Final Project Protocol

Math 321 Analysis of Variance and Experimental Design

Spring 2010

Instructor: Dr. Rickie J. Domangue

1. **Title of the Project:** The Effect of acidity on the release of pain medicine.
2. **Group Members-** Brittany Ewell, Kristin Davidoff, Ashley Barbee.
3. **Objectives of the Experiment:** To see which **Brand** of pill dissolves fastest depending on the liquid solvent.
4. **Treatment Structure:**

   Factor A: -**Brand** of pill

   Levels of A: Advil, Aspirin (Bayer)

   Factor B: Type of solvent

   Levels of B: Lime juice, coke, water
5. **Response Variable = Percent change of mass in the pill.**

   Measurement Tool= Stopwatch, **Scale.**
6. **Design Structure:**

   Type of Design: Completely Randomized Design

   Describe Testing Procedure: A brand of pill and type of solvent will be randomly selected. If the brand is Aspirin, then a single pill will be selected at random from the available aspirin pills. Measure the weight of the one pill if it is aspirin. If the brand is Advil then two pills will be selected at random. Measure the weights of the two Advil pills. We need to use 2 Advil capsules for every Bayer capsule in order to maintain roughly the same weight. Measure 25mL of the selected solvent in a clear, plastic cup. Drop the pill or pills into the cup. Next, we "zero out" the weight of the pill tray that will be used throughout the experiment. Wait for seven minutes to elapse and then strain the liquid to remove any solids. Then we will measure the mass of the solid remnants of the pill in grams.

Lastly, we will calculate percent change for each trial. This will be repeated for a total of 30 trials, 5 per treatment combination, with the combinations of brand and solvent being randomly assigned through time. The time orders of the trials will be recorded and included in the SAS data set. Dates and times of testing will be recorded and reported in the statistics report.

Experimental Units: 30 time slots

Describe Blocks: none

Randomization Procedures: The 30 combinations of brand of pill and type of liquid will be written on 30 slips of paper, 5 per treatment combination. These slips will be mixed and used to select the combination to test at a particular time slot. Once a type of pill is randomly selected then a pill of that type will be randomly selected from a bag containing the available pills of that type. The results of all randomizations will be documented and included in the statistics report.

7. Extraneous Variables:

a. **Temperature of liquid – We are going to leave each solvent out at room temperature for the same amount of time.**

b. **Measurement error – We are going to control measurement error by using a high precision scale that measure up to three decimal places.**

c. **General Time Effects – the random assignment of treatment combinations through time on a given day will balance out time effects.**

d. **variation of liquid of particular type – the liquid will be stirred before pouring the 25 mL into the cup.**

e. **variation in pills of particular brand – balanced across liquid type by randomly selecting pill to use at a particular time slot.**

8. Statistical Methodology:

a. **Number of Replications Per Treatment Combination: 5**

b. **Analysis:**
ANOVA for two factor treatment structure in a completely randomized design. Interaction will be tested at the 0.10 level of significance. Main effect testing will be done at the 0.05 level of significance. Pairwise comparisons will be conducted using simultaneous 95% Tukey confidence intervals.

9. Protocol Approval Signatures:

I have carefully read this protocol and agree to its terms. Any changes to the experimental process or the analysis must be approved by the course instructor.

Group Members	Signature	Date
Brittany Ewell		
Kristin Davidorff		
Ashley Barbee		
Instructor		
Rickie J. Domangue		