Accepted Manuscript

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PII: S1050-4648(18)30372-3

DOI: 10.1016/j.fsi.2018.06.031

Reference: YFSIM 5374

To appear in: *Fish and Shellfish Immunology*

Received Date: 18 April 2018

Revised Date: 3 June 2018

Accepted Date: 14 June 2018

Please cite this article as: Reda RM, El-Hady MA, Selim KM, El-Sayed HM, Comparative study of three predominant gut Bacillus strains and a commercial *B. amyloliquefaciens* as probiotics on the performance of *Clarias gariepinus*, *Fish and Shellfish Immunology* (2018), doi: 10.1016/j.fsi.2018.06.031.

Comparative study of three predominant gut Bacillus strains and a commercial *B. amyloliquefaciens* as probiotics on the performance of *Clarias gariepinus*.

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Abstract

The present study was conducted to evaluate the supplementation of three autochthonous *Bacillus* strains (*B. subtilis*, *B. amyloliquefaciens* and *B. cereus*) and a commercial *B. amyloliquefaciens*in doses of $1X10^{10}$CFU/ kg on the growth performance, hematology, antioxidant activities, digestive enzyme levels, immune status and disease resistance of *Clarias gariepinus*. A total of 300 fish (75.23±1.6 g) were randomly divided into 5 groups (each group was subdivided into 2 subgroups, 30 fish/each). The control group was fed basal diet (D_0).Diets D_1, D_2, $D_3$and D_4were supplemented with *B. subtilis*, *B. amyloliquefaciens*, *B. cereus* and a commercial *B. amyloliquefaciens*, respectively. During the course of the experiment, D_3 showed the best body weight, weight gain, specific growth rate and food conversion ratio. The measured hemogram blood parameters had the highest significant increase in D_3. WBCs and monocyte counts had no significant differences among the experimental groups. The serum antioxidant and digestive enzymes were the highest in D_3 and were the lowest in D_0. After 15 d, the non-specific immune parameters were markedly increased in fish fed probiotic-containing diet compared with the control. After 30 d, the highest significant immune parameters were observed in D_3; D_1 and D_2 had no significant differences in serum lysozyme activity, nitric oxide and IgM compared with D_0.Myostatin cDNA levels were adversely affected by probiotic supplements compare with the control. The PACAP expression showed the highest significant value in D_3 followed by $D_1$and D_4then D_2. The relative survival percentages of the *Aeromonas sobria* challenged *C. gariepinus* were the highest in D_3, D_2, D_4 and then D_1. Among the three isolated *Bacillus* species, dietary supplementation with the *B.*