NEWSLETTER

SIMTAP Fish Production: the results at Pisa University

Testing “alternative” diets to commercial feed, for growing Gilthead Sea Bream (GSB) and European Sea Bass (ESB), was one of the most important goals of the project. It is very well known that “aquafeed” ingredients production and transportation, and notably fishmeal and fish oil, represent the bottleneck for aquaculture development. This is particularly important whether the future aquaculture is meant to be “sustainable”. After all, on February 4, 2020, the Italian Ministry of Agriculture, food, and forestry (Mipaaf) published the Decree recognizing the "sustainable aquaculture" Production Specification within the National Quality System "Animal Husbandry". It is the first Production Disciplinary dedicated to this sector declared compliant with EU rules by the European Union.

In this perspective, the studies carried out on fish within the SIMTAP project acquire a relevant importance. Based on the SIMTAP concept and thinking to future SIMTAP application, all the diet ingredients (detritivores- filter-feeder organisms) are meant to be produced and supplied on site (no raw materials or aquafeed transportation is entailed), following the circular economy principles (wastes from fish are reused for DFF organisms and plants nutrition). Hence, the alternative experimental diets tested on GSB and ESB consisted of a chopped mixture of mussels, clams, and polychaetas. Based on the observed results, a mineral mix and sodium chloride were also used to improve diet efficiency and meet fish requirements. Moreover, 25 and 10 ppt water salinity were used for the trials on GSB and ESB, respectively.

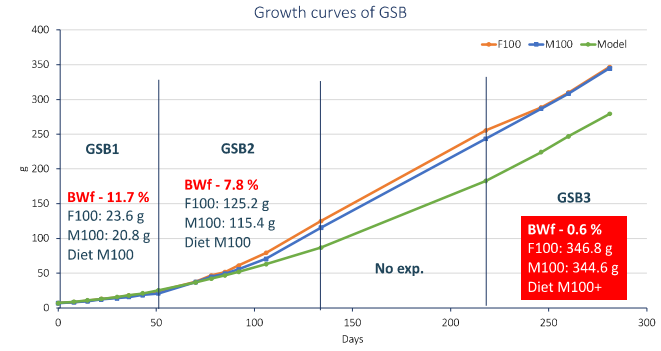

Figure 1: Final Body weight observed in the trial GSB1, GSB2 & GSB3

The GSB growth performances (figure 1) showed that when only mussels (50%) and clams (50%) were used, the alternative diets determined a lower final body weight (-11.7%) in comparison to the commercial feed (trial GSB1). Then, 20% polychaetas were added (trial GSB2) to the mussels (50% and the clams (30%), and the final body weight was lower just by 7.8% in comparison to the commercial feed. Based on these results, 1% mineral mix was added to the mixture (trial GSB3), with that reaching almost the same (-0.6%) final body weight of the group fed the commercial feed. However, throughout the trials the growth performances observed for both treatments were better than those considered standard (Lupatsch and Kissil, 1998) for GSB.

Afterwards, the same diet used in the experiment GSB3 was tested on ESB and a lower growth (-27,0%) was observed in the group fed the alternative diet in comparison to the group fed the commercial diet (figure 2). The reduced growth may be explained with a higher energy expenditure required for the maintenance of the physiological homeostasis (osmoregulation) in low salinity condition (10 ppt). Hence, 4% Sodium Chloride were added to the alternative diet (trial ESB1.2), so that obtaining comparable growth (-0,4%) between the two considered groups (figure 3). Finally, the other growth parameters measured such as FCR, Kf, VSI and HSI, were consistent with the results above described, as well as fish fillet quality, with a slightly higher n-3 content for the group fed the alternative diet.

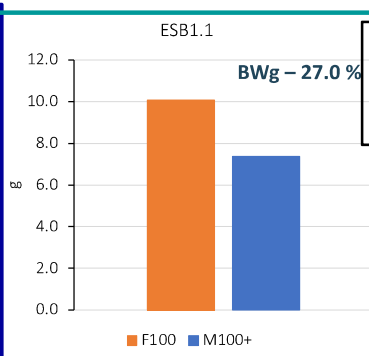

Figure 2: Body weight gain observed in the trial ESB1.1

Despite several aspects require to be further investigated, the results of the SIMTAP project can be considered highly promising under the perspective of the fish health growth performances. A new food market organization, and improvements regardless “sustainable” ingredients production within the SIMTAP system, may open to future successful application of the SIMTAP concept to commercial aquaculture production.

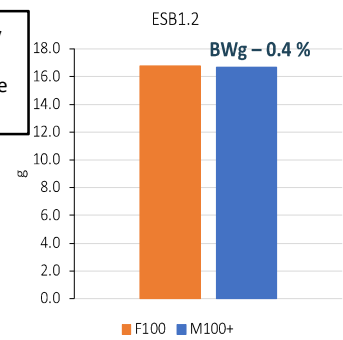

Figure 3: Body weight gain observed in the trial ESB1.2

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