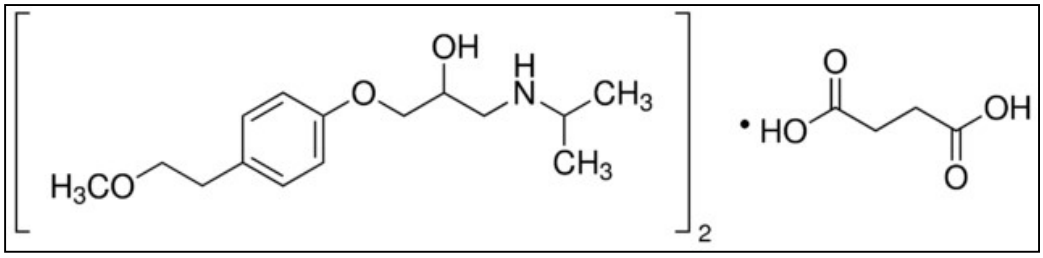
Metoprolol Succinate
23.75 and 47.5 mg Tablets

Structure:



Molecular Formula and Mass: $C_{30}H_{50}N_2O_6 \cdot C_4H_6O_4$ – 652.82
Category: Beta-Blocker
Sample:

Grind one tablet and dissolve in 7.50 mL of methanol for the 23.75 mg product and 15.0 mL of methanol for the 47.5 mg product. Shake at least 10 min and filter. Final concentration of sample solutions = 23.75 mg/7.50 mL and 47.5 mg/15.0 mL = 3.17 mg/mL, which is the required concentration representing 100%.

Standards:

High Standard:

The high limit is 115%; therefore the concentration of the high standard = (3.17 mg/mL X 1.15 = 3.64 mg/mL. Weigh approximately 36.4 mg of standard. If you weighed 36.5 mg of standard, dissolve it in: (36.5 mg)/(3.64 mg/mL) = 10.0 mL of methanol. This makes the high standard solution concentration equal to 3.64 mg/mL. [If USP metoprolol succinate standard if not available, metoprolol tartrate standard can be used. Weigh approximately 38.3 mg of metoprolol tartrate standard. If you weighed 38.4 mg of standard, dissolve it in: (38.4 mg)/(3.83 mg/mL) = 10.0 mL of methanol. This makes the high standard solution concentration to 3.83 mg metoprolol tartrate/mL, which is equivalent to 3.64 mg of metoprolol succinate/mL.]

Low Standard:

The low limit is 85%; therefore the concentration of the low standard = (3.17 mg/mL X 0.85 = 2.70 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 3.00 µL aliquots as follows:

Left spot	low standard (85%) = 8.10 µg
Center Spot	100% sample = 9.50 µg
Right Spot	high standard (115%) = 10.9 µg

Development:

Mix 50.0 mL of ethyl acetate, 30.0 mL toluene, 15.0 mL methanol, and 5.00 mL concentrated ammonia. Develop the plate in a small glass chamber with approximately 20.0 mL of this solution until the solvent front reaches within 1 cm of the top of the TLC plate.

(R_f = 0.50)

Detection:

UV:

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

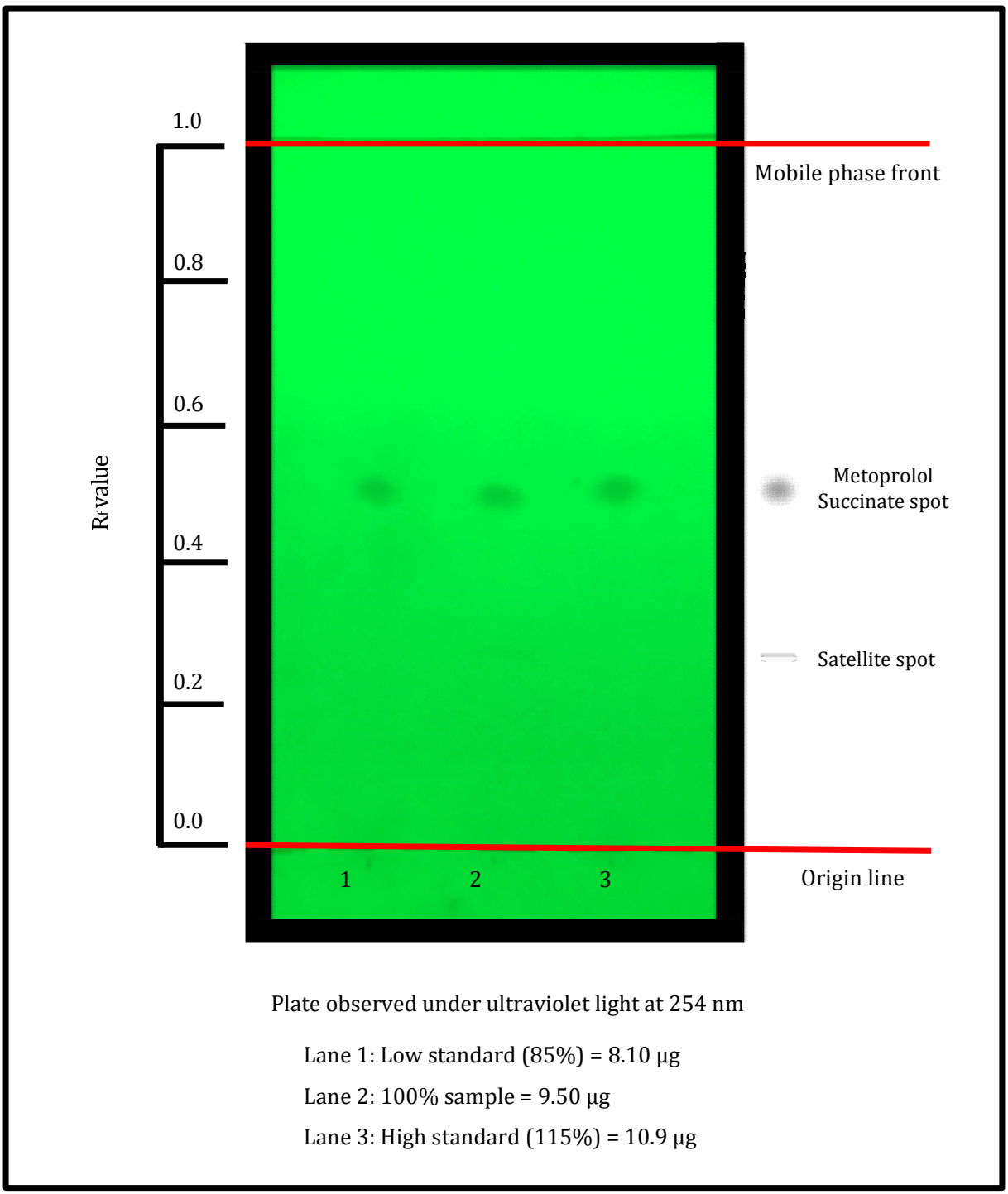


Plate observed under ultraviolet light at 254 nm

Lane 1: Low standard (85%) = 8.10 µg

Lane 2: 100% sample = 9.50 µg

Lane 3: High standard (115%) = 10.9 µg

Developed and tested by Kaitlin Nguyen and Joseph Sherma
Department of Chemistry, Lafayette College, Easton, PA, USA
July 2017

Kaitlin Nguyen's EXCEL Scholar research was supported by a Camille and Henry Dreyfus Foundation Senior Scientist Mentor Program award to Professor Sherma