Sudsy Science Showdown

What detergent brand is the most effective at cleaning stains: Tide, Great Value, Arm & Hammer, or All?

This experiment was done to find out which laundry detergent cleans clothes better than others. We expected that Tide laundry detergent would be better at removing stains from clothes compared to the other brands we tested.

Data Analysis And Research Results

Stain Color Legend	Clean → Soiled				
Black Coffee	1	2	3	4	5
Make-Up Foundation	1	2	3	4	5
Grape Juice	1	2	3	4	5
Engine Oil	1	2	3	4	5
Potting Soil	1	2	3	4	5
Yellow Mustard	1	2	3	4	5

In conclusion the experiments showed that the Tide Brand had the same effectiveness for cleaning stains as the other brands. Compared to our hypothesis, the results do not fully support it.

Background Research

Laundry detergents are cleaning products used to remove stains and dirt from fabrics like clothes, upholstery, and linens. These detergents are made up of small molecules that can trap and absorb particles and oils from stains. When the detergent comes into contact with a stain, the molecules attach to the dirt or oil and trap it inside. Then, when the fabric is rinsed with water, the dirt and oils can be washed away. This works because oils and dirt are made of non-polar molecules, which don’t mix with water, since water molecules are polar. The detergent helps break this invisible barrier, which allows the oils and particles to be lifted from the fabric and washed away.

Research Question/Hypothesis

What detergent brand is the most effective at cleaning stains: Tide, Great Value, Arm & Hammer, or All?

Our hypothesis is that the Tide brand Original laundry detergent will be the most effective brand at removing unwanted dirt- and oil-like products from the fabric.

Investigative Methods: Materials

Materials

- White Washcloths (8)
- All Laundry Detergent
- Arm & Hammer Laundry Detergent
- Great Value Laundry Detergent
- Tide Laundry Detergent
- Black Coffee
- Makeup Foundation (Powder)
- Grape Juice
- Motor Engine Oil (Unused)
- Potting Soil
- Yellow Mustard
- Tepid Water (95°F)
- Large Bowls (4)
- Medium Bowls (4)

Investigative Methods: Procedures

Procedure

1. Prepare washcloths by removing all tags and post-production packaging.
2. Label each washcloth to indicate the Trial Number and location where each detergent will be applied.
3. Apply products to washcloths in identical patterns to mimic staining on a commonly worn article of clothing. Repeat to create seven (7) soiled washcloths.
4. Cut the bottom 2/3 of each washcloth into four (4) equal sized strips to separate cleaning agent reactions.
5. Prepare detergent/water solution using 1 tsp of each laundry detergent and approximately 20 ounces of tepid (95°) water in a medium bowl. Do this for each detergent.
6. Prepare a rinsing station using approximately 40 ounces of tepid water in a large bowl. Make one bowl for each detergent/water solution.
7. With gloved hands, dip the first strip from the left into the detergent/water solution for Detergent 1. Use hands to rub stains clean in the solution for 1 minute.

Investigative Methods: Procedures continued

8. Remove strip from detergent/water solution, squeeze excess solution from strip.
9. Discard soiled water, do not reuse.
10. Dip strip into water rinsing bowl to remove absorbed detergent/water solution. Remove strip, squeeze excess water out.
11. Repeat Steps 5-10 for each strip using Detergent 2, 3 and 4.
12. Hang washcloth to dry freely for a minimum of 24 hours.
13. Observe residual stain, compare to Stain Legend and record results in Stain Data Table using a rating of one (1) to five (5), where one is nearly clean and five is completely soiled.
14.Repeat Steps 4-13 for a total of six (6) trials.

Investigative Methods: Variables

Independent:

- Type of laundry detergent
  - All
  - Arm & Hammer
  - Great Value
  - Tide

Dependent:

- Residue of stain left behind after washing

Controlled:

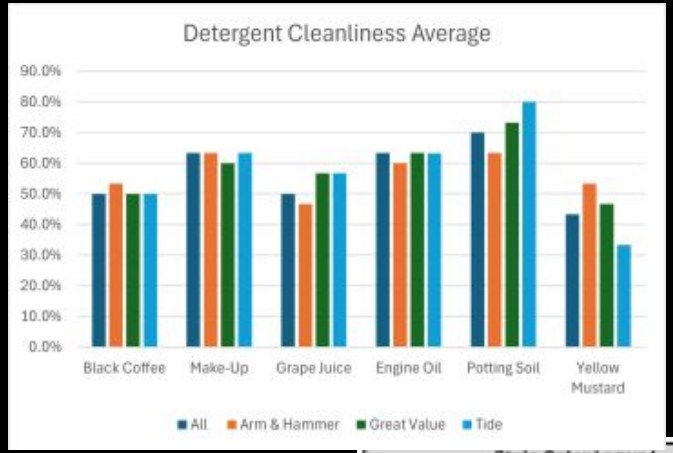
- Amount of detergent used
- Material of towel
- Washing time
- Temperature of the washing water

Results and data visualization

Analysis of Results

Percentage of Success in Removing Stain

Detergent	Black Coffee	Make-Up	Grape Juice	Engine Oil	Potting Soil	Yellow Mustard
All	50.0%	63.3%	50.0%	63.3%	70.0%	43.3%
Arm & Hammer	53.4%	63.3%	46.7%	60.0%	63.3%	53.4%
Great Value	50.0%	60.0%	56.7%	63.3%	73.3%	46.7%
Tide	50.0%	63.3%	56.7%	63.2%	80.0%	33.3%



Stain Color Legend

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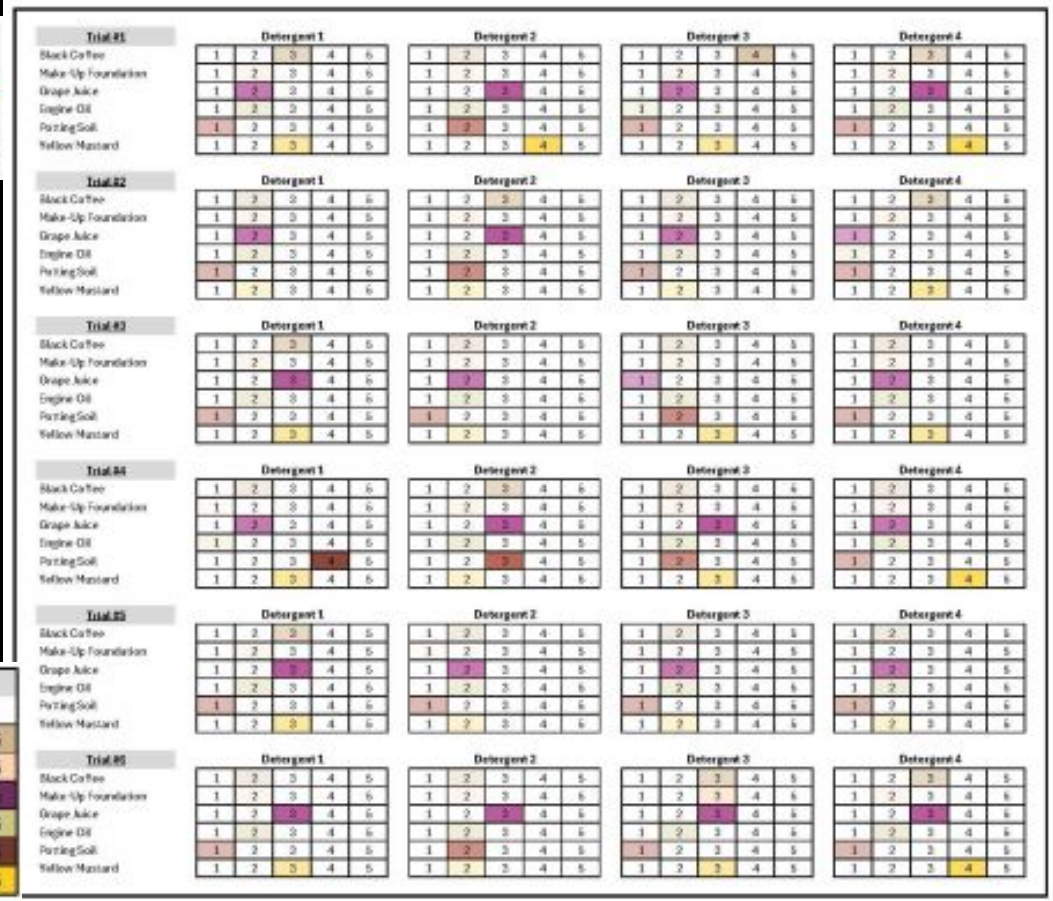

Discussion and Interpretation

After experimenting with each of the four detergents, the results have shown that each detergent performed equally overall. The Tide laundry detergent was slightly more effective than the Great Value laundry detergent when cleaning potting soil, but it was the least effective of all the detergents at cleaning yellow mustard. The Arm & Hammer laundry detergent consistently had the least effectiveness against stains across the six trials. Throughout the experiment, the results for each brand stayed relatively consistent with few variations across the trials. There is no major percentage difference between each brand.

In conclusion the experiments showed that the Tide Brand had the same effectiveness for cleaning stains as the other brands. Compared to our hypothesis, the results do not fully support it. The trial data table shows it was equally as effective as both the All and Great Value laundry detergents, especially for the black coffee, make-up and engine oil stains however it was the least effective overall for removing yellow mustard stains.

Bibliography

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