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Phytoremediation of diazinon residues by *Schoenoplectus grossus* plant

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Diazinon is a common non-systematic organophosphorus insecticide used by present cultivators to protect crops like rice, fruit trees and potatoes. But, over exposure to diazinon mainly affects the inhibition of acetylcholinesterase of humans. Therefore, to remove these organic pollutants from soil several methods could be followed. Phytoremediation, soil flushing, thermal desorption, biopiles and land farming are some of the methods that can be carried out to decontaminate the polluted soil. In this study phytoremediation technique which is the use of plants for the cleanup pollutants was carried out since it is more cost effective and environment- friendly. This model study was conducted using the *Schoenoplectus grossus* plant. Twenty one pots with same amount of air dried medium loam soil (5.00 kg) were maintained. Plants *Schoenoplectus grossus* were planted in fourteen pots. There were three plants of *Schoenoplectus grossus* in each pot. New plants were grown naturally within two months causing the death of initially planted plants. The commercially available diazinon insecticide (624.35 g/L, 117.00 µL) was sprayed homogenously into seven pots with the plants. Other seven blank pots with plants which were filled with non-contaminated soil were maintained for obtaining data about background pesticide present in the plants. Seven pots without plants were maintained to calculate the loss of pesticide due to environmental factors like microbial degradation, evaporation, leaching and photolysis. After 2 hours, 1, 3, 5, 8, 10 and 12 days the diazinon residues remaining in soil (10.00 g), shoot (5.00 g) and root (5.00 g) samples were extracted using Soxhlet method and were quantified using high performance liquid chromatography in the presence of UV-DAD detector. Results showed that the concentration of diazinon residue at eight-day exposure reached 3.82 ± 0.01 mg/kg in roots and 4.17 ± 0.03 mg/kg in shoot. After eight days the concentration of diazinon residues in both root and shoot decreased. Results indicated a significant difference in the concentrations of diazinon residues in soil between the pots with *Schoenoplectus grossus* plant and the pots without the plant. The concentration of diazinon remained in pots with the plants (1.82 ± 0.01 mg/kg in eighth day) was less than the pots without the plant (1.38 ± 0.03 mg/kg in eight day). The plant *Schoenoplectus grossus* can tolerate 13.65 mg/kg of diazinon concentration and grows rapidly and produced high biomass. Therefore, the plant *Schoenoplectus grossus* can be recommended as a good candidate for the phytoremediation of diazinon residues.

Keywords: Phytoremediation, *Schoenoplectus grossus* (Thunhiriya Pan), Diazinon pesticide