



### K25 The Morphine in Your Pantry — Understanding the Overdose Risk of Home-Brewed Poppy Seed Tea

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After attending this presentation, attendees will understand the risks involved with consuming home-brewed poppy seed tea, including death. Attendees will learn that regardless of extraction conditions, it is possible to rinse opium alkaloids from poppy seed coats by home-brewing methods. In particular, attendees will learn that it is possible to rinse lethal amounts of morphine from unprocessed poppy seeds at home.

This presentation will impact the forensic science community by demonstrating the need for further consideration regarding the legality of purchasing unprocessed poppy seeds in bulk.

Morphine, codeine, and thebaine are naturally occurring opiates found in the latex of the opium poppy (*Papaver somniferum*). This latex is harvested worldwide for both licit and illicit opioid production. Poppy seeds are commonly harvested for baking, and opium alkaloids are transferred onto poppy seed coats during the harvesting process. Bulk, unprocessed poppy seeds can be purchased online with no current legal repercussions.

Recently, a medical examiner reported the case of a 24-year-old male who died of morphine intoxication with aspiration pneumonitis; however, neither licit nor illicit sources of morphine were found at the scene. It was suspected that the decedent ingested a lethal amount of morphine from home-brewed poppy seed tea. A 5-pound bag of poppy seeds and a 33-fluid-ounce bottle filled with seeds and water were found at the scene.

Due to the recent increase in poppy seed tea-related deaths, this research proposed that lethal amounts of morphine could be extracted from poppy seeds by home-brewing methods. Codeine concentrations were investigated because codeine is another opium alkaloid with analgesic properties, and codeine and morphine can have compounding effects when both drugs are taken simultaneously. Thebaine concentrations were investigated because, although it has no analgesic properties, its presence in biological specimens is indicative of poppy seed consumption.

No studies to date investigated opium alkaloid content that can be extracted from poppy seeds by home-brewing methods. For this reason, 22 samples of poppy seed products were purchased from online sources and extracted with four home-brewing methods representative of recipes found on drug user forums. Poppy teas were produced in room temperature and heated water, with and without lemon juice (acid) modifier over 10min with gentle agitation.

Extracts were analyzed in triplicate, and morphine, codeine, and thebaine were quantified in these extracts by liquid chromatography-tandem mass spectrometry using a validated analytical method. Precision and accuracy were 4.2%–7.7% and 92.3%–103.4%, respectively, with minimal matrix effects (95.1%–103.7%). Morphine, codeine, and thebaine concentrations were <1mg/kg–2,788mg/kg, <1mg/kg–247.6mg/kg, and <1mg/kg–124mg/kg, respectively. Many samples yielded morphine levels that would correlate to lethal concentrations if moderate volumes of tea were consumed. Yield varied between all extractions for all analytes in all samples.

**Forensic Science, Forensic Toxicology, Poppy Seed Tea**