

Title Degradation behavior of methamidophos, phorate, dimethoate, diazinon, malathion and chlorpyrifos on apple surface treated with ozonized water

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Abstract

Organophosphorus pesticides are used worldwide to protect crops and improve agricultural production by controlling insects, diseases, fungi and other pests. However, along with the benefits, the widespread use poses a potential risk to human health because organophosphorus pesticides inhibit acetylcholinesterase and lead to the modification of cholinergic signaling. More and more consumers concern about food safety, especially pesticides residues in fruits and vegetables. As a result, effective techniques for removing or reducing pesticide residue in fresh and processed fruits after harvest need to be developed. In this paper, the six organophosphorus pesticides including methamidophos, phorate, dimethoate, diazinon, malathion and chlorpyrifos were applied on apple in model system. The ozonized water (the concentration of ozone was ranged 2.0-1.4 mg/l) was used to remove the pesticide residues. The results indicated the efficacy highly depended on the ozone concentration and the initial concentration of pesticide. The higher concentration of ozone and the lower initial concentration of pesticides, the better degradation efficiency was obtained. At a low concentration of pesticide (1-2 mg/kg), 35%-64% of pesticides could be removed. In addition, the kinetics equations and related parameters were obtained to characterize the degradation behavior of the pesticides. The data can better be fitted to the first order kinetics model and the competition model.