

## Effects of fungicide Chlorothalonil on leaf litter decomposition rate and Plankton communities

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### Abstract

Pesticides applied into agricultural lands can contaminate waterways and affect the different levels of the aquatic food web and key ecosystem processes underlying the provision of ecosystem services from streams. Chlorothalonil is a commonly used fungicide, in agricultural areas in Sri Lanka, but its effect on non-targets such as in-stream ecological processes is less explored. The objectives of the present study were to assess the effects of Chlorothalonil on leaf litter decomposition rate and freshwater plankton communities. The effect of fungicide Chlorothalonil on *Ficus racemosa* and *Panicum maximum* litter breakdown rate and plankton community composition were assessed in indoor microcosm systems with treatment tanks of Chlorothalonil concentrations: 0.01, 0.025, 0.1, 0.25, 1 mg/L and in control tanks with freshwater for 40 days. The leaf breakdown rates in treatment and control tanks for both leaf types were compared using ANCOVA with time as covariate and plankton counts were compared using one-way ANOVA. The results of the study indicated a significant reduction ( $p < 0.05$ ) of litter breakdown rate in terms of % dry weight reduction, % organic matter reduction and % nutrient content reduction in treatment tanks with Chlorothalonil in comparison to control tanks in *Ficus* leaves. Moreover, a significant difference was observed only in the % dry weight reduction and no significant difference was observed in % organic matter reduction and % nutrient content reduction in *Panicum* leaves. The study further revealed that these alterations were further modulated by leaf litter quality and inhibition of microbial colonisations on leaves. Further, a significant reduction ( $p < 0.05$ ) of plankton counts was also observed in Chlorothalonil treated tanks in comparison to control tanks after 20 days. The findings of the study suggests that the fungicide Chlorothalonil can have multiple impacts on non-target organisms of litter decomposing organisms and plankton communities and thus affecting the ecosystem processes of aquatic systems.

**Keywords:** Chlorothalonil, Litter decomposition, Microorganisms, Phytoplankton, Zooplankton

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