

## Cocaine in Money

**Introduction:** read case study.

### Procedure:

**Group 1:** Place a rolled dollar bill into the vial and add 2 mL methanol. Cap and shake vial for 1 minute. Use a Pasteur pipette to fill GC-MS vial 3/4 full.

**Group 2:** Place a rolled dollar bill into the vial and add 2 mL methanol. Cap and shake vial for 1 minute. Pour into a small beaker. Repeat the addition of 2 mL methanol and shaking for 1 minute for a total of three extractions. Put all methanol in the beaker (6 ml total volume). Use a hot plate on low heat in the hood to evaporate the methanol to a total volume of ~0.5 ml. Use a Pasteur pipette to transfer solution to a GC-MS vial.

**Group 3:** Place a rolled dollar bill into the vial and add 2 mL methanol. Cap and sonicate for 1 minute. Pour into a small beaker. Repeat the addition of 2 mL methanol and sonicate for 1 minute for a total of three extractions. Put all methanol in the beaker (6 ml total volume). Use a hot plate on low heat in the hood to evaporate the methanol to a total volume of ~0.5 ml. Use a Pasteur pipette to transfer solution to a GC-MS vial.

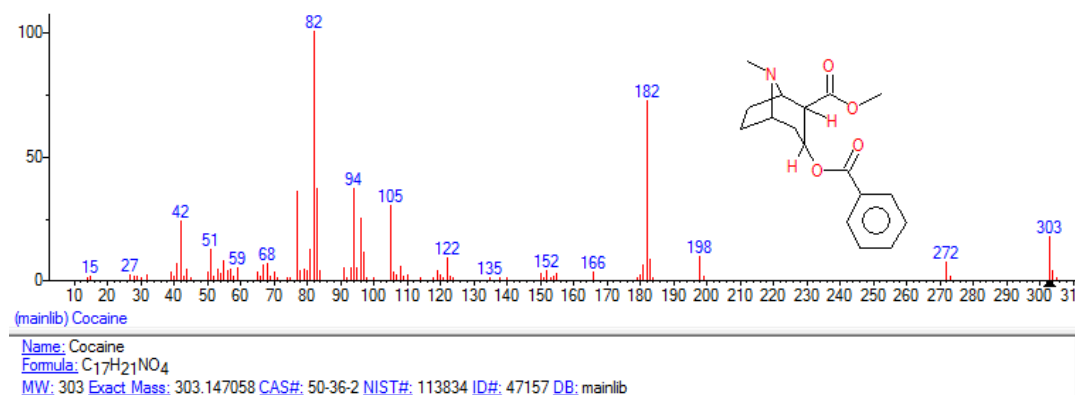
### GC-MS instrumental procedure:

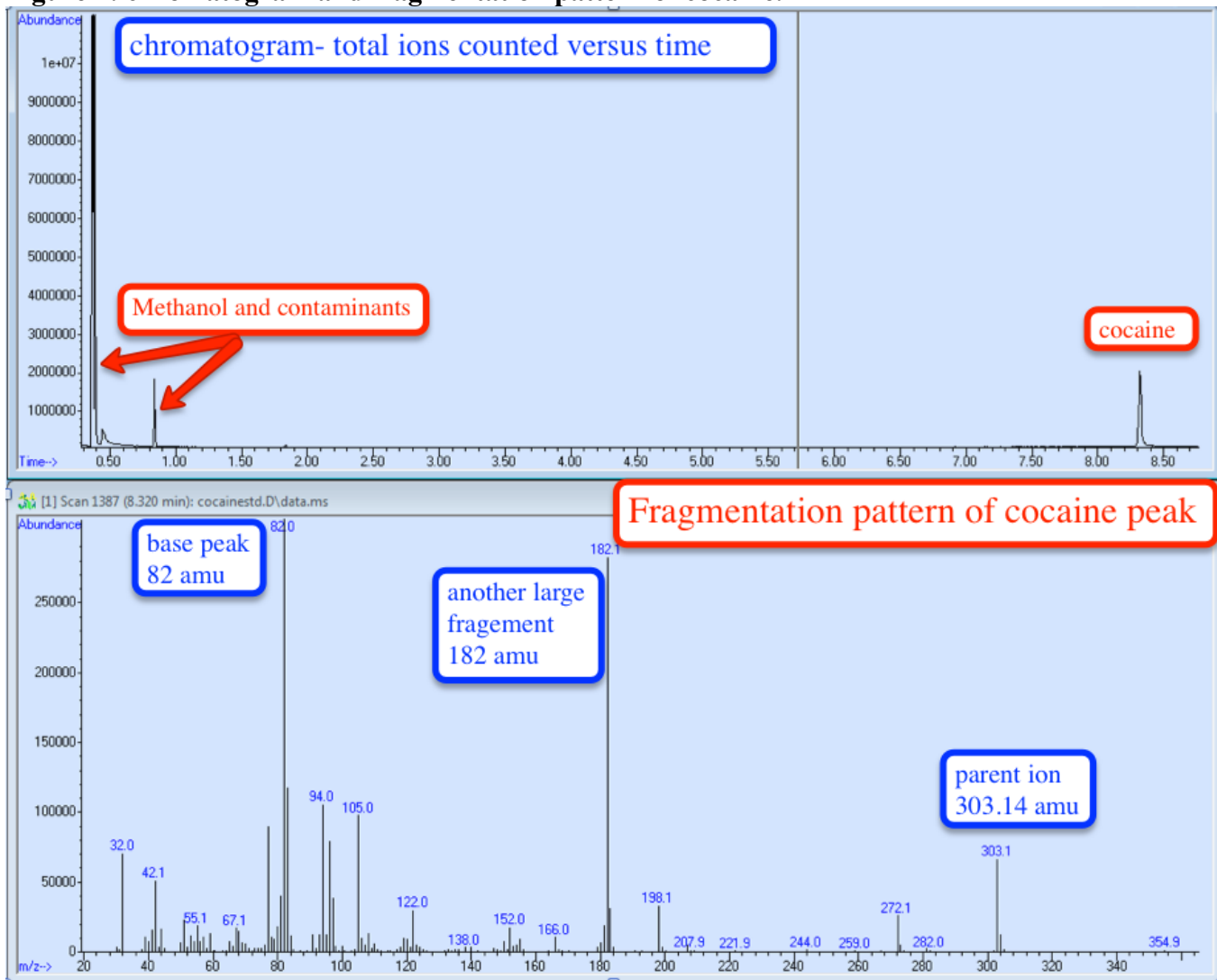
Cocaine was detected using an Agilent Technologies 7890A gas chromatography separation system coupled with an Agilent Technologies 5975C inert XL EI/CI mass spectrometry detector. Chromatographic conditions involved splitless injection of 1  $\mu$ L of methanol extracts with an injector temperature of 240 C and interface temperature of 300 C. The column (Agilent 122-5532UI) used had an inner diameter of 0.25  $\mu$ m and length of 30 m. Helium gas, the mobile phase was maintained at a volume of 1.77 ml/min. The column temperature program started at 180 C for 1 minute, then heated at the rate of 10 C/min to 280 C, and held 280 C for 1 minute.

### Potential Results:

In order to positively identify cocaine on dollar bills, we will use two criteria: 1) the retention time on the column will be the same as the cocaine standard collected in the same year, and 2) the fragmentation pattern of the peak at the correct retention time will be very similar to the library cocaine fragmentation pattern in **Figure 1**. **Figure 2** shows the retention time (8.3 minutes) and fragmentation pattern (large peaks at 303, 182, and 82 m/z) were measured using a 1000 ppm cocaine (FM= 303.1407 g mol<sup>-1</sup>) standard in methanol. The retention time of cocaine is likely to vary from year to year because we periodically change the column.

**Figure 1: Fragmentation pattern of cocaine from reference library.**



**Figure 2: chromatogram and fragmentation pattern of cocaine.****References:**

Acheson, E. Filthy Lucre: A case study involving the chemical detection of cocaine-contaminated currency. *NCCTS database*.

Negrusz, A.; Perry, J.L.; Moore, C.M., Detection of cocaine on various denominations of United States currency. *Journal of Forensic Sciences* **1998**, *43*, 626-629.

Oyler, J.; Darwin, W.D.; Cone, E.J., Cocaine contamination of United States paper currency. *Journal of Analytical Toxicology* **1996**, *20*, 213-216.