

## Tailoring your feeds

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# MODELLING OXYGEN CONSUMPTION IN POST-LARVAL SENEGALESE SOLE FED DIETS WITH DIFFERENT PROTEIN AND ENERGY LEVELS

## INTRODUCTION

### Models of growth and metabolism

Energy losses are a major driver of feed utilization



indirectly estimated by oxygen consumption measurement

- May be affected by crude protein and/or crude fat dietary levels

### Precision Feeding

Use of modelling techniques

### Senegalese sole (*Solea senegalensis*)



- High interest for fish farming
- High amino acid requirements
- Feeds with high cost: (+50%) crude protein

**Objectives:** To assess the impact of diet protein and energy levels, feeding state, and feeding level, on the oxygen consumption of Senegalese sole (*Solea senegalensis*) post-larvae, to derive parameters of energy loss for modelling growth and nutrient utilization

## CONCLUSIONS

- Energy costs of maintenance and growth are non-additive in sole from 0.02 to 5 g
- Protein and energy dietary levels do not seem to affect oxygen consumption of Senegalese sole post-larvae
- Oxygen consumption of fasted fish cannot be taken as good estimator of the energetic cost of maintenance in Senegalese sole

## MATERIALS AND METHODS

### Trial conditions

Species: *Solea Senegalesnis*  
IBW from 0.02 to 5 g  
Feeding: 8 times a day for 115 days  
20.5±0.6°C, 35.9±0.4 g Kg<sup>-1</sup> salinity

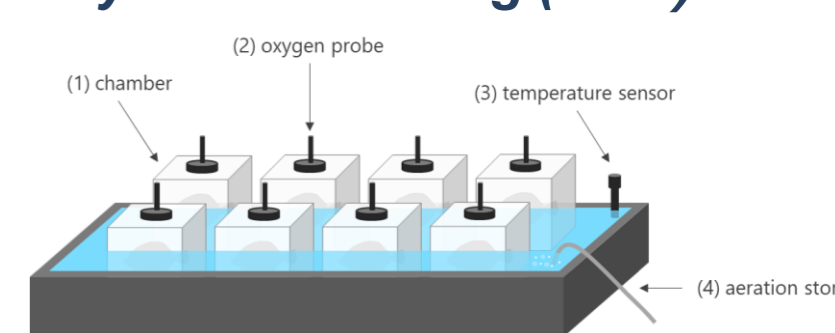


Location: **SEEXP, SPAROS / IPMA** (Olhão, Portugal)

Fed 3 Diets with = DP/DE  
100% and 80% of *Ad Libitum*

55:12 CP/CF    58:14,CP/CF    61:16 CP/CF  
CP: Crude Protein; CF: Crude Fat

### Oxygen Consumption measurements @ 41, 48, 61 and 90 days after hatching (DAH)

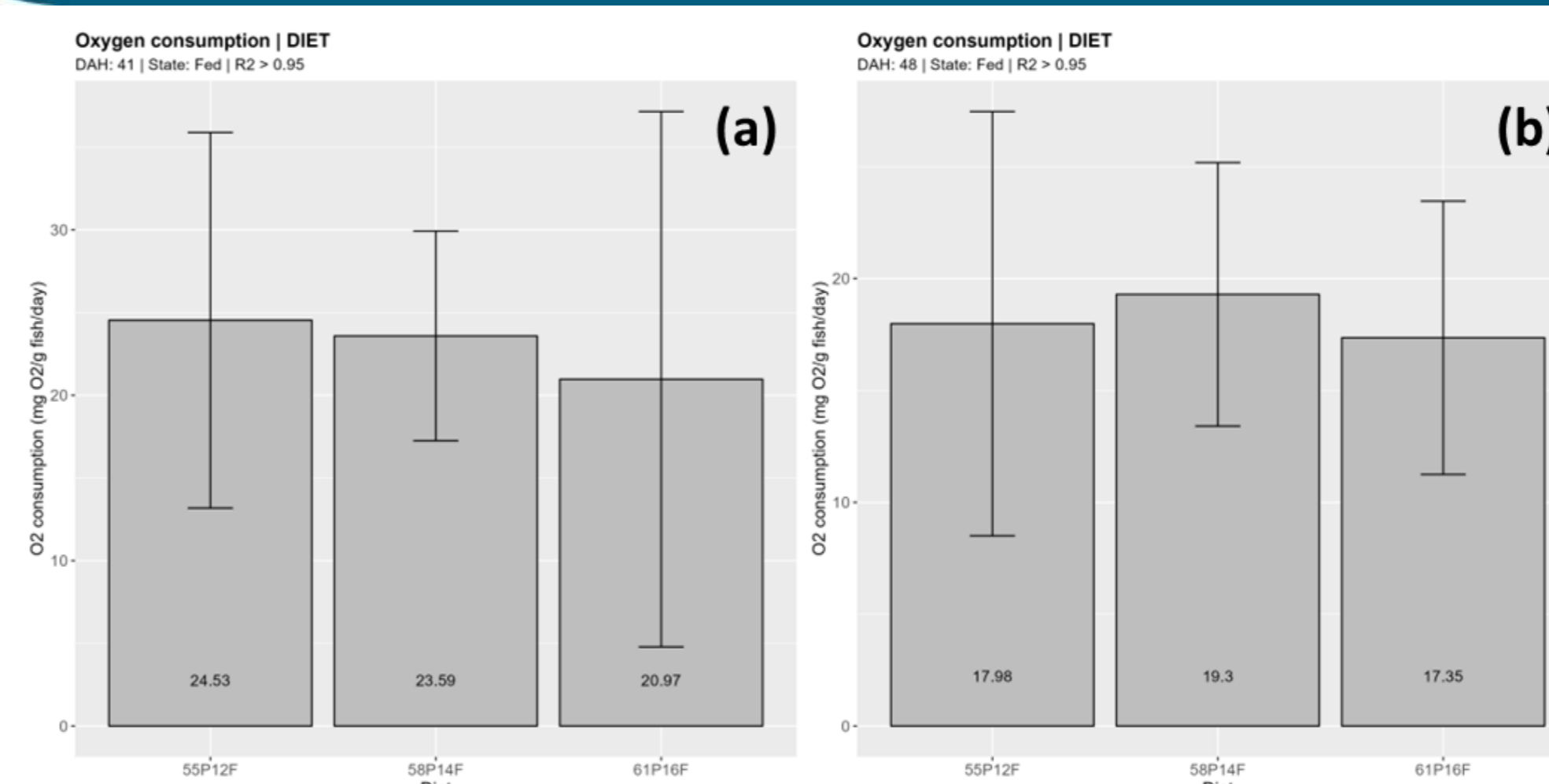


Oxygen probe: Oxy-4-ST<sub>2</sub>-PRESENS, Regensburg, Germany

Closed respirometry until reaching an oxygen saturation threshold of 85-90%

Data analysis: Allometric model, after filtering, transforming and evaluating data robustness, using scripts written in R (version 4.2.3)

## RESULTS



Comparison of oxygen consumption of fed fish by diet, considering as variable of interest the relative oxygen consumption (mgO<sub>2</sub>/g fish/day), by sampling point: a) 41DAH; (b) 48DAH

$$\text{Fasted fish } O_2\text{Cons (mgO}_2 \text{ fish}^{-1}\text{day}^{-1}) = 9.02 \cdot \text{BW}^{0.81}$$

$$\text{Fed fish } O_2\text{Cons (mgO}_2 \text{ fish}^{-1}\text{day}^{-1}) = 10.15 \cdot \text{BW}^{0.78}$$

- Neither feeding state, nor diet affected the oxygen consumption of fish in both the fasted and fed state during the post-larval period of Senegalese sole

**HATCHTOOLS**

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