Residues of dimethoate in the liver and AChE activity in blood of rats after exposure to dimethoate, and dimethoate and pyrantel embonate

D. Barski, A. Zasadowski

Division of Veterinary and Environmental Toxicology, Department of Pathology and Pharmacology, Faculty of Veterinary Medicine, University of Warmia and Mazury in Olsztyn, Oczapowskiego 14, 10-719 Olsztyn, Poland

Abstract

The study was aimed at determining the dimethoate residues in the liver and acetylcholinesterase (AChE) activity in blood of rats exposed to dimethoate (individual intoxication), and dimethoate and pyrantel embonate (simultaneous intoxication). The experiment was carried out in two stages where various doses of preparations and exposure manners were used. In the first stage of the experiment, dimethoate (1/25 LD₅₀) was administered to animals per os for 28 days, and pyrantel embonate (1/2 LD₅₀) twice, i.e. on the day 14th and 28th. In the second stage, dimethoate was administered for 5 days (1/10 LD₅₀), and pyrantel embonate (1/5 LD₅₀) on day 3, 4 and 5 from the beginning of dimethoate intoxication. The short presence of the dimethoate residues in the liver of the animals examined was found until the 2nd day after 28-day intoxication (1/25 LD₅₀) and until 14th day after 5-day intoxication (1/10 LD₅₀), however, a distinct decrease in this insecticide residues in the liver of (analysed groups of) rats occurred between the 3rd hour and the 2nd day after exposure. Dimethoate in both applied doses significantly reduced AChE activity in blood. After application of the higher dose, the inhibition of AChE was more pronounced, and the return of its activity to physiological values lasted considerably longer. Co-administration of pyrantel embonate and dimethoate, slightly influenced changes of the parameters analysed, which have been dependent not only on a dose and manner of pyrantel application but also on time which lapsed from exposure.

Key words: dimethoate, pyrantel embonate, residues, acetylcholinesterase (AChE), rat

Introduction

The phenomena of interactions among xenobiotics put into the environment e.g. pesticides commonly used in plants protection as well as the sanitary hygiene and drugs used in a medical and veterinary practice still constitute a current problem. These interactions can lead to unexpected and frequently to undesirable consequences, which are difficult to foresee based on the toxicity of individual compounds. Learning of these kinds of interactions which are more currently met can facilitate not only its identifying but also therapy.

Among pesticides, the organophosphorus insecti-