



## TRASH TO TREASURE

Interoffice Memo

To: Engineering Department

From: PDunn, CFO

Date: January, 2010

RE: %Free Fatty Acid Study

As you well know, each batch of waste frying oil that we receive must be titrated to determine the optimum amount of catalyst for the transesterification process. The purpose of this study is to determine if significant differences exist in the %Free Fatty Acid of the Waste Frying Oil collected:

- 1.) Within different restaurants **in** a chain of restaurants and
- 2.) Between chains of these restaurants

We will randomly sample the Waste Frying Oil of 3 individual restaurants within 4 chains of restaurants.

Please present your findings and recommendation at our Friday meeting in the form of a PowerPoint, and turn in your written report complete with documentation supporting your decision.

Realize that the work you continue to do for our company greatly impacts the world we leave our children.



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Group members names: \_\_\_\_\_

Restaurant Chain Chosen: \_\_\_\_\_

Addresses of the 3 locations: \_\_\_\_\_

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Be sure to label the samples.

Perform the titration for each sample:

.5 grams Phenolphthalein diluted in 100mL water.

.5 grams NaOH diluted in 100mL H<sub>2</sub>O

Place 5mL Waste Frying Oil (WFO) in flask. Mix with 15mL Ethyl Alcohol (EtOH). Add 2 drops of Phenolphthalein solution as an indicator.

Add NaOH solution drop by drop until the mixture turns pink for around 15 seconds. (Make sure to record beginning and ending amounts!!)

$$\%FFA = \frac{\frac{molecularWtOil * amtNaOH}{molecularWtNaOH}}{densityOil * VolumeOil}$$

Select proper Hypothesis test and CHECK ASSUMPTIONS!!! Show work.

Is there a significant difference in the %FFA within your chain of restaurants?

Using a 90%, 95%, and 99% confidence intervals, calculate the mean %FFA in all WFO received from your restaurant chain. What do you notice? Why is this?

Find the Mean %FFA for your restaurant chain. As a Class, perform a hypothesis test to determine if there is a significant difference in the %FFA between the restaurant chains. Show work.

Perform transesterification process. Measure %Glycerol graph this as the response variable, using %FFA as the predictor. Explain any relationship you see.

Prepare a Group PowerPoint Presentation demonstrating your findings. Presentations will be given on Friday. Each student must turn in their own report.