



Phosphate-clay mixture as adsorbent and slow released formulation for carbofuran

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Improvement of agricultural production relies on the use of phosphates as soil amendment. The presence of phosphates in soil could interact with other components of the soil and lead to various interactions with intrants such as pesticides and other fertilizers. Such interactions could play positive role as adsorbents and subsequently as controlled released formulations for pollutants in general and pesticide particularly.

In this work, we have aimed to study interactions of different combinations (in %) of clay bentonite (B) and natural phosphate (NP). Tested ratios of B/NP were 25/75, 50/50 and 75/25. The degree of retention was evaluated in batch equilibrium system using 20 ppm aqueous solutions of carbofuran (CF) and B/NP at different ratios.

Results showed that the maximum adsorption of CF was achieved within 8 hours after starting the experiment. Best result was obtained with the ratio of B/NP (50/50) resulting 30% of carbofuran adsorbed.

Desorption study showed that CF was readily released from this material at smaller amounts not exceeding 17% of the retained pesticide. This could be considered as a positive achievement in terms of released formulation.

Actually, carbofuran has high solubility in water and is subject to potential movement in the soil. This could lead to contamination of groundwater. Its slow release would make it available to the target in the soil and prevent its movement downward and far from the point of application.

Adaptation of adsorption and desorption data to Freundlich and Langmuir model showed that the best fit was obtained with Frrendlich model.