

GROWTH, HEALTH AND WELFARE OF SPOTTED WOLFFISH JUVENILE (*ANARHICHAS MINOR*) FED DIETS CONTAINING BLUE MUSSEL MEAL WITH AND WITHOUT SHELL



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INTRODUCTION

Spotted wolffish (*Anarhichas minor*), a cold-water species, is considered as a promising candidate for aquaculture and sustainable seafood production.

Given that the natural diet for wolffish includes hardshelled organisms one important knowledge gap concerns the dietary requirements of e.g. minerals for optimised growth and formulation of species specific diets.



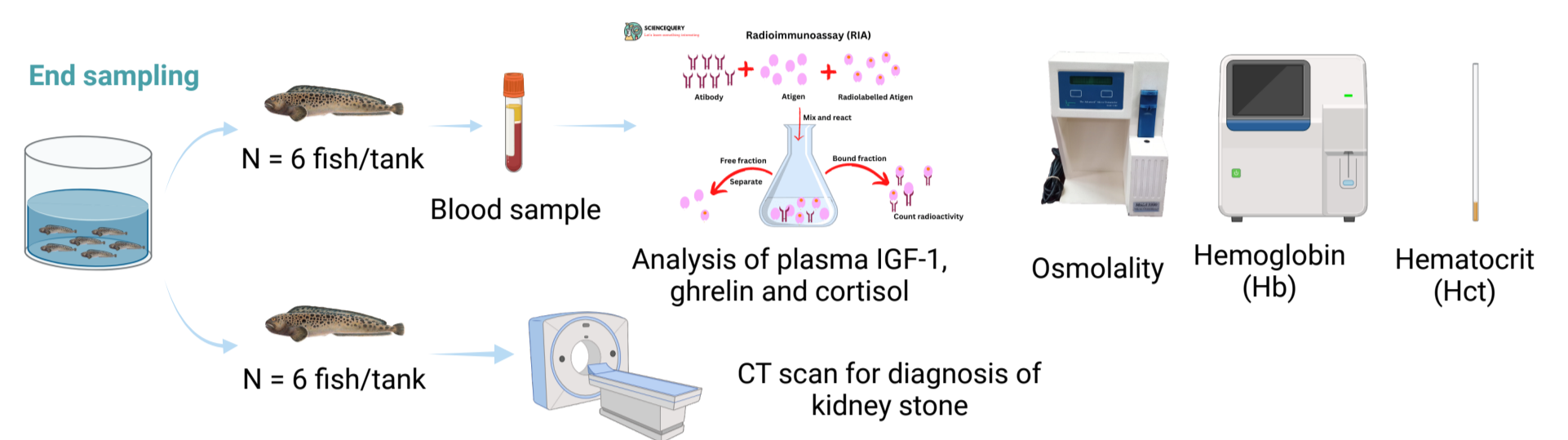
Spotted wolffish (*Anarhichas minor*)



Blue mussel (*Mytilus edulis*)

The aim is to investigate the dietary effects of blue mussel meal, with and without shell, on the growth, health, and overall well-being of juvenile spotted wolffish.

SAMPLING AND ANALYSIS



Analysis of blood plasma parameters includes the assessment of the hormones: insulin-like growth factor 1 (IGF-1; growth regulation), ghrelin (appetite regulation), and cortisol (primary stress response). In whole blood, hematocrit and hemoglobin content were measured.

Nephrocalcinosis (calcareous deposit in the kidneys) was assessed through CT scan of the whole fish.

EXPERIMENTAL DESIGN

A 12-week feeding trial with two experimental diets: one with de-shelled blue mussel meal (BM) and one with shells (BMS).

Fish initial average weight was 877.05g ± 18.88.

- 3 tanks/group

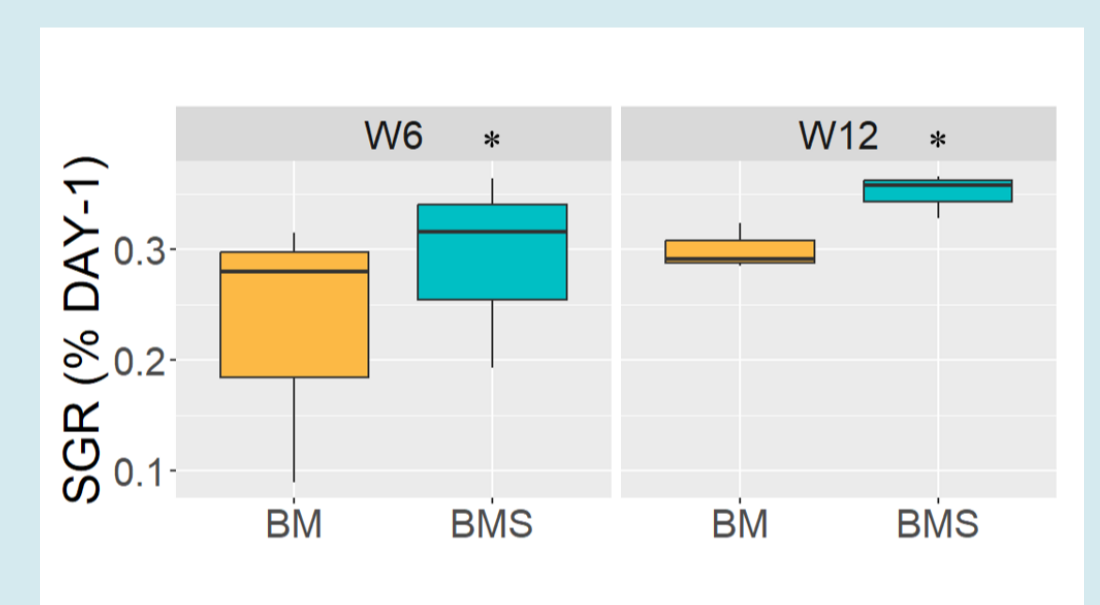
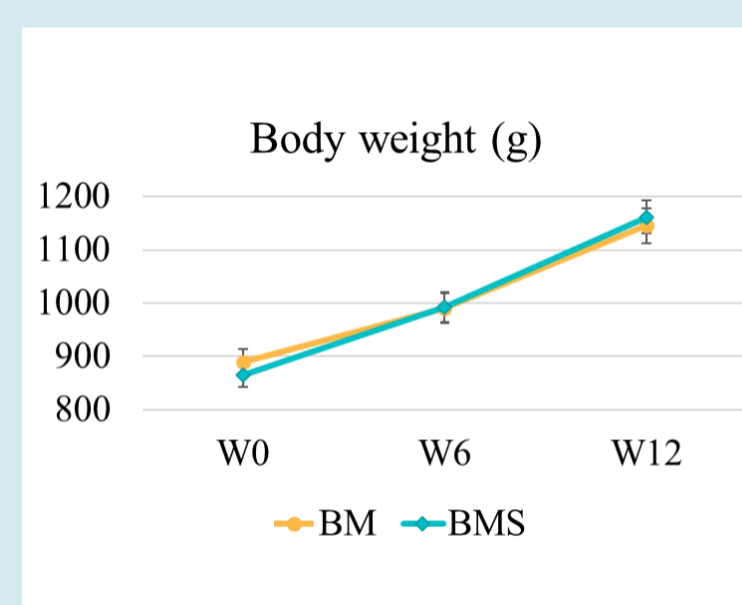
- 30 fish/tank = 90 fish



Table 1 Diet formulation and composition

Ingredients (%)	BM	BMS
Mussel meal	20	20
Fishmeal	45	44
Wheat gluten	7	7
Fish oil	10.5	10.5
Wheat meal	15	12
Mineral premix	1	1
Monocalcium Phosphate	1	1
Titanium dioxide	0.5	0.5
Shell	0	4
Total (%)	100	100
Proximate composition		
DM %	84	84.1
Ash %	13.7	17.5
Crude protein (%)	49.7	48.7
GE (MJ/kg)	20.1	20
Lipid %	14.5	14.4
Ca %	2.3	3.8
Lysine %	4.2	4.1
Methionine %	1.2	1.2

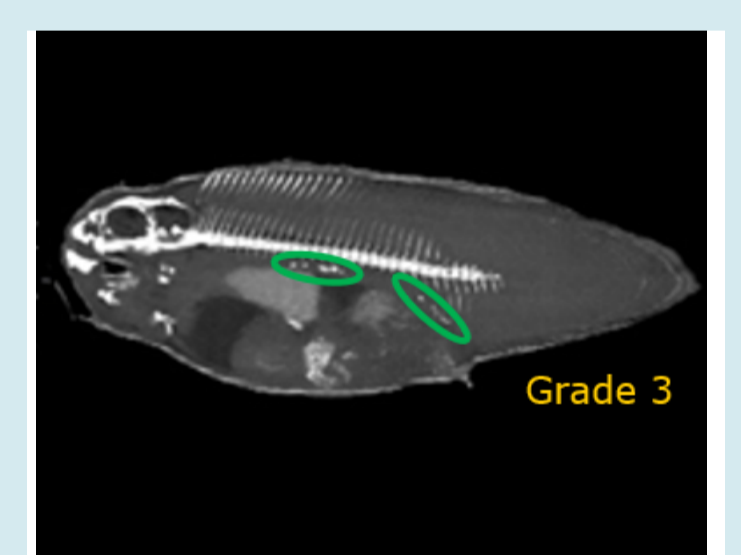
RESULTS



Better growth performances were observed in the BMS group. WG and SGR of the fish with BMS diet were significantly higher at W6 and W12 than the fish with BM diet.

There were no significant differences in any of the plasma parameters assessed.

Minor grade of nephrocalcinosis was detected in both groups but with the same frequency of occurrence 0.22% which equals that four out of the 18 fish in each group were affected.



Grade 3 nephrocalcinosis was detected through CT scan. Image by Jan Fredrik Prytz & Halvor Prytz

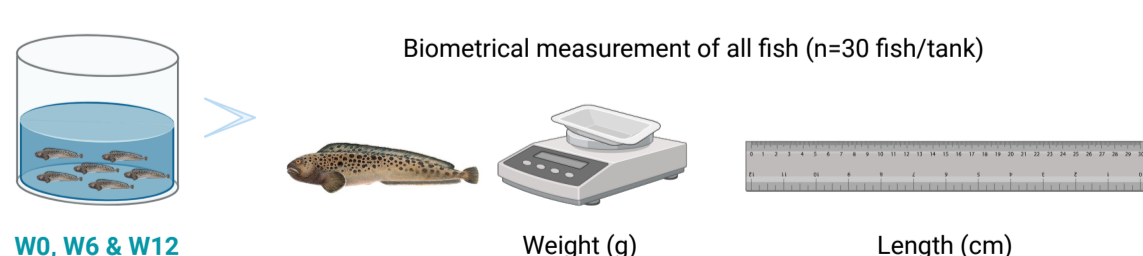
GROWTH PARAMETERS

Biometrical measurements of the fish made at week marks W0, W6 and W12:

- Body weight (g) and length (mm)

Following measurements were calculated:

- Weight gain (WG), specific growth rate (SGR) and condition factor (CF)



CONCLUSION

Including finely ground blue mussel shells in the feed increases the potential for blue mussel meal as alternative ingredient in diets for spotted wolffish. Our findings suggest that the inclusion of mussel shells in the formulation increases specific growth rate, possibly by contributing with essential minerals, e.g. by increasing the calcium content of the diet from 2.3 to 3.8%.



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