



Fireworks on milk – how soap works



Introduction

Surface tension is an important property of water. Certain substances can lower the surface tension which can be helpful to people. My project aims to **understand and demonstrate lowering the surface tension which can be used for cleaning.**

Research Questions

Soap works by **decreasing the attractive forces between water molecules**. This experiment was to see if this is true.

Prediction/ Hypothesis

Dish soap will make the food coloring drift away in the opposite direction.

The purpose is **to show that soap lowers the surface tension** of water.

Materials



Plate with
milk



Food
coloring



Food
coloring



Q-tips



Dish soap

Methods



First, put food coloring on milk



Then, dip a Q-tip in dish soap



Dip soapy Q-tip to milk with dye



Colors drift away from the soap dipped Q-tip



Beautiful firework patterns form on the white canvas of milk

Results

Test



Colors drift away from soap dipped Q-tip

Control



Color does not move away from dry Q-tip

Results

Q tip dipped in dish soap on color red	Red color drifts away from Q tip
Q tip dipped in dish soap on color blue	Blue color drifts away from Q tip
Q tip dipped in dish soap on mixed colors	Mixed colors drift away from Q tip
Clean Q tip without soap dipped in colors	No effect on colors, colors stay without drifting.

Total times Experiment was repeated : 2 times

Same results obtained on each repetition.

Conclusion

Water molecules are attracted to one another like magnets. This is called surface tension.

Soap decreases the attraction between water molecules. Soap decreases the surface tension of water.

Conclusion

The colors drifting away from Q tip dipped in soap represent the water molecules moving away due to decrease in surface tension.

This property of soap makes it useful for cleaning purposes.

Implications/ Ideas for future

Adding a surfactant to a coating or detergent lowers the surface tension of the liquid so it will flow more, covering the entirety of the surface.

Examples: Soap/ Detergents for cleaning

Adding surfactant to insecticides enables them to spread them over large area.

Surfactant are present in inks and paints.

Future: Paints and foodstuffs that stick to piping and mixing tanks and where huge amounts are lost in transit or simply stuck in the tank. New ways of reducing surface tension will enable such fluid to flow better.

Real Life Applications

- There are many applications of surface tension.

Surface tension is used in physics, chemistry and day to day activities.

Examples: Pipettes use surface tension.

Cleaning solutions

Insecticides

Paints, Inks

Surfactants



References -

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