

OP-09

## Periphyton growth and phosphorus uptake in artificial channels with different water velocity and substrates

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This study was conducted to evaluate the effect of velocity, mesh size and inflow SRP concentration on biomass and SRP uptake ability of filamentous periphyton algae (FPA). The experiment carried out in the artificial channel with nutrient-rich treated wastewater coupled with the laboratory cultivation under the difference phosphorus concentration. During the artificial channel experiment, *Spirogyra* and *Oedogonium* were the dominant species, and *Rhizoclonium* used in the laboratory cultivation. Biomass development and growth rate of FPA was higher during spring season compare to other seasons ( $P < 0.05$ ). Biomass development and growth rate of FPA were highest at water velocity about 10 cm/s (71.0~253 chl.a mg/m<sup>2</sup>/day) and at the net with 20 mm mesh size. When P concentration in inflow was over 0.2 mg/ℓ, there was no effects of it on FPA growth. Biomass development of FAP showed the more close relationship with Total N concentration (or TN/TP ratios) in inflow than P concentration in inflow ( $r > 0.96$ ,  $r = 8$ ,  $P < 0.05$ ). P uptake rate/biomass rate (hr<sup>-1</sup>) showed inverse trend with biomass of FPA (mg chl.a/m<sup>2</sup>). The highest P uptake rate of FPA was observed during the exponential stage when their growth rate was low (in winter), and during log growth when their growth rate was high (in spring). Up to 50 μg/ℓ of the inflow P concentration, P uptake rate/biomass rate (hr<sup>-1</sup>) of FPA showed correlative increase. However, when the P concentration reaches above it, P uptake rate/biomass rate (hr<sup>-1</sup>) was more strongly effected by theoretical growth pattern of FPA than P concentration of inflow. This study was supported by Ministry of Agriculture and Forestry (ARPC Grant NO. 20000375).

**Key words** : Filamentous periphyton algae (FPA), P uptake rate/biomass rate