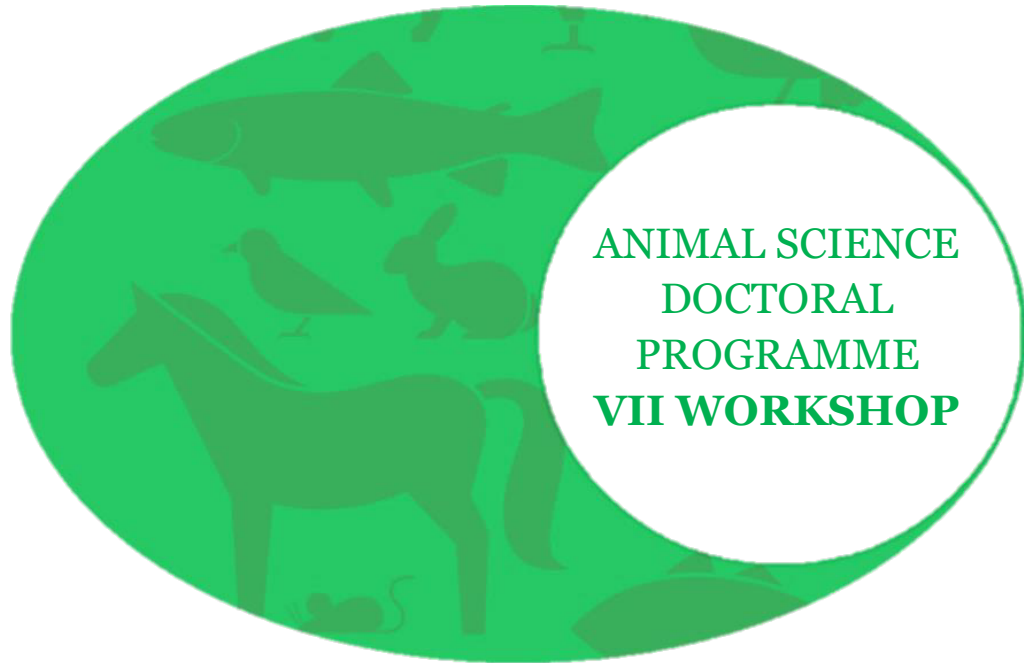


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Inclusion of blood hydrolysates in European seabass (*D. labrax*) diets: impact on nutrient retention and fish resistance of to *T. maritimum* infection

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Abstract

Bioactive peptides are small amino acid chains with interesting properties (beyond their nutritional value), including antioxidant, mineral-binding, immunomodulatory or antimicrobial activities [1]. In this study, we hypothesised that including blood hydrolysates (BH) in aquafeeds could promote fish robustness, increase the economic value of animal blood and minimize waste, contributing to a circular economy. Additionally, BH with antimicrobial properties may address the *T. maritimum* infections that occur in aquaculture farms, with high impact on fish health, well-being and aquaculture production.

Three fractions of swine BH obtained by autohydrolysis (AH) or enzymatically were selected. AH was oven dried. The BH obtained enzymatically were further submitted to a micro- (MF) and nanofiltration (NF) and freeze-dried. Dried hydrolysates were then included in five isolipidic and isoproteic diets for European seabass: a fishmeal (FM) based diet (positive control, PC), a commercial-based diet where 50% of FM was replaced by vegetable proteins (negative control, NC) and three diets where 3% of each BH was added to the NC. Diets were assigned to triplicate groups of 71 juveniles (initial weight 12.3±1.4 g), fed three times daily until apparent satiation in a recirculating saltwater system. Growth, nutrient utilisation and whole-body composition were evaluated after 12 weeks. At the end of the trial, ten fish per tank were infected with *Tenacibaculum maritimum* (3.5×10^5 cfu/L), in a two-hour water bath, and mortality was assessed for 8 days.

Fish fed PC had the highest final weight, followed by NC and NF. The NC had a significantly higher weight than the MF and AH groups. Specific growth rate (SGR) and feed conversion ratio (FCR) of fish fed NF showed no significant differences from those fed PC and NC. Fish fed AH also displayed similar SGR to those fed NF and NC, but differed significantly from the MF. Despite no significant differences among treatments regarding final body composition, lipid and energy retention and gain were lowest in fish fed MF, which also had the lowest condition factor. Protein retention was unaffected by dietary treatments. Regarding the infectious challenge, NF had the lowest mortality rate that differed significantly from the NC and MF groups. Mortality for fish fed AH and PC did not differ from NF. MF showed the highest mortality. Overall, results indicate that dietary supplementation with NF clearly improves the resistance of European seabass to *T. maritimum* without affecting growth rate and can hence become a valuable ingredient for this species.

Keywords: Blood hydrolysates; fish robustness; circular economy; bioactive peptides; *Tenacibaculum maritimum*

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