

# Food Science 2007

## Coaches training Event

You will find problems and instructions on these sheets. Please take this event after you finish for training with your team. You have individual answer sheets for marking your answers today. I will be putting these forms and instructions for preparing the samples up on the website <http://www.cals.ncsu.edu/foodrheology/fso/sciolym.html> (or accessed through [www.ncstatefoodscience.info](http://www.ncstatefoodscience.info)) in the near future.

### Experimental problem 1

A new Kraft Foods® processing plant opened with a complete line of lemon flavored food products – puddings, gelatins and drinks. You are the quality control manager at the plant, and get a frantic phone call one afternoon. Someone has made a big mistake, taking samples for quality control, but they put all the samples into unlabeled containers! The products made at the plant are:

#### **Jell-o Instant Pudding & Pie filling®**

**Ingredients:** Sugar, corn syrup solids, modified food starch, natural flavor, disodium phosphate and tetrasodium pyrophosphate (for thickening), mono- and diglycerides (prevent foaming), colors, preservatives

#### **Jell-o Sugar Free Instant Pudding & Pie Filling®**

**Ingredients:** Modified food starch, maltodextrin, disodium phosphate and tetrasodium pyrophosphate (for thickening), nonfat milk, natural flavor, calcium sulfate, xanthan gum, mono- and diglycerides (prevent foaming), aspartame and acesulfame potassium (sweeteners), colors, preservatives

#### **Jell-o Gelatin Dessert®**

**Ingredients:** Sugar, dextrose, gelatin, sodium citrate, fumaric acid (for tartness) tricalcium phosphate (controls acidity), natural flavor, dehydrated lemon juice, color

#### **Jell-o Sugar Free Low Calorie Gelatin Dessert®**

**Ingredients:** Gelatin, adipic acid, fumaric acid (for tartness) disodium phosphate (controls acidity), maltodextrin, natural and artificial flavor, aspartame and acesulfame potassium (sweeteners), color

#### **Country Time Lemonade mix®**

**Ingredients:** Sugar, fructose, citric acid (for tartness), natural flavor, ascorbic acid (Vitamin C) maltodextrin, sodium acid pyrophosphate and sodium citrate (controls acidity), magnesium oxide (prevents caking), calcium fumarate, soy lecithin, artificial color, preservatives

#### **Kool-aid®**

**Ingredients:** Citric acid (for tartness), calcium phosphate, maltodextrin, salt, natural flavor, lemon juice solids, ascorbic acid (Vitamin C), artificial color, preservatives

...Your job is to figure out which products your samples came from! You have at your disposal all the needed equipment and reagents for protein, Benedict's, Iodine and Vitamin C tests. Test instructions are found on pages 4-5. You are free to use as many or as few tests as needed to find the right labels for your products. Your samples have been diluted in advance to make the testing easier.

All solutions are found at each bench station. Please label all glassware with sample identifier and your initials. Please wear aprons. DO NOT TASTE ANY SAMPLES.

Answers are to be placed in chart on answer form. Remember to note the number of your unknown samples!



### **Experiment:**

Each sample will take one cup and approximately one tsp of sample. After completion, empty contents of cups in sink, rinse cups and place in trash can.

- (1) Label 2 cups. Place approx. 1 tsp appropriate sample in each cup. Slowly fill cups half full of water. Note reaction on chart.
- (2) Continue with testing in same cup. Run the following experiments.
  - (a) Vinegar
    - (i) Add 3 mL (1 pipet) vinegar with dropper. Note reaction in table.
  - (b) Iodine test
    - (i) Add 1 drop iodine reagent to cup. Do not shake. Note reaction in table.

**From your results, what would you expect you received as the new ingredient (10 pts) ?**

- b) Cornstarch
- c) Alum
- d) Baking soda
- e) Double acting baking powder

## **Vitamin C Test**

### **Materials:**

small cups  
stirrer  
pipets  
water  
Sample  
Starch solution  
Indicator reagent

### **Method:**

1. Pipette 10 mL of sample into cup.
2. Add 10 drops of starch solution.
3. Use water to fill the cup  $\frac{1}{4}$  to  $\frac{1}{3}$  full. Stir to combine.
4. While gently swirling cup, add iodine solution drop by drop. Swirl the solution until all evidence of the iodine is gone after each drop before adding more drops. The end point is when the solution turns a dark color.

Clean up area by emptying liquids into sink, placing all cups in trash can and wiping down all surfaces with paper towels.

**Results:** for this test will be positive or negative for Division B. Division C will need to use standard curve to estimate amount of vitamin C present.

## **Protein Test**

### **Materials:**

test tube  
Pipets  
Unknown samples  
Reagent

### **Method:**

1. Pipette 20 drops of sample into tube in labeled racks using plastic pipet.
2. From the Protein reagent bottle, add 5 drops of solution to tube with plastic pipette. Gently swirl contents of tube.
- 3. Wait 10 minutes.**
4. Observe and record results (darker purple indicates higher protein content).
5. Clean up area by emptying liquids into **waste container** and placing all tubes into glass disposal box. Do not empty reagent down sink!

## **Iodine Test**

### **Materials:**

test tube  
pipets  
Unknown  
Iodine

### **Method:**

1. With plastic pipet, pipet 20 drops of unknown solution into test tube.
2. Add 1 drop iodine to test tube. Do not shake or swirl.
3. Observe and record results in the table.
4. Place waste in designated container and test tube in glass disposal box.

## **Benedict's Test (Quantitative)**

### **Materials:**

test tube  
Styrofoam cup  
Unknown  
Benedict's Solution  
Hot water (from dispenser)  
pipets

### **Method:**

1. Add 20 drops of each unknown solution to corresponding test tube.
2. Add 5 drops Benedict's solution to each unknown.
3. From water dispenser, fill Styrofoam cup  $\frac{1}{4}$  full of hot water. Return to bench.
4. Place tubes in cup of hot water for 5 minutes.
5. Place tubes into rack for observation.
6. Observe and record results in the table.
7. Place waste in designated container and dispose of glassware in glass box.
8. Pour water down sink.