Abstract

A morphine sulfate ER tablet, an aspirin tablet or both morphine and aspirin tablets were placed into 50 ml gastric or water samples. The solutions were added to a water bath at 37 °C (to mimic conditions in the human stomach).

1 ml Aliquots of the solutions were taken at 10 min intervals from 0 min- 60 min and then at 90 min, 120 min and 240 min.

Aliquots were extracted using a previously published UCT solid phase extraction procedure, and analyzed by GC/MS in SIM mode. Acidic/neutral morphine or metabolites were the analytes of interest.

The procedure was repeated using morphine sulfate powder in place of ER tablets to determine if the formation of acetylmorphine was limited by the extended release formulation.

To examine whether the acetylation process was catalysed by gastric or microbial enzymes, the experiment was repeated in a gastric specimen containing sodium acetate. Because sodium fluoride/potassium iodate is an additive routinely used in forensic laboratories, incubations including these additives were also performed.

Further incubations were performed in gastric fluid and DI water to examine pH influences on the formation of acetylmorphine.

Additionally, cases from both the Cuyahoga County Medical Examiner’s Office and Ethics Laboratory were examined to determine whether there were any incidences of unplanned ER-M morphine.

Results & Discussion

Formation of 6-AM and 3-AM were examined at various pHs (pH 1-5) in gastric and DI water (Figure 4). The optimal pH was ≤ 5, under the conditions investigated.

Figure 5 reveals production of 3-AM exceeded that of 6-AM in both matrices (4 & 80 mg/ml for 3-AM and 4 & 15 mg/ml for 6-AM). Formation of 6-AM and gastric water was essentially the same (mean gastric-pH-water ratio of 1.15).

Figure 6: Total production of morphine in gastric and DI water after 26 hours incubation, at a variety of pHs.

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