

COMBINED EFFECTS OF DIETARY MANNAN OLIGOSACCHARIDES AND *PEDIOCOCCUS ACIDILACTICI* AND THEIR COMBINATION IN LOW FISH MEAL AND FISH OIL DIETS FOR EUROPEAN SEA BASS, *DICENTRARCHUS LABRAX*, JUVENILES

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Abstract

Low dietary levels of raw marine ingredients in marine fish species diets induce variable side-effects on fish growth performance, welfare and health, depending mainly on the terrestrial protein and oil source used, dietary levels and fish species studied. Particularly, high dietary levels of vegetable meals (VM) and oils (VO) blends, may induce intestinal dysfunction by altering tissue morphology, intestinal functionality, microbiota populations or gut associated lymphoid tissue (GALT) homeostasis. On the other hand, alternative feed ingredients such as prebiotics and probiotics have demonstrated to promote fish performance and disease resistance through potentiating GALT efficiency and functionality. Thus, the main objective of this study is to evaluate the effects of dietary mannan oligosaccharides (Biomos® and Actigen™), *Pediococcus acidilactici* (BAC; Bactocell ®) and their combination in low FM and FO diets for european sea bass juveniles.

Fish of 19.7 ± 0.09 g were distributed in 18 tanks and fed for 90 days six experimental diets with a low content of FM and FO, containing graded and combined levels of MOS and BAC as follows: HP; LP; B; HPB; LPB and C (Control). After 60 and 90 days of feeding, fish were sampled for growth, gut morphometry and histopathology, gut mucus production and expression of GALT related genes. Besides, samples were taken for gut iNOS and TNF α immunohistochemistry (IHQ) and for in situ hybridation (ISH) studies of MHC β , TCR β , CD4 and CD8.

Fish fed diets HP, LP and LPB presented higher final weight. Two-way ANOVA attributed this effect to MOS regardless of dietary BAC inclusion. The use of prebiotic induced an increase on number of goblet cells in posterior gut (Fig.1). IHQ analyses performed against iNOS and TNF α showed the use of prebiotics induce an inflammatory-like pattern in the apical side of gut villi. Results for ISH showed that combined use of pre and probiotic induced a wider distribution of TCR- β marked cells, with special emphasis in the lamina propria. Expression of GALT-related genes, will be also discussed.

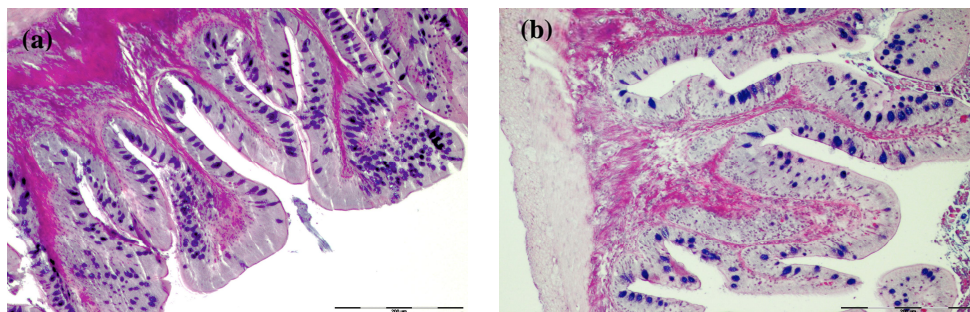


Fig.1. Posterior gut (Alcian Blue-PAS). (a) LPB and (b) C diets t=90days. Note the higher number of goblet cell for fish fed LPB diet

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Key words: *Dicentrarchus labrax*, Immunostimulants, Probiotics, ISH, GALT