Thin Layer Chromatography; Separation of Analgesics

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Purpose: To practice the TLC spotting techniques and calculate the $R\_{f}$ value for the spots and identify the components in the unknown.

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| Substance | Molecular Weight | Boiling Point (°C) | $$R\_{f}$$ |
| Aspirin | 180.16 | 140 | .58 |
| Acetaminophen | 151.17 | 157 | .14 |
| Ibuprofen | 206.29 | 157 | .76 |
| Methanol | 32.04 | 65 | - |
| 50/50 Hexane/Ethyl Acetate w/ 1% Acetic Acid | 86.1888.1060.05 | 6977.1118-119 | - |
| Unknown (P) | - | - | .13 |

Experiment: I practiced the TLC spotting technique; added a drop of liquefied aspirin, acetaminophen, and ibuprofen onto a chromatographic silicon plate. Filled a 250mL graduated beaker with 4mL of the 50/50 Hexane/Ethyl Acetate w/ 1% Acetic Acid. Because the 50/50 Hexane/Ethyl Acetate w/ 1% Acetic Acid is our mobile phase, I dipped the chromatographic silicon plate (stationary phase) into the beaker. After about 5-10 minutes, the mobile phase reached about 1 cm from the top of the silicon plate. Using a UV light, I saw how far each substance traveled, along with the unknown (P). Before the stationary and mobile phases touched, unknown P was mixed together with 1mL of Methanol. Measuring the distances, I was able to calculate the$R\_{f}$. I was then able to identify the unknown P since unknown P traveled the same distance as one of my known substances, which was acetaminophen.

Conclusion: Initially, I thought the way to identify the unknown was strictly matching the $R\_{f}$ values. However, that was not the case. By tracking how far each substance traveled in relation to my unknown P, it gave me another method to find my unknown. I was proud of this lab, because for the first time, I performed this lab correctly.

Questions:
The solvent would evaporate before it was able to reach the top of the plate, which would give a high $R\_{f}$value due to the decrease in distance. If the liquid is higher than the spots, the spots would dissociate into the solvent, thus no data. If the plate was left in the solvent too long, all the spots could have traveled to the top of the plate therefore the data would be inconclusive and inaccurate, thus the $R\_{f}$value would be wrong, messing up the entire experiment. ur