

**FORMULATION OF A LIQUID ORGANIC FERTILIZER FROM
Chlorella sp. GROWN IN DAIRY EFFLUENT**

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Abstract

The necessity for natural or biological fertilizers instead of synthetic fertilizers arises from the growing demand for food and awareness of environmental pollution due to inorganic fertilizers. In order to increase crop productivity and create healthy plants, microalgae have emerged as a potential source of bio stimulants and biofertilizers in agriculture. *Chlorella* sp. has been identified as a potential bio-fertilizer. This study investigated the formulation of a liquid organic fertilizer (LOF) by using *Chlorella* sp. grown in dairy industry wastewater according to the Sri Lanka Standards Institution (SLSI) standards for LOF. The *Chlorella* sp. was cultivated in dairy waste water in a raceway reactor for 14 days continuously with constant light intensity and constant mixing to optimize the algal growth. The nutrient content of dry biomass of *Chlorella* sp. grown in dairy industry effluent was 5% nitrogen, 2.33% phosphorous and 2.68% potassium. The nutrient content of formulated *Chlorella* liquid organic fertilizer was 1% nitrogen (N), 0.58% phosphorous (P) and 0.67% potassium (K). pH and EC were 7.4 and 9.8 ds/m respectively. The trace metal content in the formulated LOF was 0.0047 ppm chromium (Cr) and 0.0023 ppm arsenic (As). Cadmium (Cd) and lead (Pb) were not detected. According to SLSI standards, the LOF should contain 6.0 – 8.5 pH, 20.0 ds/m EC (maximum), 1% total nitrogen, 0.5% total phosphorous, 0.5% total potassium in minimum, and 0.5 ppm chromium. Also, heavy metal concentration of LOF should be 0.5 ppm arsenic, 0.5 ppm cadmium and 1.0 ppm lead in maximum concentration. The formulated LOF using *Chlorella* sp. grown in dairy wastewater fulfilled the chemical requirements and trace metal requirements of SLSI recommendations. This study highlights the feasibility of formulating a liquid organic fertilizer using *Chlorella* sp. cultivated in dairy wastewater, aligning with the requirements outlined by SLSI standards.

Keywords: Biofertilizer, *Chlorella* sp., Dairy industry, Liquid organic fertilizer, Sri Lanka Standards Institution, Wastewater

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