

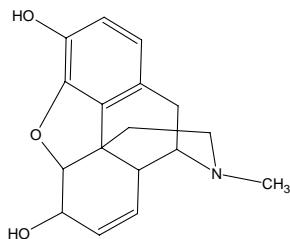
Instantaneous Detection of Opiates in Single Poppy Seeds

Poppy seed is a common flavoring ingredient that is known to contain small amounts of opiates. Maximum morphine and codeine concentrations are estimated to be about 33 and 14 micrograms respectively per gram of seed¹. Consumption of typical amounts of baked goods containing poppy seeds has not been shown to cause any ill effects. However, ingestion of poppy seeds may result in false positives from drug tests.

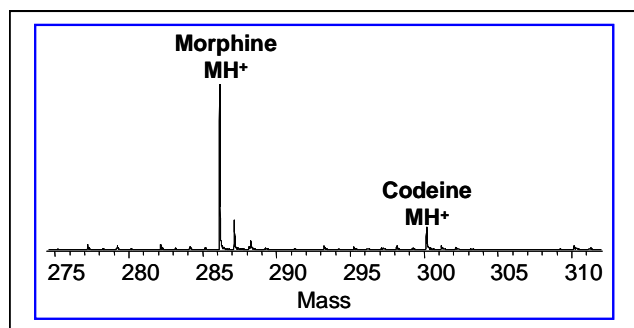
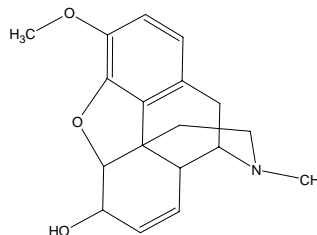
Single poppy seeds from different sources were analyzed independently in two different laboratories by using the DART™/AccuTOF™ combination. The resulting mass spectra were nearly identical.



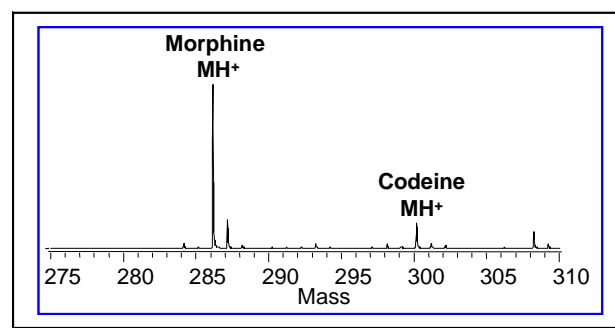
Morphine C₁₇H₁₉NO₃



Codeine C₁₈H₂₁NO₃



Poppy seed # 1 (DART in Maryland)



Poppy seed # 2 (DART in Massachusetts)

Measured Mass

286.1443 Da
300.1611 Da

Mass Error (mmu)

<0.001
0.001

Elemental Composition

C₁₇H₂₀N₁O₃ (Morphine)
C₁₈H₂₂N₁O₃ (Codeine)

¹Opiate concentrations following the ingestion of poppy seed products – evidence for the poppy seed defense. Medway, C.; George, S.; Braithwaite, R. *Forensic Sci. Int.* vol. 96 (1998), pp. 29-38.