



## **The preparation of modified chitosan beads and their efficiency in heavy-metal ion removal**

Nopsuda Phonphai and Nopparat Plucktaveesak\*

*Green Polymer Research Laboratory, Department of Chemistry, Faculty of Science and Technology, Thammasat University, Rangsit Center, Phatum Thani, Thailand*

\*e-mail: nopparat@tu.ac.th

In this study, the modified chitosan beads were successfully prepared. The stability of these beads was enhanced by crosslinking with various concentrations of glutaraldehyde solutions. The chitosan used in this study was modified with various organic acids to alter the functional groups and so to change its ability to react with heavy-metal ions. To prepared modified chitosan beads, a solvent-free microwave-assisted synthesis was employed. Various parameters had been studied including concentrations of chitosan solutions, types of organic acids used in the modification steps, concentrations of crosslinking agent used, and duration of crosslinking process. The obtained beads were then used as a bio-adsorbent for the removal of some toxic heavy-metal ions. The results had shown that this simply prepared chitosan beads could be used effectively as a low-cost and environmental friendly bio-adsorbent. The results has also been compared with those of unmodified chitosan beads. It was found that adipic acid-modified chitosan beads enhanced the ability of this bio-adsorbent. Although, upon crosslinking, its ability to absorb metal ions was reduced, the beads could be easily recovered and reused. The latter property enhances this novel bead a high potential as bio-adsorbent in the wastewater treatment, especially to remove toxic-heavy-metal ions contaminated in the water.

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