

Changing Membran Morphology Induced by Dichlorvos and Protective Role of Lycopene

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Aim of the study: Pesticides have been widely used in agriculture and household. Studies have shown that both short-term and long-term exposure to pesticides could cause serious toxicity. Among the organophosphorous class of pesticides, dichlorvos (2,2-dichlorovinyl dimethyl phosphate, DDVP) is a commonly used insecticide which is generally used around homes and in gardens. Lycopene, especially, found in red colored foods, is an antioxidant with an ability of scavenging of singlet oxygen and free radicals, thus lycopene can play an important act in oxidative stress caused disorders and cancer. This work evaluates whether treatment with an oxidant (dichlorvos) and antioxidant (lycopene) can effect the membran morphology damages in human erythrocytes with the May-Grünwald-Giemsa method staining method *in vitro* conditions.

Material and Methods: A solution of dichlorvos was prepared in distilled water. The doses of dichlorvos that were used in this study lower concentrations, the medium concentration and the higher concentration were selected based on the earlier studies. Fresh human bloods were collected in ethylenediaminetetraacetic acid (EDTA) in polyvinyl chloride containers and stored at 4 °C for 1-3 h and centrifuged. The supernatant was removed and PBS was added at 4 °C. RBC suspension (100 µL) treated with dichlorvos and/or lycopene at room temperature and only saline solution was given to control group. Histological preparations were used for images of the RBC and staining carried out with May-Grünwald-Giemsa method.

Results: In this study, it was demonstrated that the interaction of dichlorvos and/or lycopene with human erythrocytes. Completely normal erythrocytes cells were detected in control group. The toxic effect of dichlorvos against erythrocytes was shown in Figures. There were no changes in membrane morphology detectable at low doses of dichlorvos when compared with control group. Changes in membrane morphology increased by increasing the exposure doses of dichlorvos. Intact human erythrocytes incubated with dichlorvos showed clearly changes in echinocytic form. It was seen that depending on the lycopene treatment, membrane morphology was negatively affected, in other words changes in membrane morphology was increased. In conclusion, data in this study showed that lycopene treatment partially decreased toxic effects of dichlorvos on erythrocytes but not protect completely. So we must avoid to treatment of dichlorvos which were induced generation of crenated cell-shaped cell. Also *lycopene* should be included in the diet.

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Keywords: Dichlorvos, erythrocytes, morphology, lycopene, echinocytes