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DEGRADATION OF CARBOFURAN IN A SANDY REGOSOL AND RESIDUE LEVELS IN SELECTIVE CROPS

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The indiscriminate use of pesticides in agriculture has resulted in detrimental effects on soil quality and human health. Carbofuran is one of the most toxic and widely used pesticides in Sri Lanka. This study was conducted to assess the degradation of carbofuran in a sandy regosol and carbofuran residue in selective food crops grown in carbofuran contaminated soil and available in the market.

Soil was collected from a field exposed repeatedly to carbofuran in Batticaloa. An incubation experiment was conducted by contaminating soils with carbofuran at four different rates; 10 mg/kg as recommended by the Department of Agriculture (DOA), 20 (DOA×2), 50 (DOA×5) and 300 (DOA×30) and replicated thrice. Contaminated soils were incubated *in vitro* and sub samples were taken on 3rd, 7th, 14th, 21st and 28th days after contamination. They were extracted with chloroform and carbofuran was analysed using a colourimetric method. For the pot experiment, brinjal, onion and chilli were grown in some soils contaminated with carbofuran at 20 kg/ha (DOA recommendation) and 40 kg/ha as farmers practice (FP). Plants were uprooted at 8 and 11 weeks after planting (WAP). Samples of vegetables were also collected from markets in Batticaloa and Kandy, a homegarden and an organic farm. They were assessed for carbofuran residue in the chloroform extractable fraction using colourimetric method. Mean separation was performed in Duncan New Multiple Range Test using SPSS software.

The chloroform extractable carbofuran was about 2-5% of the initial concentration in all treatments at the 28th day of contamination. Complete dissipation of carbofuran applied at 10 -300 mg/kg into the experimental soil did not take place over a period of 28 days. Carbofuran accumulation in experimental crops was proportionate to the rate of application. The highest carbofuran residue level was recorded for onion (13.2 mg/kg) in the FP treatment and in onion leaves (5.49 mg/kg) collected from the Kandy super market. The carbofuran residue levels of samples collected from the home garden and the organic farm was below the detectable quantity. Although carbofuran is not recommended for chilli, an extremely high residue level was observed in chilli (17.87 mg/kg) collected from the field in Batticaloa. Carbofuran residue levels of market samples varied from 0.3 to 5.5 mg/ kg fresh weight and all samples except one exceeded the maximum residue level recommended by European Union standards (0.2- 0.5 mg/kg).