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Potential of *Chlorella* sp. cultivated in dairy effluent as a complementary liquid organic fertilizer on growth and yield of finger millet (*Eleusine coracana* L.)

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Abstract

The over-use of synthetic chemical fertilizer has an adverse effect on the environment. To overcome this issue, usage of alternate sources of nutrients is essential. *Chlorella* sp.(C) is a green microalga which has been identified as a potential bio-fertilizer. The present study was intended for identifying the potential of *Chlorella* sp. grown in dairy effluent as a complementary liquid organic fertilizer (CLOF) on growth and yield of finger millet (*Eleusine coracana* L.). Nutrient content of CLOF namely nitrogen (Kjeldhal method), phosphorous (Spectrophotometer method), and potassium (Flame photometer method) was analyzed. A greenhouse pot experiment was conducted to study about the effect of CLOF as foliar spray in combination with organic or inorganic sources on the growth and yield of finger millet (*Eleusine coracana* L.). The treatments were T1 – control, T2- 100% inorganic fertilizer (IF), T3 – 75% IF + 25% CLOF, T4 – 50% IF + 50% CLOF, T5 – 25% IF + 75% CLOF, T6 – 100% Vermicompost (VC), T7 – 75% VC + 50% CLOF, T8 – 50% VC + 50% CLOF, T9 – 25% VC + 75% CLOF, arranged in CRD design with four replicates. The CLOF was diluted (1/5 times) and a total of 150 ml, 100 ml and 50 ml per plant was applied to treatments 75%, 50% and 25% CLOF respectively. For each treatment with CLOF, the required amount of nitrogen was applied by changing the volume of spray in eight split doses. Data analysis was done by using the SAS statistical analytical system with Duncan's multiple range test at p=0.05 significant level. The nutrient content of CLOF was 1% nitrogen, 0.58% phosphorous and 0.67% potassium. In the greenhouse experiment, the results of plant height, leaf number, effective tiller number, ear number, weight of the yield and nutrient content of plant tissue (total nitrogen, total phosphorous and total potassium) revealed that, the T4 (50% IF+ 50% CLOF) treatment gave the equal or higher values as that of T2 (100% IF). In addition, T8 (50% VC + 50% CLOF) and T3 (75% IF+ 25% CLOF) showed comparable values in most growth parameters and yield as that of T2. T1 (control) showed the significantly lowest results in all parameters. This study, therefore, highlights the potential of using *Chlorella* sp. cultivated in dairy wastewater as a nutrient source for crop production as a complementary liquid organic fertilizer.

Keywords: Liquid Organic Fertilizer, *Chlorella* sp., Dairy Industry Wastewater, Finger millet, Complementary Fertilizer

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