**Southern New Mexico-West Texas Chemical Olympiad Competition**

**Forensics Team Experiment**

**Summary:** Although generally considered harmless, aspirin overdoses are relatively common and occasionally fatal. Cases of intentional poisoning by aspirin have also been documented. Aspirin is rapidly metabolized to salicylate. Serum levels up to 0.2 g/L are therapeutic while concentrations in excess of 0.3 g/L can be toxic. The concentration of salicylate in a sample can be determined “colorimetrically”. Although salicylate is colorless in solution, it forms a 3:1 complex with Fe(III) that is an intense purple color.

The concentration of a compound is proportional to the intensity of its color. Thus, concentration of an unknown sample can be estimated by comparison to known standards at a range of concentrations. You have been provided a serum sample from a suspected poisoning victim (ok, not really but it makes the story more fun). Your task is to estimate the concentration of salicylate in the sample by visual comparison to salicylate standards. ***You need to be as precise as possible in order to determine if he/she may have been poisoned with aspirin***. You are provided with the following materials:

-1 g/L salicylate standard

-10% w/v FeCl3 w/ dropper (this is an oxidizer, so use caution)

-A “serum” sample containing an unknown concentration of salicylate

-A control “serum” sample from a patient who had ingested no aspirin

-Deionized water

-Plastic well plate

-4, 1 mL glass pipettes and bulb

***Do not physically touch, smell or taste the solutions.***

***Winning teams will be selected based on the accuracy of their measurements and responses to questions***.

**Procedure**

**Create a standards using serial dilution**:

-Into 6 adjacent wells, pipette 1 mL of H2O as accurately as possible

-Using a clean pipette, transfer 1 mL of your 1 g/L standard solution to the leftmost well. Pipette up and down several times to ensure thorough mixing. This is now 0.5 g/L in salicylate

-Using the same pipet, transfer 1 mL of the 0.5 g/L solution into the next well containing H2O and mix well. Now transfer 1 mL of this solution into the next well.

-Repeat this process until you have generated a range of salicylate concentrations. **Record these concentrations on your answer sheet**

-Now, using a clean pipette, transfer 1 mL of your negative control into a nearby well. Using the last pipette, transfer 1 mL of your unknown sample to a well next to your control

-Finally, add 1 drop of the Fe Cl3 solution to each well, shaking the plate gently to mix.

-**Use your data to complete the remainder of your answer sheet.** Dispose of any excess solutions into the waste beaker and turn in your answer sheet to the lab assistant.

-**Turn in your completed answer sheet including the unknown ID number to the lab proctor before you leave the lab.**

New Mexico – West Texas Chemistry Olympiad

March 10th, 2018

**Forensics Experiment Scoring Sheet**

**UNKNOWN ID:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**NAMES and ID**: (1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ID:\_\_\_\_\_\_\_\_\_\_\_\_\_

 (2) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ID:\_\_\_\_\_\_\_\_\_\_\_\_\_

 (3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ID:\_\_\_\_\_\_\_\_\_\_\_\_\_

**High School:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**What is the concentration of salicylate standard in each of your wells?**

**What is the purpose of analyzing a control sample from an individual who had not ingested aspirin?**

**What is the concentration of salicylate in your unknown? How might you improve the accuracy of your estimate?**

**Do you think this person taking aspirin therapeutically, was he/she poisoned or is the data inconclusive?**