

## Immobilization of Phosphorus and Heavy Metals in Swine Manure Using Activated Red Mud

Xianjia Peng<sup>1\*</sup>, Li Shi<sup>1</sup>, Chuan Liang<sup>1</sup>, Ming Zhang<sup>2</sup>

<sup>1</sup>Chinese Academy of Sciences, <sup>2</sup>AIST

Swine manure contains large amounts of water-soluble pollutants such as phosphorus and heavy metals. When it is applied to land, these pollutants may pose a serious threat to soil and groundwater quality through runoff. In this study, an immobilization material was prepared from red mud (RM) and used to immobilize the pollutants in swine manure. It was found that phosphorus and heavy metals were effectively immobilized by the prepared immobilization material and the efficiency increased with the increase in activation temperature and the RM dosage. Leaching experiments showed that the immobilization efficiency of phosphorus, copper, zinc, and arsenic reached 84%, 65%, 47%, and 89% respectively as the swine manure was amended with 10% RM. Sequential extraction experiments suggested that the mechanism for immobilization reaction was mainly co-precipitation that transformed labile phosphorus and heavy metals into stable forms.

Keywords: Phosphorus, Heavy Metals, Immobilization, Swine Manure, Activated Red Mud