# PARTICLE SIZE EXPERIMENTS ON THE ADSORPTION OF PB(II) FROM POLLUTED WATER BY RICE STRAW

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**Abstract: Particle Size Experiments on the Adsorption of Pb (II) from Polluted Water by Rice Straw.** As rice straw is abundantly available in Indonesia and other tropical developing countries as an agricultural waste. This material may be used as a simple and environmentally friendly alternative to remove heavy metals from contaminated water sources for human use. In this paper the effect of particle size of rice straw in adsorbing Pb (II) is studied. The Pb (II) adsorbed by straw is build up in the increasing of Pb concentration in the solution and it reached an optimum at a certain point, which showed that there is a limit in the active sites. At lower initial concentrations of Pb (II) solutions particle size of straw cause much variation in the adsorption of Pb, while surprisingly at increasing initial concentration, bigger particle shows higher adsorption capacity. This study showed that the adsorptive power of rice straw for Pb is independent of particle size.

**Key words:** Water pollution, rice straw, Pb (II) elimination, particle size.

**Abstrak: Pengaruh Ukuran Partikel Pada Penjerapan Pb (II) dari Air yang Tercemar Menggunakan Jerami Padi.** Jerami padi terdapat dalam jumlah besar sebagai limbah pertanian di Indonesia dan negara tropis lain, maka jerami padi dapat digunakan sebagai pilihan yang sederhana dan ramah lingkungan untuk menghilangkan logam berat dari sumber air yang tercemar. Pada penelitian ini, diteliti efek dari ukuran partikel jerami padi dalam menjerap Pb(II). Pb(II) yang dijerap oleh jerami padi meningkat dengan bertambahnya konsentrasi Pb dalam larutan, dan mencapai maksimum pada titik tertentu, yang menunjukkan bahwa ada keterbatasan pada titik aktif (*active sites*). Pada konsentrasi awal Pb (II) yang lebih rendah, terjadi variasi pada penjerapan Pb (II) sehubungan dengan ukuran partikel yang berbeda-beda, sedangkan yang menarik adalah dengan meningkatnya konsentrasi awal dari Pb(II), ukuran partikel yang lebih besar menunjukkan kapasitas penjerapan yang lebih tinggi. Penelitian ini menunjukkan bahwa kekuatan penjerapan dari jerami padi terhadap Pb tidak tergantung pada ukuran partikel.

**Kata kunci:** Pencemaran air, jerami padi, penjerapan Pb(II), ukuran partikel

## INTRODUCTION

Heavy metals contamination of ground and surface water is of growing concern in many parts of the world, particularly in developing countries in which large populations have to use these sources for drinking and cooking water. Many studies have been conducted to eliminate heavy metals from water resources, such as flocculation, filtration using activated charcoal, ion exchange, precipitation by chemicals, etc. However, because of the high cost of these methods, the development of a more cost-effective and environmentally friendly remediation system is necessary (Larsen & Schierup, 1981, Gardea Torresdey *et al.*, 1998; Kohar *et al.*, 2004).