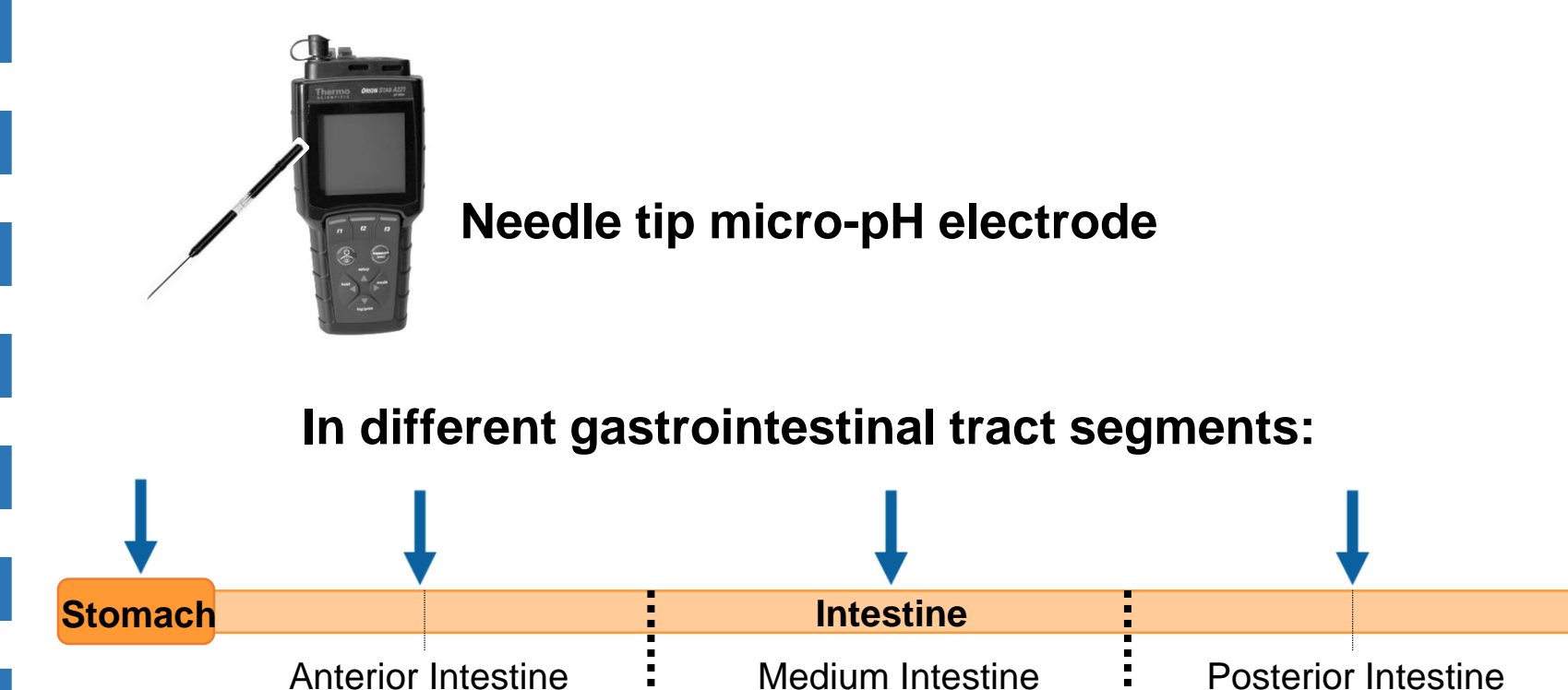
CULTURE CONDITION (19.5 °C ; 35 ppt ; 11L/13D)



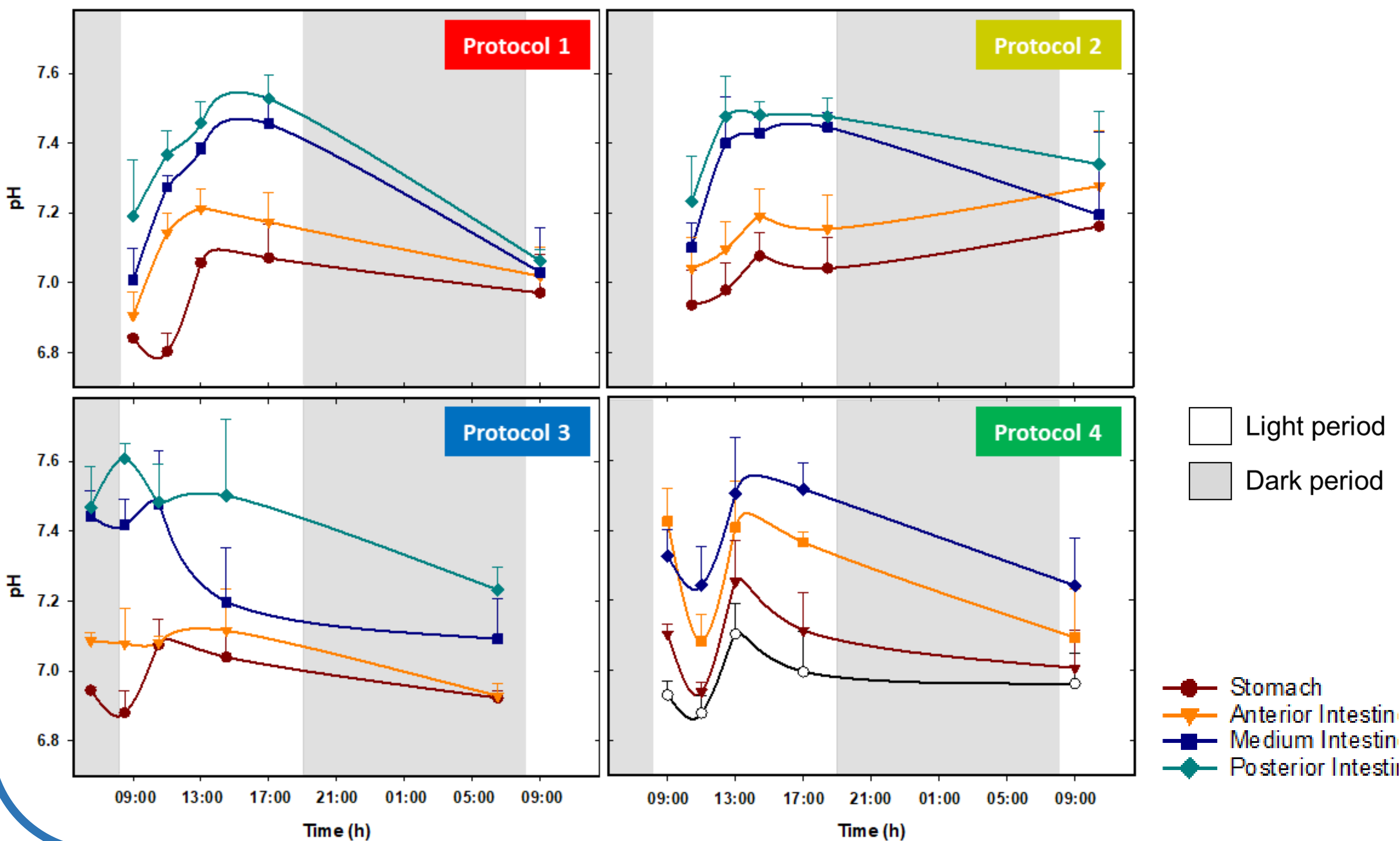
SAMPLINGS

Different postprandial times (during a 24 h cycle)

PH MEASUREMENTS

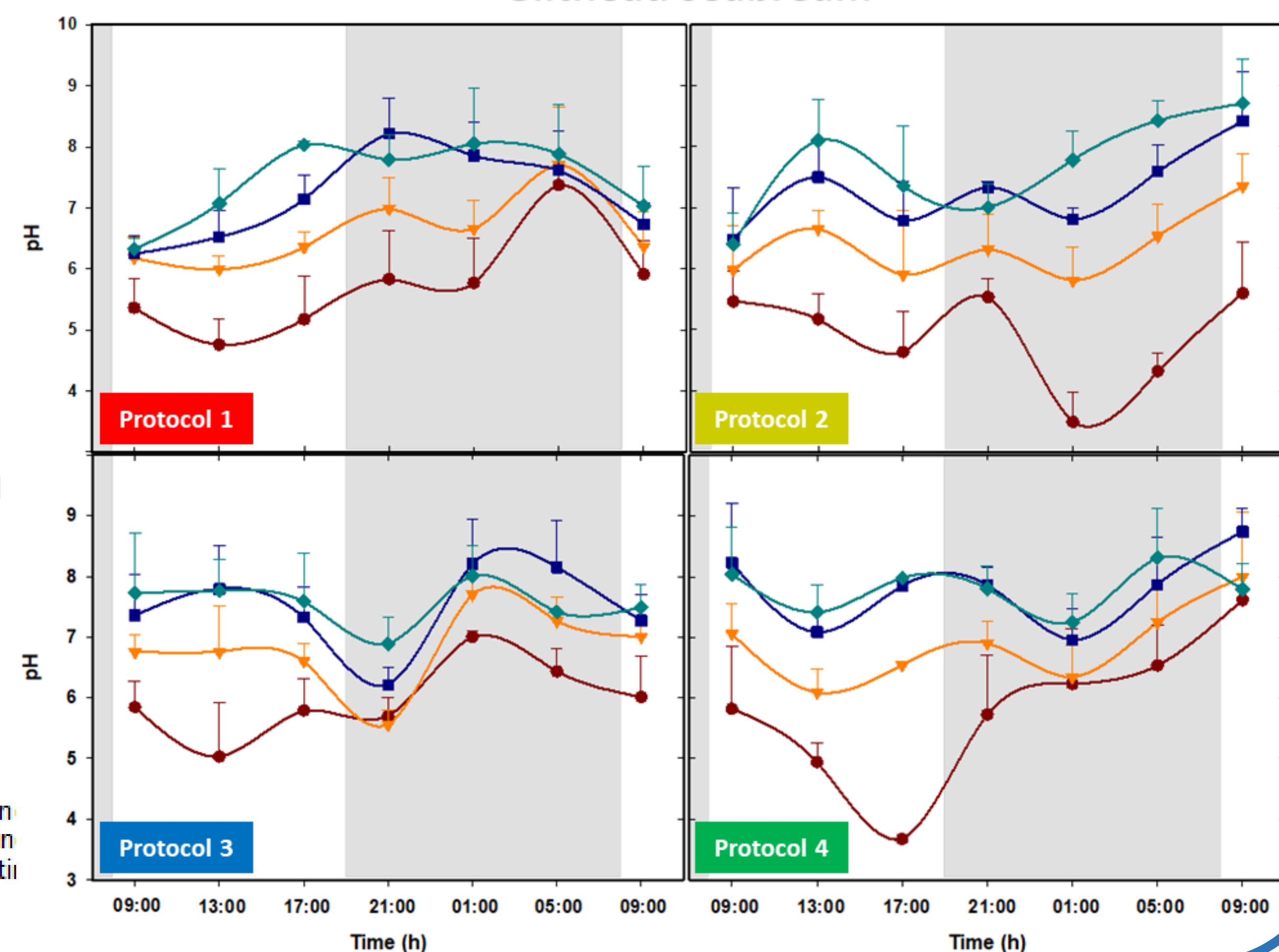


Senegalese sole



RESULTS

Gilthead seabream



DISCUSSION

- In both species, a clear pH change was observed during the 24 h cycle in all the segments of the GIT showing different daily patterns in the four feeding protocols.
- In *S. senegalensis*, a small acidification capacity was observed. In all the protocols, anterior intestine displayed neutral pH, while medium and posterior intestine showed slightly alkaline pH.
- In *S. aurata*, stomach presented considerable acidification in all the protocols. However, low pH levels were not maintained along 24 h, but increased at some point of the daily cycle depending on the feeding protocol. Differences in alkalization pattern among treatments were also observed in the intestine.

CONCLUSIONS

Results from this study confirm the previously addressed negligible acidification of Senegalese sole stomach [1], demonstrating that optimal gastric conditions for pepsin activation are hardly attained, and, otherwise under real physiological pH, that pepsin activity is highly overestimated in this species. On the other hand, as it was already observed for gilthead seabream [2], pH pattern is notably affected by the feeding protocol.

References:

1. Yúfera M, Darías MJ. 2007. Changes in the gastrointestinal pH from larvae to adult in Senegal sole (*Solea senegalensis*). *Aquaculture* 267, 94–99.
2. Yúfera M, Romero MJ, Pujante IM, Astola A, Mancera JM, Sánchez-Vázquez FJ, Moyano FJ, Martínez-Rodríguez G. 2014. Effect of feeding frequency on the daily rhythms of acidic digestion in a teleost fish (gilthead seabream). *Chronobiol. Int.* 31, 1024–1033.

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