GUT TRANSIT RATES AND DIGESTIBILITY IN SENEGALESE SOLE AND GILTHEAD SEABREAM JUVENILES IN RELATION TO DIFFERENT DAILY FEEDING PROTOCOLS

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ABSTRACT
Gut transit rates and relative digestibility were studied in Senegalese sole and gilthead seabream juveniles in response to different feeding frequencies. Our findings confirm that feeding protocol has a clear effect on gut transit rate and that digestibility efficiency varies along the daily cycle.

INTRODUCTION
- Digestive efficiency is largely related to food residence time, which can be modulated by time of feeding and frequency of meals. Several factors such as temperature, fish size, gut morphology, and feed composition are thought to influence feed transit time. Nevertheless, the incomplete and fragmentary information prevents a global understanding of the factors affecting gastrointestinal tract (GIT) transit in teleosts.
- The aim of the present work was to estimate the effect of different daily feeding protocols on GIT filling and evacuation rates and relative digestion of the ingesta in Senegalese sole (Solea senegalensis) and gilthead seabream (Sparus aurata).

MATERIALS AND METHODS

CULTURE CONDITION (19.5 °C ; 35 ppt ; 111/13D)

<table>
<thead>
<tr>
<th>Protocol 1: One meal/day</th>
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<td>Protocol 2: Six diurnal meals</td>
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<td>Protocol 3: Five diurnal meals</td>
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<td>Protocol 4: Continuous feeding</td>
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Average mass: 10.0 ± 0.3 g
Average mass: 17.66 ± 0.38 g

Filling Rate:
- Food without ylbum
- Food with ylbum

Evacuation Rate:
- Change to food without ylbum
- Change to food with ylbum

Digestibility:
- Measuring ylbum content using an ICP-MS
- Measuring the feces carbon and nitrogen content using an elemental analyzer

RESULTS
Senegalese sole

GIT Transit

Evacuation Rate

Relative Digestibility

Senegalese sole

Githead seabream

RESULTS

DISCUSSION
- In S. senegalensis, GIT filling rate is faster in the group fed during night. The evacuation finalized up to a maximum of 24 h, although with variable pace in the different feeding protocols.
- In both species, C/N and ash contents in feces changed during the 24 h cycle and in the different feeding strategies. In general, feces of S. senegalensis contained lower levels of C/N (and therefore of energy content) compared to S. aurata.
- In S. senegalensis, C/N and ash contents showed comparable patterns. But, in S. aurata, these patterns were opposite for some of the protocols.

CONCLUSIONS
Feeding frequency and timing have a key role on GIT transit rate and digestibility. Feeding frequency determines how much ingested food and during how long is subjected to different steps of GIT digestion. Besides, circadian rhythms in digestive machinery of teleost [1], taken from gene expression to enzymatic activity, predetermine the digestive capacity during different hours of the day. Therefore, feeding timing is also a crucial factor that should be taken into consideration in farming practice of each species.

References:

Acknowledgements: This research was funded by the Spanish Ministry of Economy, Industry and Competitiveness (MINECO) by project EFISHDIGEST (AGL2014-52888-R) with FEDER/ERDF contribution. Additional funding from the project WISEFEED funded by the European Union’s H2020 programme (Marie Skłodowska-Curie grant No 691150). N. Gilannejad is supported by a grant from MINECO (Ref. No.: BES-2015-071662).