

Distribution of dimethoate in the body after a fatal organophosphate intoxication

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The body of a 35 year-old male was found lying on the side of an auxiliary street. Whitish powder-like residues were noted around the lips and on the chin. Autopsy was unremarkable except for grayish fluid in the stomach, with garlicky odor. A systematic toxicological analysis on the post mortem specimens from the autopsy revealed besides chlorpyrifos high concentrations of dimethoate in the tissues and body fluids. Ethyl alcohol and other hydrocarbons were also detected in the blood samples. Cause of death was the organo phosphate intoxication.

METHOD: A GC/MS method after liquid liquid extraction using Toxi® extraction tubes were used for the determination of dimethoate and chlorpyrifos in post mortem materials. The analyses were carried out before and after addition of p-thionmethyl as an internal standard. The GC/MS method used was validated. Other hydrocarbons such as ethyl acetate, cyclohexanol and cyclohexanone were determined using headspace GC/MS.

RESULTS: Dimethoate, omethoate (metabolite of dimethoate) and chlorpyrifos were detected in the stomach contents and blood. Dimethoate was determined at concentrations of 104 µg/g in stomach contents, 38 µg/ml in blood, 0.47 µg/ml in urine, 2.2 µg/g in brain tissue, 7.6 µg/g in myocardial muscle, 4.6 µg/g in liver, 7.4 µg/g in the lungs, 21 µg/g in skeletal muscle, 55 µg/g in kidney and 31 µg/g in gall bladder. Chlorpyrifos was found in blood and gastric contents. In the other tissues it was detected at trace levels only. It totally disappeared after a few days storage even at – 20 degrees C. Dialkyl phosphate were not detected in the blood and urine samples [1]. Alcohol concentrations in blood, urine and stomach contents were 2.85, 4.35 and 2.83 g/l respectively. in the blood samples. Cyclohexanone and cyclohexanol were found in blood. We presume Salut® containing 222 g/l dimethoate, 278 g/l chlorpyrifos and cyclohexanone as solvent was ingested.

CONCLUSIONS: The distribution of dimethoate in post mortem materials showed significantly differences between the organs. Notable is the fact that only traces of chlorpyrifos and no degradation products (dialkyl phosphates) were found in the body. Chlorpyrifos is in contrast to dimethoate very lipophilic and should normally be present at high concentrations in all tissues. We have at the moment no explanation for our observation.

REFERENCE:

1 F. A. Tarbah, B. Kardel, S. Pier, O. Temme, T. Daldrup (2004) "Case study: Acute poisoning with phosphamidon. Quantitation of dimethyl phosphate (DMP) as a metabolite in case of organophosphate insecticide intoxication". J. Anal. Toxicol 28: 198-203

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