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Evaluation of sardine cooking wastewaters as feed intake modulators for European seabass diets

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There has been a tendency to replace marine ingredients in aquafeeds, namely fishmeal, with more sustainable vegetable protein sources. However, this replacement often reduces diet palatability, with a subsequent decrease in feed intake and growth and/or alteration of flesh quality. The goal of this work was to evaluate the effectiveness of aromatic mixtures extracted from sardine cooking wastewaters, a by-product of the canning industry, as feed intake stimulants in highly vegetable diets for European seabass (*Dicentrarchus labrax*).

Sardine cooking wastewaters were either used directly (CW) or after processing by vacuum condensation (VC) or liquid/liquid extraction with soybean oil (LLE). The chemical profile of the extracts differed, but the most abundant compound identified in all extracts was the 1-penten-3-ol, hence selected as marker and included at 2 µg/g in plant protein-based diets. Thus, four isolipidic and isoproteic diets (one for each aroma sample and a non-supplemented control) were produced. Diets were assigned to triplicate groups of fish (initial weight 95.7 ± 13.5 g) that were hand-fed twice daily until apparent satiation in a recirculating saltwater system at 21 °C. After 18 weeks, fish growth performance and nutrient utilisation were evaluated. Flesh colour and textural properties were assessed instrumentally and by sensory analysis using a consumer panel.

Fish fed LLE displayed a significantly higher voluntary feed intake than those fed diet CW, although neither differed from the control. LLE diet also resulted in increased feed conversion ratio, but final weight, daily growth rate, whole-body composition, and nutrient gain remained similar among diets. No differences were also found in fish skin or muscle colour. Despite a lower hardness in fillets of fish fed LLE when compared to those fed the control, no significant differences could be perceived by the sensory panel; global liking of samples was similar among treatments, being all generally well accepted. Additionally, the taste and odour of all samples was similar with a “characteristic fish” and “soft” odour/taste. Overall, results suggest that the aromas from sardine cooking wastewaters can modulate feed intake, but further optimization of either the processing and/or incorporation levels seems required to potentiate their effectiveness on fish growth. The physiological mechanisms underlying the modulation of appetite also merits further evaluation.

Keywords: Circular economy; feed intake; palatability; sustainability.

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