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Monospecies and multispecies probiotic formulations produce different systemic and local immunostimulatory effects in the gilthead seabream (*Sparus aurata* L.)

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Abstract The effects of the oral administration of heat-inactivated *Lactobacillus delbrueckii* ssp. *lactis* and *Bacillus subtilis*, individually or combined, on gilthead seabream immune responses were investigated both systemically and locally in the gut.

In a first experiment, seabream (65 g) were fed for 3 weeks different diets supplemented with 1×10^7 CFU g⁻¹ *Lactobacillus*, 1×10^7 CFU g⁻¹ *Bacillus*, or 0.5×10^7 CFU g⁻¹ *Lactobacillus* plus 0.5×10^7 CFU g⁻¹ *Bacillus*. Controls were fed non-supplemented diet. Six fish per group were sampled at the end of the trial and some humoral and cellular systemic innate immune parameters were evaluated. Feeding the mixture of the two killed bacteria species significantly increased natural complement, serum peroxidase and phagocytic activities compared with controls.

In a second experiment, juvenile seabream (13 g) were fed for 3 weeks the same experimental diets and total serum IgM and numbers of gut IgM⁺ cells and acidophilic granulocytes were evaluated. All these parameters were significantly higher in the multispecies probiotic group compared to monospecies and control fed groups.

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