Sorption dominance of biowaste *Camelia sinensis* and *Gallus domesticus* to activated carbon, alumina, and silica

Aliya Fazal\textsuperscript{a,*}, Uzaira Rafique\textsuperscript{b}

\textsuperscript{a}Nano Sciences and Catalysis, National Centre for Physics, Quaid-e-Azam University Campus, Islamabad 44000, Pakistan, Tel. +92 3235074767; email: aliyafazal38@yahoo.com

\textsuperscript{b}Department of Environmental Sciences, Fatima Jinnah Women University, The Mall, Rawalpindi 46000, Pakistan, Tel. +92 519270050 137; email: uzairaiqbal@yahoo.com

Received 2 December 2013; Accepted 13 April 2015

**ABSTRACT**

Toxicity of heavy metals to higher life forms is ascribed to mobility and accumulation in water reservoir. Adsorption offers a promising alternative to treat wastewater. This article proposes green and economically viable options for the replacement of expensive commercial adsorbent. The spent *Camelia sinensis* (black tea) and *Gallus domesticus* (hen egg shell) powder under identical experimental conditions possesses better sorbing potential for cadmium (Cd) and lead (Pb). The adsorbents can be conveniently regenerated with HCl solution. The proposed adsorbents were found successful in situ remediation of textile, pharmaceutical, and leather industry effluents. Cost benefit and batch sorption analysis strongly recommends the present experimental endeavor for commercial scale up.

**Keywords:** Biowaste; *Camelia sinensis*; *Gallus domesticus*; Wastewater