K19 Detection of Acute Diazinon Exposure in Postmortem Bone Samples

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After attending this presentation, attendees will understand the techniques of analyzing the acute diazinon exposure in postmortem bone samples in explaining the mechanism and cause of death.

This presentation will impact the forensic science community by the mechanism of diazinon exposure in understanding the cause of death and the importance of detecting it with the forensic toxicology lab techniques.

Forensic toxicological analyses have traditionally focused on the use of blood, body fluids, and certain organs in examinations of deaths due to intoxication. However, in some situations, putrefaction and contamination make proper sampling from tissues and blood impossible, such as in exceedingly degraded exhumation cases. In these cases, bone might be useful as an alternative specimen since it is a potential depot for pesticides and other chemical agents.

This third study is focused on the use of alternative specimens where putrefaction and contamination make proper sampling from

tissues and blood impossible. The first study, regarding this issue, was the use of bone marrow in detection of Endosulfan and Diazinon. The second study dealt with use of adipose tissue in detecting chronic organochlorine exposure. As the following experimental research after the study by Akcan et al. in 2009 and Daglioglu et al. in 2010, the present study separately deals with the use of bone samples in detection of diazinon in a longer postmortem period. In order to find out the value of use of alternative biological samples in long period of postmortem cases, further series of experimental researches examining different alternative samples are currently designed.

Diazinon is widely applied to control agricultural pests in the Cukurova region which is the largest agricultural area in Turkey. In this region, diazinon takes place as the most common cause for organophosphate related intoxications. Most poisonings by diazinon are due to suicidal or accidental exposure and usually occurs by oral ingestion. Therefore, detection of diazinon in postmortem cases or putrefied corpses is of high importance in forensic toxicological analyses.

The goal of this study is to determine diazinon in bone samples of close term postmortem cases and putrefied corpses of pesticide treated rabbits, in order to show and emphasize the value of boney tissue, a potential depot for most chemical agents, as an alternative toxicological sample of long term after death. A 2500 mg/kg dose of diazinon was orally given to six rabbits through a gavages tool. One rabbit was not treated with anything and served as a blank control sample. The rabbits were buried in soil, after obtaining postmortem right femoral bones of each as first sample. All seven rabbits were exhumed three months later, and remaining left femoral bones were sampled. The bone specimens were cleaned of any overlying muscle and putrefied tissue using a scalpel. The samples were subsequently rinsed with deionized water until the wash was clear and free of debris and air-dried. The bone was weighed (2 g), cut into slivers, soaked in methanol and rotated for 16 hours. Solid-phase extraction (SPE) and gas chromatography/mass spectrometry (GC/MS) were used for the analysis of diazinon in bone samples. The methanol supernatant was removed and then loaded into sample extraction cartridge, the eluent was evaporated to dryness under a nitrogen stream, reconstituted with methanol, and then analyzed by GC/MS. Ethion was used as an internal standard. Limit of detection (LOD) for diazinon was 0.03 mg/kg and limit of quantification (LOQ) for diazinon was 0.10 mg/kg. Calibration curve was prepared with seven sample concentrations and correlation coefficient were (r) > 0.999, the values obtained for intra- and interday precision and accuracy were within the criteria usually accepted for bioanalytical method validation.

The mean concentrations of diazinon in bone taken just after death and bone samples of exhumed corpses were 11.52 and 7.97 mg/kg, respectively.

These results suggest that in pesticide intoxication related deaths when other specimens are unavailable due to degradation, bone samples should be considered as useful alternative specimen. **Diazinon, Bone, Forensic Toxicology**

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