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OXIDATIVE STATUS EVALUATED IN RATS EXPOSED TO 1-BUTANOL AND ETHANOL

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ABSTRACT
Introduction: The study focused on the evaluation of the pro-oxidative effect of acute ingestion of ethanol superimposed on prolonged 1-butanol vapour inhalation to simulate combined exposure to both alcohols in the industry: short term ethanol abuse and long-term exposure to 1-butanol.

Material and Methods: Experiments were performed on male Wistar rats exposed to 1-butanol at the concentration of 320 mg/m³ for 3 months (5 h/day, 5 days/week), in dynamic inhalation chamber) and to ethanol (6 oral doses, 0.25 g/100 g b.w.) administered at 12 h intervals for the last three days of exposure. To estimate the redox state, cytochrome P-450 level, glutathione sulfhydryls content, glutathione-S-transferase activity, microsomal lipid peroxidation rate in the liver, and the total antioxidant potential of the serum, were determined.

Results: The studies revealed that the combined exposure to ethanol and 1-butanol, contrary to exposure to 1-butanol vapour only or ethanol ingestion, resulted in the stimulation of hepatic microsomal lipid peroxidation with inhibition of glutathione-S-transferase activity, as well as inhibition of serum antioxidant potential.

Conclusions: Disturbances of the oxidative status induced by combined exposure may contribute to disorders in the lipoprotein structure of biomembranes both at subcellular and cellular levels with special reference to target organ, and thus aggravate the biological consequences of ethanol abuse and occupational exposure to 1-butanol.

Key words: 1-butanol, ethanol, lipid peroxidation, glutathione-S-transferase

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