Caffeine
200 mg Tablet

Structure:
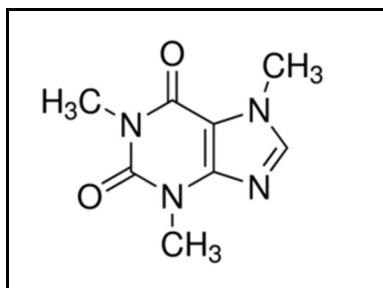
Molecular Formula and Mass: $C_8H_{10}N_4O_2$ - 194.19

Category: Stimulant

Sample:

Grind 1 tablet and dissolve in 100 mL of methanol. Shake at least 10 min. Concentration of solution = 200 mg/100 mL = 2.00 mg/mL. Dilute 1 mL of the 2.00 mg/mL solution to 10 mL by adding 9 mL of methanol. This 0.200 mg/mL solution will represent 100% sample.

Standards:

High Standard:

The high limit is 115%; therefore the concentration of the high standard = (0.200 mg/mL X 1.15 = 0.230 mg/mL. Weigh approximately 23.0 mg of standard. If you weighed 23.2 mg of standard, dissolve it in: (23.2 mg)/(0.230 mg/mL) = 101 mL of methanol. This makes the high standard solution concentration equal to 0.230 mg/mL.

Low Standard:

The low limit is 85%; therefore the concentration of the low standard = (0.200 mg/mL) X 0.85 = 0.170 mg/mL. Dilute 1.00 mL of high standard to 1.35 mL by adding 0.35 mL of methanol (1.15/0.85 = 1.35).

Spotting:

Spot on the 5 X 10 cm silica gel TLC aluminium plate with 3 µL aliquots as follows:

           Left spot   low standard (85%) = 0.690 µg

           Center Spot   100% sample = 0.600 µg

           Right Spot   high standard (115%) = 0.510 µg

Development:

Mix 34.00 mL of ethyl acetate with 6.00 mL methanol. Develop the plate in a small glass chamber with approximately 20.00 mL of this solution until the solvent front reaches within 1 cm of the top of the TLC plate. (R_f= 0.32)

Detection:

UV:

Dry the plate and observe under ultraviolet light at 254 nm. Observe the intensities and the sizes of the spots.

Developed and tested by Danhui Zhang, Ellen Armour and Joseph Sherma, Department of Chemistry, Lafayette College, Easton, PA, USA. March 4, 2015.