

| Name |
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## **Laboratory Report**

| Mass of Salicylic Acid                 |  |
|----------------------------------------|--|
| Mass of Filter Paper and Watch Glass   |  |
| Mass of Watch Glass, Filter Paper, and |  |
| Aspirin Product                        |  |

| Properties of Aspirin                             |                               | Salicylic Acid | Aspirin Product | Aspirin Tablet |
|---------------------------------------------------|-------------------------------|----------------|-----------------|----------------|
| Melting Point                                     |                               |                |                 |                |
| Fe <sup>3+</sup> Observations (Color of solution) |                               |                |                 |                |
|                                                   | Spot distance                 |                |                 |                |
| Thin Layer                                        | Solvent front distance        |                |                 |                |
| Chromatography                                    | $R_{ m f}$ value (calculated) |                |                 |                |

- 1. Calculate the number of moles of salicylic acid used in this experiment.
- 2. Calculate the maximum amount of acetylsalicylic acid in grams that may be obtained from this amount of salicylic acid. This is the theoretical yield. **Hint:** See *Pre-Laboratory Questions* 3–5.
- 3. Determine the mass of aspirin obtained in this experiment and calculate the **percent yield.**
- 4. Iron(III) ions are used as a qualitative test for **phenols** (aromatic compounds containing an –OH functional group). (a) What compound was used as a **positive control** for the Fe<sup>3+</sup> test in this experiment? (b) Did the reaction product give a positive or negative test result with Fe<sup>3+</sup> ions? Explain.

| 5. | Old aspirin tablets often have a faint vinegar (acetic acid) smell and give a positive test with iron(III) ions. Write a balanced chemical equation for the <b>hydrolysis</b> of aspirin (reaction of aspirin with water) to explain these observations. |
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| 6. | Acetic anhydride was used in excess in this experiment. What does this mean, and how was the excess acetic anhydride decomposed at the end of the reaction?                                                                                              |
| 7. | Look up the melting points of salicylic acid and aspirin (acetylsalicylic acid) in a reference book or online and compare with the melting point of the reaction product.                                                                                |
| 8. | Describe the results of TLC analysis of the aspirin product obtained in this experiment. Compare the purity and $R_{\rm f}$ values of the product against commercial aspirin and the starting material.                                                  |
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