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### Influence of propanil on soil nitrogen mineralization as affected by the rate of application

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Despite the beneficial impact on improving agricultural productivity, the potential dangers of soil contamination with toxic substances has stimulated researchers to investigate the detrimental effects of herbicides on soil microbial activity. Propanil, one of the commonly used post emergence herbicide, was selected in this study to determine the effect of its rate of application on nitrogen mineralization.

Soil used for the study belongs to the Red Yellow Podzolic great soil group (Rhodustult). The experiment consisted of three propanil treatments (i.e. 0.0224, 0.224 and 2.24  $\mu\text{g/g}$  soil) with a control. Determination of  $\text{NH}_4^+$  - N and  $\text{NO}_3^-$  - N were carried out at 1, 3, 5, 7, 14, 21 and 35 days after herbicide application. A Completely Randomized Design (CRD) with four replicates was used. Results revealed that the  $\text{NH}_4^+$  - N contents are not affected significantly ( $P \leq 0.05$ ) when propanil was applied at the rates of 0.0224 and 0.224  $\mu\text{g/g}$  soil. However, it was observed that the release of  $\text{NH}_4^+$  - N becomes significant ( $P \leq 0.05$ ) compared to the control when the application rate was increased up to 2.24  $\mu\text{g/g}$  soil. In the case of  $\text{NO}_3^-$  - N, no distinct pattern of treatment behavior could be observed except for 2.24  $\mu\text{g/g}$  soil, which differed significantly ( $P \leq 0.05$ ) from the control, whereas, in the control, 'most constant  $\text{NO}_3^-$  - N level could be seen throughout the incubation.

Propanil has influenced positively on ammonification at all the application rates, in spite of slight inhibition shown at the early stages. As far as nitrification is concerned, propanil showed no significant ( $P \leq 0.05$ ) difference of stimulatory or inhibitory effects. Therefore, it could be concluded that as nitrification was less affected by propanil even at higher rates, careful application of recommended rates of propanil on Red Yellow Podzolic soils would not be harmful on microbial processes involved in nitrogen mineralization.

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### Prediction of pesticide risk on ground water in the Kalpitiya peninsula using Pesticide Impact Ranking Index (PIRI)

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Systematic methods of the assessment of potential risk of pesticides to environmental components can serve as valuable tools in decision-making and policy formulation. Relative risk of pesticide on ground water was assessed using a software namely Pesticide Impact Rating Index (PIRI). It can be used to rank pesticides in terms of their relative pollution potential (PP) to ground water or surface water. When applied in Australia, PIRI has correctly estimated the PP of pesticides in greater than 80% of cases under case studies. In this study PIRI was used to rank frequently used pesticides such as Captan, Carbaryl, Carbofuran, Chlorfluazuron, Chlorothalonil, Chlorpyrifos, Diazinon, Dimethoate, Fenthion, Fenvalarate, Fipronil, Imidacloprid, Mancozeb, Metalaxyl, Permethrin, Phenthoate and Profenofos in the Kalpitiya area. Pesticides were ranked on the basis of mobility to ground water (GW) and toxicity to human being. PIRI uses environmental half-life of the pesticide ( $t_{1/2}$ ), soil profile depth, recharge rate, residence time of the pesticide in depth of soil profile, retardation factor, volumetric moisture content of the soil at field capacity, to estimate concentration of pesticide in GW and it uses lethal dosage for rat as a toxicity parameter.

PIRI uses temperature, Irrigation and rainfall of pesticide treated areas and site conditions as environmental parameters. Also  $t_{1/2}$  and organic carbon partition coefficient (Koc) of pesticide, fraction of active ingredient, application frequency and rate of the product application are required as pesticides data.

PIRI estimation indicates that according to attenuation factor, Carbofuran is the most mobile pesticide. Dimethoate, Carbaryl, Diazinon and Fenthion are also extremely high mobile pesticides under the field conditions. All other pesticides indicate very low mobility.