

SUMMARY

The use of probiotics seems to be a better alternative for antibiotics and other traditional disease management strategies. The present study looks into the possible immunostimulatory effects of the microbial probiotic *Lactobacillus sporogenes* when administered as water additive or feed supplement or in a novel way i.e. immobilized cells in three different concentrations viz 2.5×10^4 (T1), 5×10^4 (T2) and 1×10^5 (T3) cells/ml in *Oreochromis mossambicus*. Probiotic cells were immobilized in sodium alginate gel beads. Bacterial agglutination assay was used for estimating the specific anti *Aeromonas hydrophila* antibodies and NBT assay for enumerating the number of activated neutrophils. Rowley's method was followed for counting the total and differential count of peripheral blood leukocytes and host resistance test was applied for assessing the potential of the probiotic in disease protection. The ability of the probiotic to colonize the gut of the host and its survival in tank water was studied for two months. The probiotic was also tested for its

efficacy in enhancing growth of tilapia fingerlings. Mathematical models were worked out to delineate the relation between number of lactobacilli administered and to that colonized in the gut, number of lactobacilli colonized in the gut with antibody response, disease resistance, survival in tank water, growth, food consumed, and the conversion rate. The major findings of the present investigation are:

1. In general *Lactobacillus sporogenes* is highly effective in stimulating the immune response, growth, survival, and disease resistance.
2. In the immune responses like antibody response, neutrophil activity, white blood cell count, disease resistance, intestinal colonization and survival in tank water a dose dependent response was observed with T3 stimulating the maximum response and T1 the minimum when compared with the control.
3. Among the different methods of administration water additive seems to be the most effective method as it uses the vegetative cells in the log phase of growth.
4. However immobilized route is recommended based on the present investigations and environmental ecosafety issues.
5. In growth and food utilization studies T2 concentration seems to be the optimal one as it enhances the growth and food utilization parameters maximally. T3 even though contains more number of cells did not offer maximum effect.

6. Mathematical models derived with the soft ware Curve fit, suggested that the relation of immune parameters, growth or food utilization parameters with that of number of lactobacilli administered or that colonized in gut or tank water fit only in either polynomial fit or MMF model.