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NEUTROTROPIC EFFECTS AND BLOOD LEVELS OF SOLVENTS AT COMBINED EXPOSURES: BINARY MIXTURES OF TOLUENE, o-XYLENE AND ACETONE IN RATS AND MICE

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SUMMARY

Male rats and female mice were exposed to vapours of toluene, o-xylene and acetone in basic or double concentrations or to binary combinations of basic concentrations, for 4 and 2 hours, respectively. Basic air concentrations were for rats and mice (in ppm): toluene 270 and 380, o-xylene 230 and 320, acetone 1700 and 1530, respectively. The CNS effect – inhibition of electrically evoked seizure discharge – was measured immediately after exposure and blood levels of solvents were monitored during the desaturation phase. The effect of all binary mixtures was lower than that of double concentrations of each single component, the difference being significant only in mice, and lower than the additive effects predicted on the basis of regressions of the effect on air or on blood concentrations of individual components. On the target site in the neuronal membrane, the effects of mixtures were substantially less than additive. Blood concentrations of solvents immediately after the exposure to a mixture were generally higher in aromatics and lower in acetone than after exposure to individual solvents. The decline of blood toluene and even more so that of xylene after exposure was slowed down by acetone. Presumption of additivity seems to protect safely from acute neurotropic effects of solvents at realistic exposure levels. On the other hand, substantially *protracted* late phases of desaturation of aromatic solvents in the presence of slowly eliminated polar solvent points to a possible underestimation of exposure by biological exposure tests.

Key words: combined effects, solvents, blood concentrations, neurotropic effects, rats, mice

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