The effect of dimethoate and pyrantel on vitamin C concentration in the rat liver

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Abstract

The aim of this study was to determine the content of vitamin C in the liver of rats exposed to dimethoate or pyrantel embonate as well as co-intoxication with both agents. Investigations were carried out in two stages. At each stage, the rats were divided into three experimental groups (I-III) and a control (C) group. In the first stage, rats from group I were administered pyrantel embonate at a two-week interval at a dose of 1/2 LD50, while the animals from group II received dimethoate for 28 days at a dose of 1/25 LD50, and those from group III – both mentioned compounds in an identical manner as in groups I and II. In the second stage, the rats from group I received pyrantel embonate at a dose of 1/5 LD50 for 3 consecutive days, while the animals from group II received dimethoate at a dose of 1/10 LD50 for 5 consecutive days, and those from III received both compounds, but pyrantel was administered on day 3, 4 and 5 of dimethoate administration. The concentration of vitamin C after pyrantel embonate and dimethoate administration was influenced not only by doses of the compounds used but also by the manner of their application (single or co-administration). Dimethoate delivered at a dose of 1/25 LD50 evoked an increase in vitamin C concentration that was observed to continue up to the 14th day after the exposure, whereas when applied at a dose of 1/10 LD50 it increased the vitamin C level only at the 3rd hour. A considerable decrease in the vitamin C level was reported after pyrantel treatment at a dose of 1/5 LD50. In rats from groups where the compounds were co-administered, increased level of vitamin C was observed at both stages of the experiment only in the first period after intoxication, i.e. up to the 6th hour.

Key words: vitamin C, liver, rat, dimethoate, pyrantel

Introduction

Due to the widespread use of pesticides, the problem of their toxic interactions with various types of compounds, including medicines, becomes very important both in terms of biological and therapeutic effects as well as mechanisms affecting this phenomenon.

Organophosphorus insecticides, including dimethoate (O,O-dimethyl S-N-methyl carbamoyl methyl phosphodithioate), are one of the most important pesticides extensively used in agriculture (Worthing 1987, Pruett 1996, USEPA 1999). The mechanism of the toxic action of dimethoate in mammals (similar to other organophosphorus compounds), is based on its ability to bind to acetyl-