

30 Aug 2021

Separation of Analgesic Drugs using TLC
Purpose: Thin Layer Chromatography can be used to help distinguish different components in a solution. This Exp. will be used to determine if a "mystery Powder" is Advil, Aspirin, Tylenol, Anacin, or Excedrin.

Needed Supplies:

Materials:

- Lead pencil
- PPE (Gloves, glasses, labcoat)
- 400 mL Beaker
- 2 TLC plates
- Watch glass
- 13 x 100 Test Tubes
- Filter
- VV lamp
- Iodine Chamber
- Ruler

Chemicals

- 2 mL Ethyl acetate *
- 1.8 mL Glacial acetic acid *
- 1.8 mL Ethanol *
- 1.8 mL Dichloromethane *

Hazards: *

- Ethyl acetate: Flammable (avoid flame)
- Dichloromethane: Flammable (avoid flame)
- Ethanol: Flammable (avoid flame)
- VV lamp: don't expose skin / sight
- Iodine is corrosive: use under hood

~~* Ethyl Acetate is flammable while the other 3 compounds are~~

Hypothesis:

Because Silica gel (TLC plate) is polar, (highly polar), the more polar compounds will not move as far up the plate as the less polar compounds.

I predict that the order (from lowest R_f) the compounds will appear will be:

1) Caffeine 2) Acetaminophen

3) Aspirin 4) Salicylamide

5) Ibuprofen. The lower the R_f value the less distance it travels. \therefore Caffeine will travel the least and will have the lowest R_f .

Caffeine is most polar because it contains two amine, two amide, and an alkene group.

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Procedure:

Obtain 10x6.6 cm TLC plate (silica) \rightarrow Draw (with pencil) a line @ ~ 1 cm

From left to right: spot \leftarrow from bottom

Acetaminophen, Aspirin, Caffeine

Ibuprofen, and Salicylamide ~~WAZ~~

(use different capillaries)



Pour ~~mobile~~ mobile phase into 400 mL beaker until 0.5 cm deep



~~Place~~ Fold Filter paper 2" and place in beaker, cover with watch glass

Procedure Cont'd:

Place TLC plate in beaker, without touching filter



When mobile phase reaches ~1cm from top of plate, use tweezers to remove plate and let dry on paper towel



mark spots under UV lamp / Iodine chamber



Use Ruler to measure distance from initial line to spot.

Record:

Observe

- Something dripped on my first TLC Plate
- Folded Filter paper and added acetic acid
- Some spots smaller than others (aceta/asprin)
- After UV, some spots big, some lanes had multiple spots

Calculate

Plate (1)

Front: 7.5 cm

aceta: 3.0 cm

Aspirin: 4.0 cm

Caffeine: 0.6 cm

2.6 cm?

Ibu: 5.5 cm

Salic: 4.8

REF: 5, 3.8, 3, 0.6



Observe
after Iodine
is darker under UV

After Iodine, Aceta and
Salicylamide turned
yellow

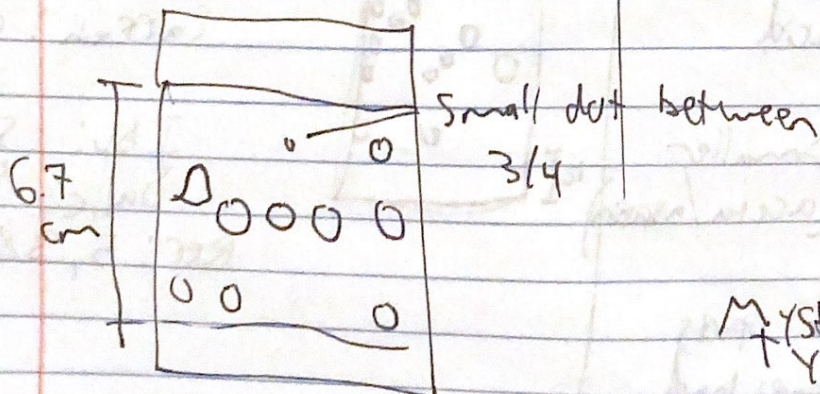
Calc
Observed two dots @ ~2.6cm
for Caffeine. Maybe Contaminant

Use Mystery B

	1	Anacin	3.7cm, 0.9
	2	Excedrin	0.9, 3.0 (pinkish)
Small dot 5.4cm	3	Tylenol	8.0cm
	4	Mystery B	3.0cm
	5	Ref	0.9, 3.0, 5.0

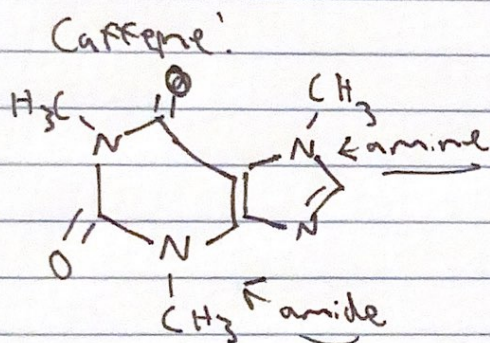
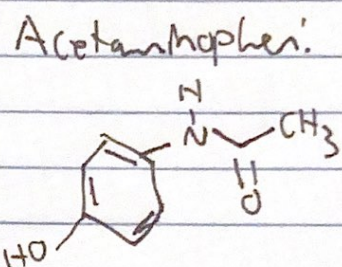
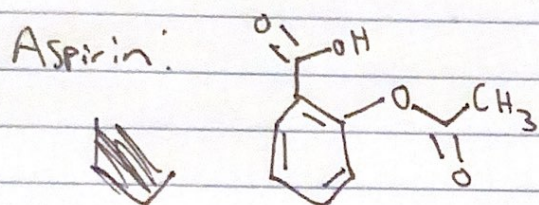
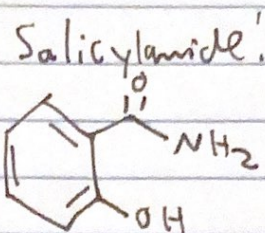
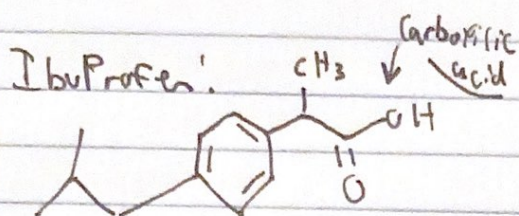
- Excedrin had pinkish dot
- Anacin (3.7cm) had ghost shape

- Excedrin, Tylenol, Mystery turned yellow with Iodine (3cm)
- Ref @ 5cm turned yellow



Mystery B looks like
Tylenol

Spot	Distance (cm)	Color after UV	Color w/ Iodine
Acetaminophen	3.0	Purple	Yellow
Aspirin	4.0	Purple	White
Caffeine	0.6, 2.6	Purple	White
Ibuprofen	5.5	Purple	White
Salicylamide	4.8	Purple	Yellow
Ref	0.6, 3, 3.8, 5	Purple	Yellow/white
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Anacin	0.9, 3.7	Purple	White
Eccidin	0.9, 3.0	Pink / Purple	Yellow / White
Tylenol	3.0	Purple	Yellow
Mystery B	3.0	Purple	Yellow
Ref	0.9, 3.0, 5.0	Purple	Yellow/white



Rf: Ibuprofen > Salicylamide > Aspirin > Acetaminophen
> Caffeine