



Paddy periphyton: an important regulator in phosphorus migration between the soil and water interface in coastal reclaimed land

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Periphyton plays an important role in nutrient cycling of wetland ecosystems, however, the significance of periphyton that growing in paddy ecosystem (paddy periphyton), especially on soil surface of mudflat reclamation, on phosphorus and salt migration in coastal reclaimed paddy field is still unclear. In the present paper, a paddy field was simulated in a greenhouse to investigate how periphyton influences P migration in paddy ecosystem. Results showed that periphyton colonizing on paddy field significantly reduced the salt content in the topsoil (0-10 cm) from about 6.0 to 2.5 ms cm⁻¹. Also, the presence of periphyton greatly reduced P content in paddy floodwater but increased P bioavailability of paddy soil. Furthermore, comparing with the control, the maximal P sorption capacity (qm) and equilibrium P concentration at zero sorption (EPC0) of the paddy soil based on Langmuir model were enhanced under periphyton treatments. The paddy periphyton captured P up to 1.4 mg g⁻¹ with Ca-P as the dominant P fraction and can be a potential crop fertilizer. This study not only provides valuable insights into the understanding of phosphorus cycling with periphyton or similar aggregates, but for technical support for P regulation in paddy field.