IMPACT OF EFFECTIVE MICROORGANISMS (EM) ON PRIMARY AND SECONDARY PRODUCTION IN PONDS

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In the classic pond production system, pond eco-system and the success of the production are based on the primary (phytoplankton) and secondary (zooplankton) producers. In the first case, phytoplankton organisms are responsible for the oxygen balance, in the second case, they serve as food for secondary producers. Zooplankton organisms are natural food for fishes and have an important role in the quality of fish meat. In many cases, we have to control phytoplankton organisms because if they grow in a significant amount, they could upset the oxygen balance of the pond and prevent the development of zooplankton.

Effective Microorganisms (EM) play a role in the detection of allochtonous and autochtonous organic materials, thereby decreasing the amount of sludge in the pond. EM produce simpler compounds and organic particles from organic ones via fermentation. These materials are totally used by zooplanktons. In particular, rotting processes take place in sludge in anaerobic circumstances, though the phyto- and zooplankton organisms have access to food and food particles. In the EM microbe mixture anaerobic and aerobic microorganisms are equally found, so the rotting processes reach the way of fermentation without adverse effects. During the operation of EM, the presence of useful materials was recognized (antioxidants, vitamins), which improve the efficiency of the production system.

In our experiments, the effects of EM technology were investigated on the level of primary and secondary producers. In the case of phytoplankton organisms, the concentrations of cyanobacteria, green mosses and diatoms and chlorophyll concentration of the water were examined weekly. On the level of zooplankton organisms, the amount of biomass of wet zooplankton were assessed in 100 litres of water weekly, as well, more over, the concentrations of *Rotatoria* and *Cladocera* and *Copepoda* and the levels of their development were investigated too. In addition, the representative results of tests were achieved from the average of the samples of three locations at every sampling time.

In terms of results, the longterm experiment series were successful for pond eco-system in the two angling waters (treated and control) of the pond system. During the operation of EM technology, we could not determine the species belonging to *Cyanobacteria* (at some sampling time *Microcystis* were found in the concentration of <2.0 µg/l) and the rate of green mosses and diatoms were lower than the control pond. The concentration of *chlorophyll-a* was under the adequate limit (80 µg/l), which means that the oxygen saturation (average 154%) was relevant. The biomass of zooplanktons was much higher than the control pond with the application of EM technology: in the case of treated pond wet biomass was measured as an average amount of 10.1 ml/100 l, then in the case of control pond, it was 1.8 ml/100 l.

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