



K37 Determination of Methamphetamine Concentrations in Thighbones Buried in Soil

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After attending this presentation, attendees will understand the interpretation of methamphetamine concentrations in the bone tissue of decomposed or skeletal remains.

This presentation will impact the forensic science community by demonstrating the role and importance of toxicological analysis of bone in the diagnosis of death from drug abuse.

Bone samples are used for toxicological analysis of decomposed or skeletal remains. To determine the relationship between the concentrations of methamphetamine in bone and those in blood or muscle, the methamphetamine concentrations in mouse thighbone were determined and these concentrations were compared with those in heart blood and muscles. The methamphetamine concentrations in thighbones buried in soil for 7 to 180 days were also determined.

Male ddY mice were intraperitoneally injected with methamphetamine at doses of 1mg/kg, 5mg/kg, or 10mg/kg or with saline, once a day for seven days (n=25 per group). Heart blood samples were collected under general anesthesia by cardiac puncture and the thigh muscles and thighbones were also removed. Thighbones were buried in soil and left in a chamber maintained at 16.2°C and 62% humidity for 0, 7, 30, 90, or 180 days (n=5 at each time point). Five hundred microliters of heart blood or 0.5g thigh muscle were analyzed using Liquid Chromatography coupled with Tandem Mass Spectrometry (LC/MS/MS). Thighbone samples were sterilized with distilled water and acetone and were dried at 50°C for 24h. The dried thighbones were pulverized with a bead homogenizer and were evaluated using LC/MS/MS.

In all mice groups, methamphetamine concentrations in thighbone samples were higher than those in heart blood and thigh muscle samples. Significantly higher concentrations of methamphetamine were determined in thighbone samples of mice administered a dose of 1mg/kg or 10mg/kg methamphetamine ($p<0.05$). Although methamphetamine was detected in all thighbone samples after a burial period of 7-180 days, methamphetamine concentrations in buried thighbone samples were significantly lower than those in thighbones without burial in all mice groups ($p<0.05$). The results of this study indicate that: (1) methamphetamine accumulates in bone and shows higher concentrations in bone than in blood or muscle; (2) methamphetamine is detectable in bone for up to 180 days after burial; and, (3) methamphetamine shows lower concentrations in buried bone than in blood and muscle; this may be because of its diffusion into the soil.

Methamphetamine, Bone, Decomposition