Effect of Poultry Excreta on Water Quality and Daphnia Magna Production in Chlorella Powder Medium

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Abstract

Daphnia magna Straus, 1820, plays a significant role in food supply for fish farming; thus, it is important to formulate a medium that can increase the *D. magna* population. This can be achieved by supplying a direct nutrient for *D. magna* while supporting the growth of the phytoplankton and zooplankton population. However, at certain levels, the nutrient source addition adversely affects the culture medium. This study aims to investigate the effects of different concentrations of poultry excreta included in a culture medium enriched with chlorella powder on the biomass production of *D. magna*. An experiment was conducted by adding poultry excreta at four concentrations (0, 2, 4, and 6 $g \cdot L^{-1}$) to the chlorella powder culture medium. The culture was maintained for 15 days, and samples were collected on days 0, 5, 10, and 15 to analyze the *D. magna* population, water pH, and concentrations of ammonia, nitrate, and dissolved oxygen (DO). Furthermore, a statistical evaluation was conducted using one-way analysis of variance in a completely randomized research design. The results showed that an increase in the poultry excreta concentration reduced the water quality ($P < 0.01$), as indicated by the water pH and ammonia, nitrate, and DO concentrations. In addition, a longer duration of the experiment substantially improved the qualitative parameters evaluated. Similarly, the population of *D. magna* was significantly affected ($P < 0.01$) by both factors. In conclusion, the addition of poultry excreta decreased the water quality of the chlorella powder medium. The water quality improved on prolonged days; thus, the highest population of *D. magna* was achieved on day 15 using 2 $g \cdot L^{-1}$ of poultry excreta.

Keywords: *Daphnia Magna*, Daphnia production, Chlorella powder medium, poultry excreta, water quality.