Abstract

The first step in treatment of acute intoxications is usually based on a method suitable to eliminate the toxic agent from the poisoned body. The principle of such a method consists of binding the harmful substances to the surface of a suitable adsorbent material. The aim of the present study was to compare the adsorption ability of two adsorbent materials, namely diosmectite and activated charcoal towards selected model compounds which are most commonly involved in acute intoxication in the Czech Republic. The eleven model compounds were selected: acetylsalicylic acid, α-amanitin, amlodipine, digoxin, phenobarbital, ibuprofen, imipramine, carbamazepine, oxazepam, promethazine, and theophylline.

Of the tested compounds, promethazine was most effectively adsorbed to diosmectite. Its adsorption to diosmectite (0.191 ± 0.035 mg promethazine/mg diosmectite) was significantly higher than its adsorption to activated charcoal. Amlodipine, imipramine and carbamazepine were adsorbed both to diosmectite and to charcoal, by analogous efficiencies. The effect of temperature and pH on the adsorption efficiencies of these adsorbents was also evaluated. The utilized pH simulated physiological conditions in the various parts of the gastrointestinal tract. Surprisingly, the pH was not found to significantly influence the adsorption of model compounds to the tested adsorbers.

Using various methods such as N₂ adsorption, X-ray diffraction and fluorescence analysis, thermogravimetric analysis, diosmectite and activated charcoal surface structures were characterized in detail.

Key words: diosmectite, intoxication, adsorption efficiency