



## Article

# Evaluation of the Inclusion of the Green Seaweed *Ulva ohnoi* as an Ingredient in Feeds for Gilthead Sea Bream (*Sparus aurata*) and European Sea Bass (*Dicentrarchus labrax*)

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**Simple Summary:** The use of seaweeds in aquafeeds is receiving increasing attention due to their potential nutritional and functional benefits. However, several green seaweeds such as *Ulva* presents nutritional limitations because of the undigestible polysaccharides, although these may exert a positive effect on the immunological status of the fish. The present study developed three different experiments aimed to re-evaluate the presence of protease inhibitors described for *Ulva ohnoi*, to assess its nutritional value as an ingredient and also to evaluate its potential protective effect on the oxidative metabolism of fish, being experiments developed in two different fish species (European sea bass *Dicentrarchus labrax* and gilthead sea bream, *Sparus aurata*). Results indicate the absence of negative effects of *U. ohnoi* on protein digestion of sea bream but a limited value as a feed ingredient. In contrast, its contents in bioactives seem to be correlated to the observed positive effects on the immune status and oxidative metabolism when fish are challenged by the consumption of highly oxidized dietary oil.

**Abstract:** This study evaluated the use of *Ulva ohnoi* as an ingredient in feeds for aquaculture in three different experiments. Experiment 1 was oriented to confirm the negative effect of *U. ohnoi* on fish digestion. Experiment 2 assessed the effect on growth, feed efficiency, and immune status of juvenile sea bass (*Dicentrarchus labrax*) fed on diets including *U. ohnoi*, previously treated or not with carbohydrases used to partially hydrolyze indigestible polysaccharides. Experiment 3 was aimed to evaluate the potential protective effect of *U. ohnoi* on the oxidative status of sea bream (*Sparus aurata*) challenged by the consumption of a feed formulated with the oil fraction completely oxidized. Results show a negligible effect of *U. ohnoi* meal on protein digestion when included in feeds at levels of 10% or less. Moreover, results of growth and feed use evidenced the possibility of using up to 5% inclusion of algal meal in feeds without adverse effects on the zootechnical parameters, while the enzyme pretreatment was ineffective to improve its nutritional use. Finally, the inclusion of *U. ohnoi* in feeds determined both an immunostimulatory effect, evidenced by an increase in skin mucus lysozyme in the two mentioned fish species, and a positive influence on the oxidative metabolism of seabream when fed on a diet including rancid oil.

**Keywords:** aquaculture feeds; bioactive compounds; *Ulva ohnoi*



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## 1. Introduction

*Ulva* are green macroalgae belonging to the phylum Chlorophyta that presents a great environmental polymorphism, and genetic analysis suggests that the different described species for the genus (*U. armoricana*, *rigida*, *prolifera*, *pertusa*, *fasciata*, or *ohnoi*) are only