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ABSTRACT

- This study determines the impact of both dietary methionine levels (9.2; 12.8 and 16.8 g kg⁻¹ diet) and temperatures (30 and 34°C) on feed intake (FI) and brain expression of *npy*, *agrp*, *cart* and *cck*. Cobia showed lower feed intake (FI) when fed deficiency or surplus dietary methionine at both temperatures.
- Significant interaction between methionine and temperature on FI were observed in cobia. Feeding, temperature and/or dietary methionine affects the brain expression of *npy* and *agrp*, *cart* and *cck*.

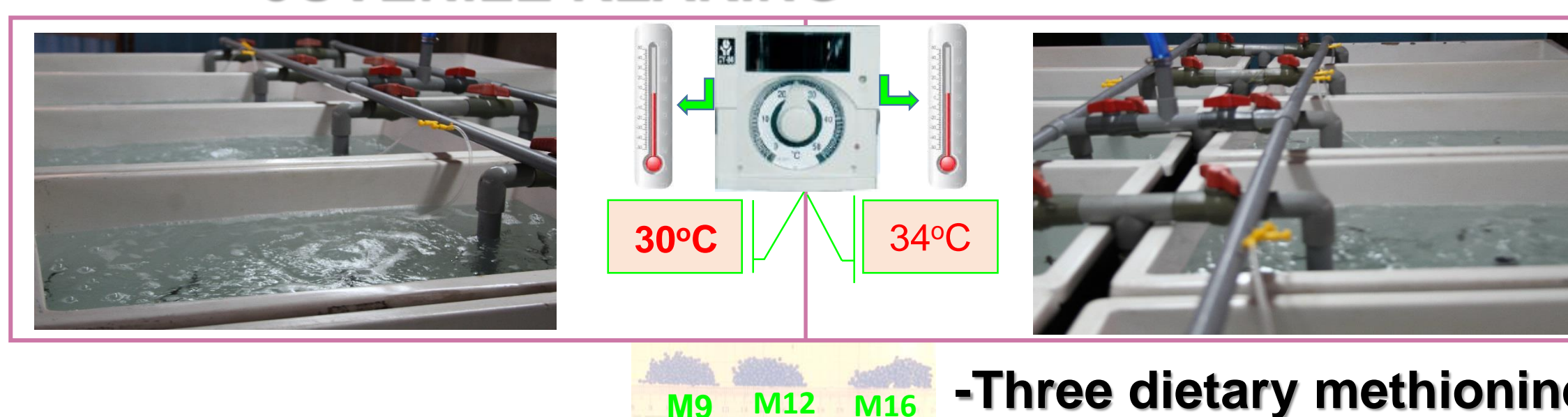
INTRODUCTION



- Increased sea temperature due to climate change will affect the physiology, behavior, and geographical distribution of marine species.
- Cobia (*Rachycentron canadum*) is a candidate species in aquaculture.
- This work aim to determine the effect or relation between the dietary methionine levels and elevated temperature on feed intake in cobia.
- We describe the effects on appetite and brain expression of *npy* (neuropeptide Y), *agrp* (agouti-related protein), *cart* (cocaine- and amphetamine-regulated transcript) and *cck* (cholecystokinin) in cobia.

MATERIALS AND METHODS

JUVENILE REARING



SAMPLING

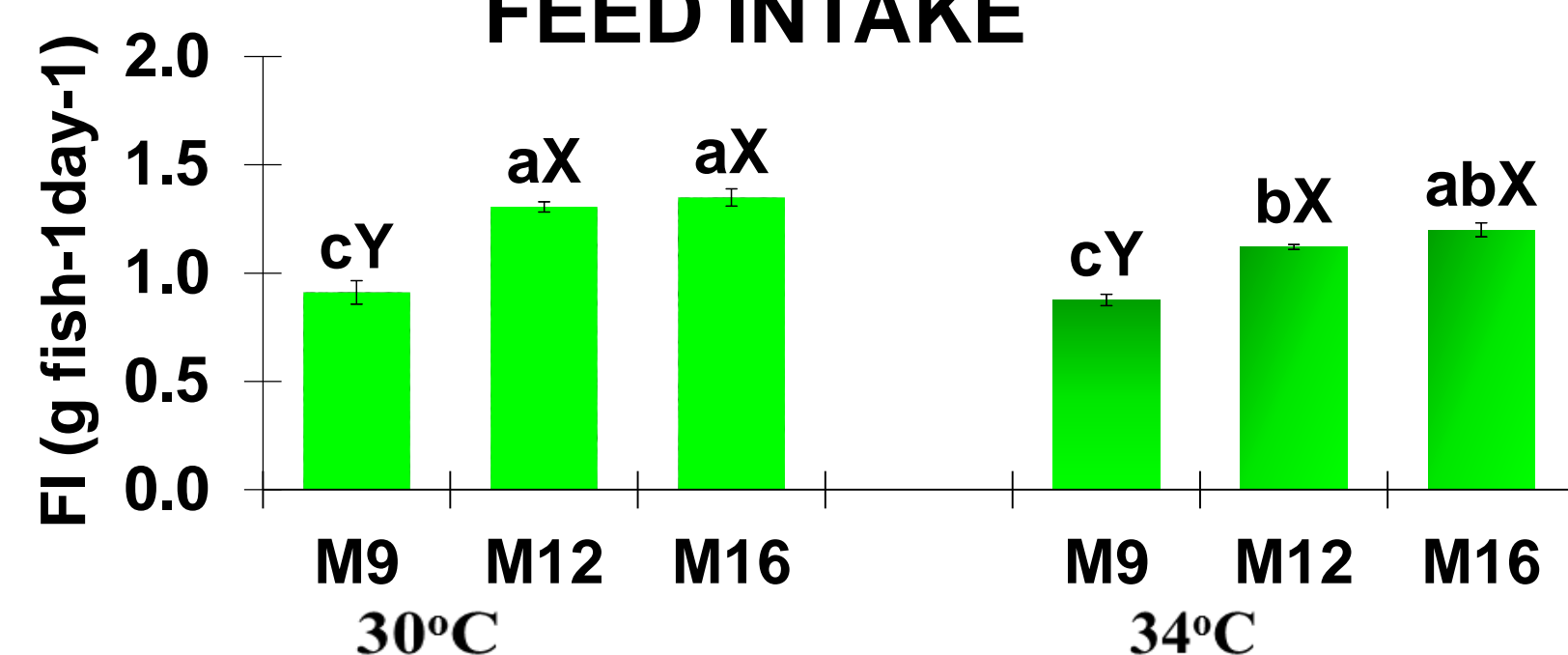


6 WEEKS

Pre- and post feeding for qPCR

- Cobia juveniles (3.8 g, 9.7 cm) were randomly distributed in 18 rectangular fiberglass tanks (0.4x0.5x0.8 m; 20 individuals/tank) and reared at two temperatures 30 and 34°C with continuous aeration.
- The cobia were fed ad libitum by hand (at 8:00 and 17:00) with experimental diets produced by SPAROS Lda for 6 weeks. Crystalline methionine was added in the diets to produce dietary methionine levels at 9.2; 12.8 and 16.8 g kg⁻¹ diet (M9, M12 and M16).
- At the end of the trial, brains were sampled pre- and post-feeding for analysis of gene expression.

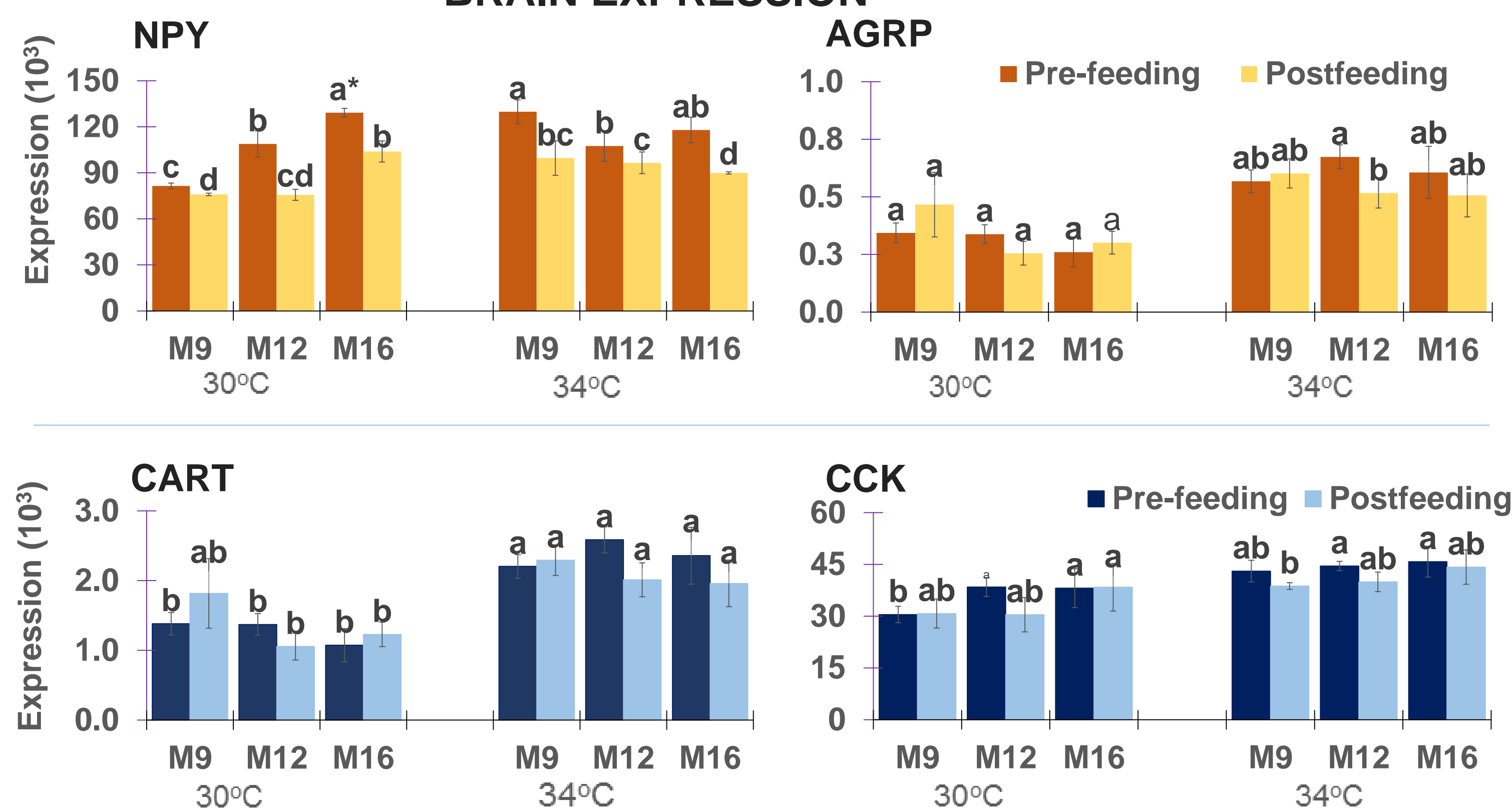
FEED INTAKE



- Methionine and temperature affected feed intake (FI) in cobia. Cobia fed M12 at 30°C had higher FI than those at 34°C ($P < 0.05$; lower and capital letters for pair-wise comparisons within and between temperature, respectively).
- Brain expression of *npy* in pre-feeding cobia were higher than postfeeding cobia for all diets at both temperatures.
- The interaction between dietary methionine and temperature on levels of brain *npy* was significant ($P < 0.05$).
- Higher brain expression of *agrp* in pre-feeding compared to postfeeding cobia at 34°C fed M12. Temperature significantly affected expression of brain *agrp* in cobia.

RESULTS

BRAIN EXPRESSION



DISCUSSION

- Cobia fed methionine at requirement level (M12) at 30°C had higher FI than those fed either methionine deficiency (M9) or surplus (M16) at both temperatures. This supports results reported by Sun and Chen (2014), but not in accordance with results from Wang et al. (2016).
- Temperature and feeding significantly affected brain expression of *agrp* that support the idea that *npy* and/or *agrp* plays as orexigenic factors in cobia, as well as in other fish (Nguyen et al., 2013; Volkoff, 2016).

CONCLUSIONS

- Elevated temperature and dietary methionine deficiency reduced feed intake in cobia.
- Elevated temperature and/or dietary methionine affects brain expression of *npy* and *agrp*. Expression of *cart* and *cck* was affected by temperature but not by dietary methionine.

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Acknowledgements: The project WISEFEED received funding by the European Union's H2020 programme (Marie Skłodowska-Curie grant No 691150). Additional funding from Norwegian Agency for Development Cooperation NORHED, No. QZA-0485 SRV-13/0010, MINECO Spain project EFISHDIGEST AGL2014-52888, and the European Social Fund FCT IF/00482/2014/CP1217/CT0005. S.E. acknowledges a FCT investigator grant IF/00482/2014/CP1217/CT0005 funded by the European Social Fund, the Operational Programme Human Potential and the Foundation for Science and Technology of Portugal (FCT). This work also received national funds through FCT - Foundation for Science and Technology through project CCMAR/Multi/04326/2013.

