**Effect of Light Exposure Duration and Depth of High Rate Algal Reactor (HRAR) in Urban Wastewater Nitrogen and Phosphate Removal**

**Student Name**: Sekar Ayu Ardhanareswari  
**NRP**: 3307 100 056  
**Department**: Teknik Lingkungan FTSP-ITS  
**Supervisor**: Welly Herumurti, S.T., M.Sc.

**Abstract**

Study on wastewater treatment in Boezem Kalidami Surabaya has not been done yet. The aim of this study is to determine removal efficiency of nitrogen and phosphate in Boezem Kalidami wastewater using High Rate Algal Pond (HRAP) treatment system, and also determine an effect of light exposure duration and depth on its performance.

During this study, High Rate Algal Reactors (HRAR) were conducted by using 25 cm, 40 cm and 60 cm reactors depth in reactor dimension of 60 cm and 30 cm for length and width, respectively. All reactors were operated in both 12 hour and 24 hour light exposure durations. The samples were taken for every two days which operated in 4 days, 6 days and 8 days contact times. Nutrient concentrations were analyzed in form of ammonia, nitrate and orthophosphate.

Based on the experiment results, the positive effect of 24 hour light exposure duration was shown only on the reactor with 60cm depth, for the rest, the better results were obtained in 12 hour natural light exposure reactors. An optimum performances were achieved by reactor with 25 cm depth and 12 hour light exposure duration. It was achieved not only for dissolved oxygen and chlorophyll a concentrations, but also for its nutrient removal. Ammonia removal was 94,5%, nitrate removal was 68,8%, and orthophosphate removal was 66,7%.

**Keywords**: HRAP, light exposure, nitrogen, phosphate, reactor depth