Chem 2990 – Chem Tech Seminar

Assignment: Calculations relating to FCC and USP Analytical Methods Reviewed in Class

1. During the normalization of your newly –prepared Perchloric Acid, 0.1N, you standardize the solution as directed in the FCC III Monograph. 703.5mg of dried, standard potassium biphthalate required 32.84mL of perchloric acid. What is the normality of the solution?

2. Using a commercially-supplied 0.1000N perchloric acid solution, you titrate 583.2mg of sodium benzoate as directed in the FCC III Monograph. Report the percent purity of sodium benzoate in your sample if it required 39.71mL. Would this sodium benzoate meet the minimum requirements for a food additive as required by the FCC?

3. Instead of using the 0.1000N perchloric acid solution, suppose you titrated the same sample in Problem #2 with the same volume of titrant, but used your own freshly-prepared perchloric acid solution from Problem #1 above. Calculate the purity of the sodium benzoate using this save volume of your titrant. Would the sample pass the minimum requirement for a food additive based upon this test? Comment on the difference between the two results in Problem #2 and #3.

4. A sample of caffeine is tested according to the FCC III: 824.11mg of caffeine requires 42.65mL of 0.1000N perchloric acid. What is the percent purity of the caffeine? Should you pass it as approved for use?

5. Citric acid is supplied as either anhydrous or as "hydrous" monohydrate. You analyze a sample of the monohydrate by first drying it by heating. The original sample weighed 3.2845g. After heating at 120°C for four hours, the sample weighted only 3.0700g. This entire dried sample was titrated, required 47.91mL of 1.000N sodium hydroxide to a pink phenolphthalein end point. Report the water content of the original sample and the percent purity of the anhydrous citric acid. Can you accept this lot citric acid for use in preparing (compounding) a fruit drink for your customer?

6. An old container of sodium bicarbonate is found in the back of the warehouse. It looks like a good product and there is no worry about contamination, but the plant manager want to know if he can use it to manufacturer a batch of cookies next week. You decide to test it according to the FCCIII: Following the direction in the FCC, your sample of 2.9861g requires 34.48mL of 1.000N sulfuric acid. Does this product meet the specification as required in the FCC? What do you tell the plant manager? Can he go ahead and use it in his cookie dough?

7. A standard analysis of drug tolnaftate as required in the USP 23 yields the following data: Exactly 50.0mg of the tolnaftate sample is quantitatively transferred into a 100mL volumetric flask and adding enough methanol to fill the mark. After mixing well, 1.00mL of this solution is transferred to a 50-mL volumetric flask and mixed with enough additional methanol to 50.00mL of solution. The absorbance of this solution at 258nm is 0.6490. The absorbance of a previously prepared standard tolnaftate solution of exactly 10.0 ug/mL was 0.6555. What is the percent purity of the tolnaftate? Does meet the purity specification for use in a drug product as specified by the USP 23?