STUDY THE REMOVAL RATE OF NH_4-N POLLUTION IN MUNICIPAL WASTEWATER BY ALGAE DUCKWEED LAB-SCALE TREATMENTS

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Summary

The effectiveness of nitrogen treatment in urban domestic wastewater by algae and duckweed has been demonstrated through 3 laboratoty treatment units: 1 treatment unit contains blue algae (*Chlorella vulgaris*), 1 treatment unit with Lemna (*Lemnaceae, Spirodela, Lemna subfamily*), and a reference unit. The treatment units are designed the same dimension with a capacity of 135l, the retention time HRTs 10 days, the treatment units do not have a re-aeration system and no CO_2 added, an artificial lighting system with 8000 Lux level supports the photosynthesis and development of algae and duckweed was provided, the experiment period is 200 days. Removal of ammonia from wastewater by using algal and duckweed of three laboratory treatment series with continuing upward and downward flow were examined. Although the high loading rate of raw wastewater into treatment series, a high ammonium removal rate up to 69% is obtained with ammonia loading of 7.0 g/(m^3.d) and average concentration of 62 mgNH_4^+-N/l in the influent. The investigations further revealed that 85%-90% of COD and BOD_5 removal efficiencies were achieved after 200 days testing with HRTs of 10 to 11 days; nitrate concentration was increased up to 5 mgNO_3^--N/l, it proofs that both nitrification and denitrification processes occurred in treatment series.

Keywords: *Algal, duckweed, nitrogen removal, nitrification, denitrification*.