Separation of 3-component mixture by Extraction and Acid-Base Chemistry

Although only 0.606g of the stock 3-component mixture was used to start, we recorded a total of 1.51g of precipitate. We measured 0.57g of Benzoic Acid, 0.47g of Benzocaine, and 0.47g of 9-Fluorenone. Using the equation , we calculated the percentage of recovery to be 282% Benzoic Acid, 233% Benzocaine, and 233% 9-Fluorenone. These percentages may be well above 100% due to excess water contaminating the compounds. We allowed the precipitates to dry in the filter but I do not believe that they dried completely.

The melting point values in the literature for Benzoic Acid, Benzocaine, and 9-Fluorenone are 122.3, 84, and 89°C respectively. We recorded them as 119-122°C, 45-49°C, and 72-75°C respectively. The literature value for Benzoic Acid and our observed value are fairly similar but the observed value is still too low. The range we observed was only 3°C so it can be concluded that the Benzoic Acid precipitate was relatively pure but possibly not dry enough so the water interfered with the melting. Similar observations can be made about the Benzocaine and 9-Fluorenone precipitates, as they were tight ranges but much too low compared to the literature. Considering that our calculations and measurements indicate that we finished with over twice as much material as we started with, a wet compound would explain our final results.

The IR spectra for the pure Benzocaine and our extracted Benzocaine look identical with peaks representing the Amine, C=O bond, C-O-C bond, and the aromatic ring. The Benzoic Acid IR spectra for our extracted compound is also similar to that of the pure compound with peaks correlating to the aromatic ring, C=O bond, and alcohol. The spectra for Fluorenone are extremely different with only three weak peaks on showing on the spectra for the pure compound correlating to the C=O bond and aromatic rings while many more show for the extracted compound. The peaks that show on the spectra for the extracted compound that are not shared by the pure compound have similar wavenumbers as Benzocaine suggesting that there was some Benzocaine contaminating the 9-Fluorenone.