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## Use of by-products of the brewing industry as alternative protein and lipid sources in gilthead seabream (*Sparus aurata* L.) diets

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Aquaculture consumes large amounts of food to produce a kilo of fish. In addition, the increase of farmed fish has increased the demand for fish meal and oil as the main source of protein for food. The general aim of this study was to use by-products of the brewing industry as alternative protein and lipid sources for fish diets. Two isocaloric experimental diets were elaborated, taking into account in its design the nutritional requirements of gilthead seabream (*Sparus aurata* L.). This fish species was chosen for being the most cultivated marine fish species in the Mediterranean area. The by-products of the brewing industry included in the experimental diets were: yeast, grain and root (in the experimental diet 1) and yeast and grain (in the experimental diet 2). Furthermore, one group was fed with commercial diet and used as control. All fish were fed ad libitum twice daily for one month. Results demonstrated lower growth in fish fed the experimental diets. Blood tests revealed a state of dehydration of the specimens (as indicated by creatine kinase, sodium and potassium levels). Furthermore, enterocytes from fish fed the experimental diets had a vacuolated cytoplasm demonstrating also the enteritis. These effects on fish seem to be due to the high inclusion of root in the diet. Further studies are needed to know the percentages of substitution of these ingredients in the diet of fish.

### Biography

M A Esteban is a full time professor at the University of Murcia. Her research interest focuses on the study of the fish immune system, fish immunomodulation and fish defence. She has published more than 150 papers in reputed international journals and more than 100 presentations at national and international conferences. She has participated in more than 25 research projects and in 15 contracts with enterprises and she has 2 patents.

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