

## **SYNTHESIS OF MAGNETIZED PECTIN HYBRID PARTICLES FROM ORANGE PEEL BIOMASS FOR PESTICIDE ADSORPTION STUDIES**

**R.K.S.N. Rathnayaka<sup>1\*</sup> and M.A.C.M. Haniffa<sup>1</sup>**

<sup>1</sup>*Department of Chemistry, Faculty of Applied Sciences, South Eastern University of Sri Lanka.*

<sup>\*</sup>*subodanr@gmail.com*

Disposal of pesticides into the water can cause a huge environmental issue for a few decades. It can also affect human health with negative consequences. Therefore, in the novel studies, scientists mainly focus on the most effective way to eliminate pesticides from contaminated water. Magnetic separation is a novel method of separation and purification. The reason for the popularity of magnetic separation is because they are biocompatible, easily separable, low cost, high performance, and renewability. Magnetization of bio-waste material is an environmentally friendly and cost-effective method in water remediation. Orange peel Biomass (OPB) contains a higher amount of pectin than other natural sources. It is easily available as well as can be used to create magnetic particles easily with Fe<sub>3</sub>O<sub>4</sub> due to the presence of -OH and COO- groups. Fe<sub>3</sub>O<sub>4</sub>@Pec-OPB can partially remove the sofit pretilachlor and profenophos pesticides from the water around the paddy fields. The concentration gradient of both pesticides after 24 h is  $70 \pm 2$  ppm (35%). The adsorption isotherm model of the pesticides fits with Langmuir isotherm. Monolayer adsorption capacity ( $q_m$ ) of sofit pretilachlor and profenophos are  $201.26 \pm 68.06$  mg g<sup>-1</sup> and  $170.93 \pm 44.72$  mg g<sup>-1</sup> respectively. The adsorption kinetics of both pesticides on Fe<sub>3</sub>O<sub>4</sub>@Pec-OPB followed the pseudo-second-order kinetic model and chemisorption mechanism. Based on the results show that using synthesized bio adsorbent represents the adsorption process that occurs via the chemisorption mechanism and it helps to partially remove sofit pretilachlor and profenophos from agricultural wastewater.

**Keywords:** *Magnetic separation, Magnetization of pectin, Orange peel biomass, Sofit pretilachlor, Profenophos*