

# Utilization of Macrophyte Ponds for Processing Liquid Waste from the Soybean Industry

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## ABSTRACT

Macrophyte pond is a WWTP system that is suitable for small cities and developing countries because it is energy efficient, cost effective and easy to operate. The plant used is duckweed (*lemna minor*). The aim of this research is to find out whether the *lemna minor* plant can break down pollutants in soybean liquid waste, how effective it is and how to plan a macrophyte pond design on an original scale.

The research was carried out by flowing liquid waste from the artificial soybean industry into a reactor containing minor *lemna* plants. The data collection method was carried out in the laboratory by testing Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), Dissolved oxygen (DO), total N, total P, pH and turbidity. Meanwhile, waste water discharge data was taken from the tofu industry in Margoagung, Seyegan, Sleman, Special Region of Yogyakarta. The data obtained is analyzed and calculated in order to obtain the most effective macrophyte pond design.

The research results show that the macrophyte pond system can neutralize pH values, reducing COD by 98.29% (HRT 11), BOD by 99.79% (HRT 9), total P by 97.06% (HRT 36), turbidity by 93.21 % on day 58 (HRT 7), and increased DO by 820% on day 51 (HRT 8). Meanwhile, there was no visible decrease in the total parameter value of N. HRT 7 was chosen as the basis for planning the original scale macrophyte pond by considering the effectiveness of the reactor and land. The planned macrophyte pond dimensions have three ponds with varying wet dimensions for each reactor of 12.25 m × 6.95 m × 1.25m; 15.6m × 8.5m × 0.8m; 18.6 × 11.5 m × 1.25 m; and 23.45 m × 14.25 m × 0.8 m.

Kata Kunci: *soybean industry wastewater, anaerobic treatment, macrophyte pond*