Do detergents containing enzymes really perform better than those lacking enzymes?

Introduction: Many advertisements on television are about cleaning products. These cleaning products claim to take out stains faster, easier, at any temperature and with minimal water. What is a detergent and how is it able to take out the dirt? What makes a “great detergent”? Detergents contain synthetic, organic surface-active agents called surfactants, which lower the surface tension of water and allow dirt and grease on clothing to be removed. In the early 1900s an enzyme was added to the detergent because it is believed that most of the dirt on clothing is protein based. Many enzymes used today are proteases combined with amylases for starch removal.

In this lab, students will determine the effectiveness of detergents containing enzymes and those without. This lab can be extended to allow students to test different factors that will affect the activity of the detergent (e.g. temp, concentration, proteases)

Hypothesis:

Materials:
- 5 T shirt sections
- 4 mL Grass stain solution or other protein based “soil solution”
- 1.5 L of water
- 1 mL liquid laundry detergent containing enzymes such as Wisk or Tide
- 1mL liquid laundry detergent without enzymes such as Woolite

Variables:
- Manipulated
- Responding
- Controlled
- Experimental Control

Procedure:

Day 1

1. One day before the lab cut an old white T shirt into 5 equal squares. Be certain that all 5 squares come from the same shirt to avoid variables such as brand and fiber content.
2. Prepare grass stain solution by blending 100g of grass with 100mL of water. (You could rub the material in a freshly cut lawn)
3. Strain through a cheesecloth.
4. Label each T shirt square A, B, C, D, E. A will serve as your control and will be washed only with water. B and C will be washed with enzyme containing detergents and D and E will be washed with detergents lacking enzymes.
5. Add 4 mL of the grass stain solution to each square.
6. Allow to sit overnight.

Day 2

1. Measure 300mL of cold tap water and pour it into a clean quart resealable plastic bag.
2. Place T shirt A into the bag.
3. Repeat for the remaining T-shirts.
4. Add 1mL detergent with enzyme to B and C
5. Add 1 mL of detergent without enzyme to D and E.
6. Squeeze and shake the bags periodically over the next ten minutes.
7. Create a scale of stain intensity of 0-10 based on the control.
8. Record the results in a data table

Safety:
Validity:

Follow Normal Lab Rubric: