FATE OF CARBOFURAN IN SELECTED SOILS OF SRI LANKA

R C Watawala[1], J A Liyanage[1], A P Mallawatantri[1], & S S Liyanage[2]
[1]Department of Chemistry, University of Kelaniya,
[2]Department of Chemistry, University of Sri Jayewardenepura

Carbofuran (2,3 dihydro 2,2 dimethyl 7 benzofuranyl methyl carbamate) is the most popular pesticide used in Sri Lanka. The fate, degradation and dissipation, of carbofuran was determined in four soil groups in Sri Lanka in order to study the persistence of pesticide in soils after application.

Red yellow podzolic soils (Nuwara Eliya), Alluvials (Pugoda) and Regosols (Kalpitiya and Negombo) types were selected for the experiment.

For the degradation analysis, 10 g of each soil was incubated under 70% of maximum water holding capacity and 28 ^{0} C of temperature at 13 hours light and 11 hours dark conditions. 0.05 □Ci of ^{14}C ring labelled carbofuran (98% of chemical purity) was added to each soil sample and incubated in the above conditions. Liberated CO_2 collected to an alkaline solution was analyzed by using Liquid Scintillation Counter after 0, 1, 3, 5, 7, 14, 28, 56, 90 days.

For adsorption studies, 5 g of soil mixed with 1ppm pesticide solution was shaken for 16 hours in the room temperature. The supernant collected after centrifuging was analysed using High Performance Liquid Chromatograph having 18C Apollo column.

Carbofuran mineralization percentage was below 7.5% in all soils after 10 days but a significant different showed in Kalpitiya regosols, which had a rapid mineralization rate than other three soils. After 20 days mineralization in Kalpitiya was 12.5% and in Pugoda it was 7.5%. After 90 days Kalpitiya regosols showed over 60% of mineralization and in other three soils it was below 50%. During 90 days incubation period only 10% mineralization was showed in Nuwara Eliya red yellow podzolic soils.

In the adsorption study K_d value obtained were 1.64 for Nuwara Eliya, 0.63 for Kalpitiya, 0.2 for Pugoda and 0.11 for Negombo. Hence Nuwara Eliya has the highest adsorption rate and Negombo exhibited the lowest.

Nuwara Eliya has the highest organic matter among the selected soils and pesticide sorption can be expected to be the highest to Nuwara Eliya soils.

The microbial degradation is expected to be high in soils having high organic matter but the degradation rate was highest in sandy soils in Kalpitiya. Hence it can be seen that chemical and other degradation is higher than microbial degradation of pesticides in soils in Sri Lankan conditions.