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A study of culture conditions, growth rate and manganese absorption potential of the aquatic weed *Lemna major* under laboratory conditions

Lemna major is a free- floating aquatic monocot that commonly occurs in both fresh water and brackish water stagnating ponds and sluggish streams in tropical countries. It can grow into dense aggregations in nutrient rich water bodies.

Aquatic plants possess tremendous potential to bio-concentrate metals relative to their environment. This study undertaken to study the culture conditions and optimal growth rates of Lemna under laboratory conditions and also to investigate its absorption potential of manganese.

A known number of mature plants were placed in a concentration series of Hoaglands solution ranging from 20% to 100% in 200 mL. Glass vessels under artificial light with 12 hours of intermittent light and dark periods. After every 24 hours the numbers of fronds or entire plants were counted. For the study of manganese concentrations ranging from 0 to 4 mg/L. Plants were harvested at 48, 72, 96, 120, 144, and 168 hours and analysed using atomic absorption Spectrometer.

30% Hoaglands solution provided the medium for shortest doubling time and eventually the optimal growth. The doubling time of Lemna ranged from 4-6 days. Uptake of manganese depended on the concentration of the ion in the medium and duration of exposure. The maximum accumulation occurred at 120-h exposure at 4mg concentration per mL beyond which plants showed signs of toxicity. The rat of accumulation was 2.2 mg manganese ion per g fresh weight of *Lemna.* With the increase of manganese accumulation in *Lemna* there was decrease of manganese concentration in the medium relative to the absorption indicating manganese accumulation in the plant.

If wastewater is not heavily loaded with metal ions, *Lemna* mat can be used in wastewater pond systems for removal of manganese ions as *Lemna* has both high rate of growth and high absorption potential.