APPLICATION FOR NSF – 2025

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CLASS IN WHICH STUDYING : XI (Senior Secondary level- Grade-1)

TITLE OF THE PROJECT : ENHANCEMENT AND INVESTIGATION OF CONVERSION OF CLOTH-WASHING SOAP INTO A DETERGENT AND ITS PROPERTIES.

CATEGORY/LEVEL OF THE PROJECT: PHYSICAL SCIENCE/ SENIOR SECONDARY LEVEL

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ENHANCEMENT AND INVESTIGATION OF CONVERSION OF CLOTH-WASHING SOAP INTO A DETERGENT AND ITS PROPERTIES

Aim:

To convert cloth-washing soap into a detergent-like solution using simple additives and to compare its cleaning efficiency, foaming ability, and surface tension with plain soap.

Objective

In this project, I want to find out if I can change ordinary cloth-washing soap into a detergent-like solution that cleans better, removes stains more effectively, and produces more foam by adding simple, safe additives.

Hypothesis

The common household substances like baking soda or washing soda to dissolved soap, the mixture will behave more like a detergent by lowering surface tension, creating more foam, and improving stain removal.

Variables

- **Independent variable:** The type of solution (plain soap solution vs. soap with additives).
- **Dependent variables:** Stain removal, foam height, surface tension, and turbidity of rinse water.
- **Controlled variables:** Type and size of fabric, type of stain, water temperature, washing time, and concentration of soap solution.

Materials and Method:

Materials:

- Bar cloth-washing soap (grated)
- Additives: baking soda, soda ash, and a small amount of commercial liquid detergent
- Cotton fabric pieces (same size)
- Staining material (like cooking oil)
- Measuring cylinder, beakers/buckets, thermometer, stopwatch
- pH strips
- Containers for washing
- Gloves and safety goggles
- Phone/camera for recording results

Method :

Grate the soap and dissolve a fixed amount in water to make a standard solution. **T**hen prepare three other versions by adding different additives (baking soda, soda ash, and detergent). Prepare equal stains on cloth swatches using oil, and let them dry. Wash the swatches in the different solutions under the same conditions (same time, water volume, and stirring).

Analysis:

Visual Comparison: By taking before and after photos of each cloth.
Factors Comparison:

- ✓ Measuring foam height.
- ✓ Checking surface tension using a simple drop test.
- ✓ Observing how turbid (cloudy) the rinse water is.
- ✓ Measuring pH with strips.

Data Comparison:

- ✓ Record the stain removal percentage, foam height, and surface tension for each solution.
- ✓ Then, Represent Graphically to compare Effectiveness.

Safety Measures

Wear gloves and goggles while handling soap and additives. use safe, store-bought materials and dispose of the used solutions properly.

Timeline

- **Day 1:** Prepare soap solutions and stain the fabric pieces.
- **Day 2:** Carry out the washing experiments.
- **Day 3:** Collect data, analyze results, and prepare my report.

Conclusion

The research work expected that modified soap solutions to perform better than plain soap in terms of stain removal, foam formation, and emulsifying oils.

Reference:

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