ABSTRACT

Until now urea wastewater at several urea plants has not been specifically treated, The treatment of urea wastewater is only stored in large ponds and then discharged to a body waters. If the waste is not treated properly, it will cause environmental pollution. One alternative ways to overcome the wastewater pollution problem of the urea plant is using microalgae of Chlamydomonas to decompose urea compounds contained in wastewater. Some of the advantages of urea wastewater treatment using microalgae of Chlamydomonas includes: breeding quickly, have a high tolerance to environmental factors, nitrogen content in wastewater of urea can be used as a nutrient, does not produce toxic compounds, produce oxygen required by other organisms and, produce biomass which could be used as a source of organic carbon.

This study used 75 L bioreactor to examined several things: (1) the influence of retention time, the N/P ratio, CO_2 flow rate, density of microalgae, air flow rate and the addition of dolomite to the biomass growth rate of Chlamydomonas microalgae; (2) determine the optimum conditions of the growth rate on biomass of Chlamydomonas microalgae using Response Surface Methods (RSM) and (3) determine the correlation of the growth of biomass of Chlamydomonas microalgae with the nitrogen concentration in urea wastewater treatment.

The results indicated that variables which affect have dominant to the biomass growth rate was of Chlamydomonas microalgae retention time, the N/P ratio, and the CO_2 flow rate. Optimum conditions obtained at the retention time = 45 hours, the N/P ratio = 17 and the CO_2 flow rate = 116 ml/min with microalgae growth rate by 0.6676 million cells /day. From the results of the study also can be noted that the microalgae maximum growth was 10.25 million cells/ml and the concentration of nitrogen was 45.74 ppm after the wastewater treatment process lasts for 48 hours.

Keywords: Urea liquid waste, Chlamydomonas, Response Surface Methods.