DETERMINATION OF EFFECTIVE CONCENTRATION OF DIATOMACEOUS EARTH (SiO_2) FOR PADDY, MAIZE AND SOYA BEAN USING RICE WEEVIL, MAIZE WEEVIL AND PULSE BEETLE

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Rice weevil (*Sitophilus oryzae*), maize weevil (*Sitophilus zeamais*) and pulse beetle (*Callosobruchus chinensis*) are destructive insect pests of stored grains in Sri Lanka. The loss of grains during storage conditions (30 ± 2°C, 79 ± 2 r.h.) was 4-6% and 80% loss was due to insect attack. Chemicals have been using in controlling insects of grains. These chemicals are harmful for human besides Diatomaceous earth (DE) is nontoxic to human. In Sri Lanka researches are insufficient to find the best concentration and effectiveness for DE. Therefore, this study was done. First experiment was conducted to determine the effective dose of DE using 0.15, 0.3, and 0.45 gkg^{-1} concentrations for paddy, soya bean and maize with respected control samples of each crop. In the first experiment, 30 days old adult rice and maize weevils and 5 days old adult pulse beetles were used. The second experiment tested the efficacy of DE under storage conditions (30 ± 2°C, 79 ± 2 r.h.). Grain weight losses were obtained at weekly intervals up to 12 weeks. The experimental design was a complete randomized design (CRD). In results, there was no significant difference ($p>0.05$) in insect mortality between treated and untreated maize samples. But insect mortality was significant ($p<0.05$) between paddy and soya bean samples with their respective controls. Therefore, paddy and soya bean were used for the second experiment. The treatments weren't significantly different between soya bean and paddy. The effective dose of DE was 0.15 g kg^{-1}. Paddy and soya bean which were treated with DE showed significantly reduced weight losses compared to the untreated controls. Therefore, diatomaceous earth can be recommend as an effective chemical for controlling *Stophilus oryzae* and *Callosobruchus chinensis* of stored paddy, pulses but it is not very effective for controlling *Sitophilus zeamais*.

Keywords: Diatomaceous earth, Insects, Mortality, Weight loss