DIETARY USE OF PREBIOTICS IN GREATER AMBERJACK JUVENILES: EFFECTS ON GROWTH PERFORMANCE, IMMUNE GENE EXPRESSION AND DISEASE RESISTANCE AGAINST *Neobenedenia girellae*

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Introduction

The greater amberjack *Seriola dumerili* (Risso 1810) is a marine pelagic species that is of high interest for aquaculture due to its rapid growth and high commercial value (Takakuwa et al., 2006). Nowadays, the production of this species needs to solve a major health bottleneck caused by infection with monogenean ectoparasites (Hirayama et al., 2009), which limits its large-scale production in sea cages. Despite its importance, very little is known about the optimum culture conditions for this species and their impact on the immune system (Fernandez-Montero et al., 2016; Milne et al., 2016), and no studies have reported the use of prebiotics in this species (Dawood et al., 2015: Hossain et al., 2017). The effect of prebiotics in fish production have been well studied in other species (Torrecillas et al., 2014; Hoseinifar et al., 2015) where they improve the MALT immune response, and show promising results against endoparasites infections. For these reasons, the aim of the present work is to determine the effect of several commercial prebiotics on the greater amberjack immune system and the impact on resistance to an experimental infection against the ectoparasite *Neobenedenia girellae*.

Material and methods

Three hundred and twenty four fish of 331 ± 30 g (mean ± SD) were distributed in eighteen 1,000 l tanks (18 fish/tank) and fed to apparent satiety 3 times per day for 90 days. The experimental diets used were: greater amberjack base control diet (C), supplemented with prebiotic A (A), supplemented with Prebiotic B (B) and a combination of both prebiotics (AB). Feed intake was monitored daily while growth performance and feed efficacy were recorded monthly. At the end of the experimental period, samples of posterior gut, gills, skin, head kidney and spleen were placed in RNA later for gene expression analyses by qPCR and a parasite challenge was conducted. For this challenge, fish from the diet trial were infected by cohabitation with heavily parasited greater amberjack infected with *N. girellae* for 10 days, and prevalence and parasite level were recorded.

Results

No significant differences were observed for growth performance, feed efficiency or feed intake ($P>0.05$), and only a trend towards diet B having higher values was seen. Parasite challenge showed significant differences ($P<0.05$) among the dietary groups, with the control group (C) being the most parasited, followed by diet A, AB and B (Figure 1).

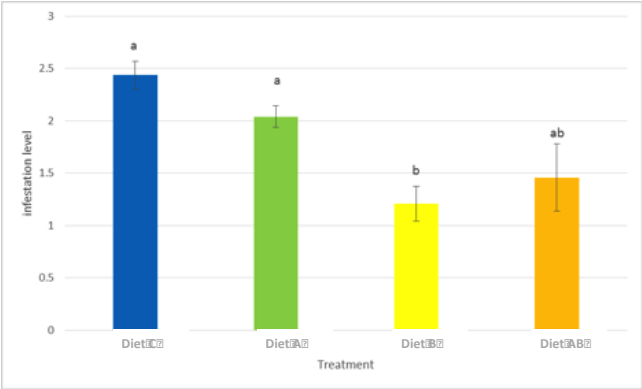

Fig. 1. Parasite level of fish on different diets. Different letters denote significant differences (P<0.05).

Fish fed prebiotic A and B also showed a positive effect on immune gene expression. Results of the gene expression analysis are discussed in relation to the diets and different tissues, distinguishing the mucosal from the systemic immune response.

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