

To Investigate the Cleaning Power of Hydrogen Peroxide and Sodium Carbonate

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Theoretical Background:

Detergents and washing agents are commonly used in our everyday lives to wash or get rid of unwanted stains on clothing. From our research, we have concluded that hydrogen peroxide and sodium carbonate are common components in washing detergent, found in almost all different types of washing detergents. Thus, we have decided to come up with an experiment to find out which of the two chemical are the chemical responsible for cleaning the clothes.

Sodium carbonate, which has a similar chemical formula to baking soda, is commonly found in the form of a white powder on the shelves in most supermarkets and can also be found in soap formulas, used as a water softeners and bleaching agents. Sodium carbonate can come in the form of liquid which is clear and odourless. It also is alkaline in nature and has a pH level of 11.6 and thus, is able to remove acidic based stains by neutralising it. Some examples of these stains are food items such as fats, oils and protein-based substances. However, sodium carbonate can be harmful as it can cause irritation to eyes or skin.

Hydrogen peroxide is an oxidising agent, making stains white, like bleach would and thus is known for being able to hide blood stains very effectively. Hydrogen peroxide introduces oxygen to the chemical and breaks down the colour-causing sections of the chemical structures and thus, removes the stains. As hydrogen peroxide has an acidic pH, it is unable to neutralise acidic based stains and remove the stains well. Hydrogen peroxide is commonly found in liquid form and can be used to disinfect cuts. It can also be found in whitening toothpaste and bleaching agents.

Hypothesis:

Hydrogen peroxide is the chemical mainly responsible for removing dirt from clothes.

Abstract:

The main aim of this project is to research on washing agent chemicals, sodium carbonate and hydrogen peroxide, which are commonly found in washing detergents, and to find which of these chemicals is more effective in removing dirt from our clothing. Several tests were conducted on a school uniform where it would be stained with 4 different types of stains, soil, chocolate, chili, tea. Each of these stains were then washed with the 2 chemicals, sodium carbonate and hydrogen peroxide separately. The stains are then observed for their level of cleanliness to determine the cleaning power of each chemical. The main findings of the experiment concludes that the washing power of sodium carbonate is generally higher, as the relative cleanliness of the stains for sodium carbonate is higher.

Introduction:

We will be investigating which chemicals in washing detergent is responsible for removing the most amount of stains from clothing. Based on these results, it might help with further studies on the best chemical composition which will best help remove stains, to improve the quality of detergents. After much research on chemical composition of detergents, we've realised that sodium carbonate and hydrogen peroxide were commonly found in detergents and we wanted to test which chemical had better cleaning power.

Procedure:

1. Stain the blouse with chili sauce and let it sit for 5 minutes.
2. Take a picture of the stain for comparison with the 'after' picture.
3. Mix 50 ml of water with 5ml of hydrogen peroxide.
4. Soak the stained area in the mixture of water and hydrogen peroxide for 5 minutes, stirring continuously.
5. Take out the blouse after 5 minutes and take a picture of the stained area to do a comparison with the 'before' picture.
6. Repeat the experiment twice more to ensure that the results are fair.
7. Repeat steps 1-6 using sodium carbonate instead of hydrogen peroxide.
8. Repeat steps 1-7 with tea, dark chocolate and soil.

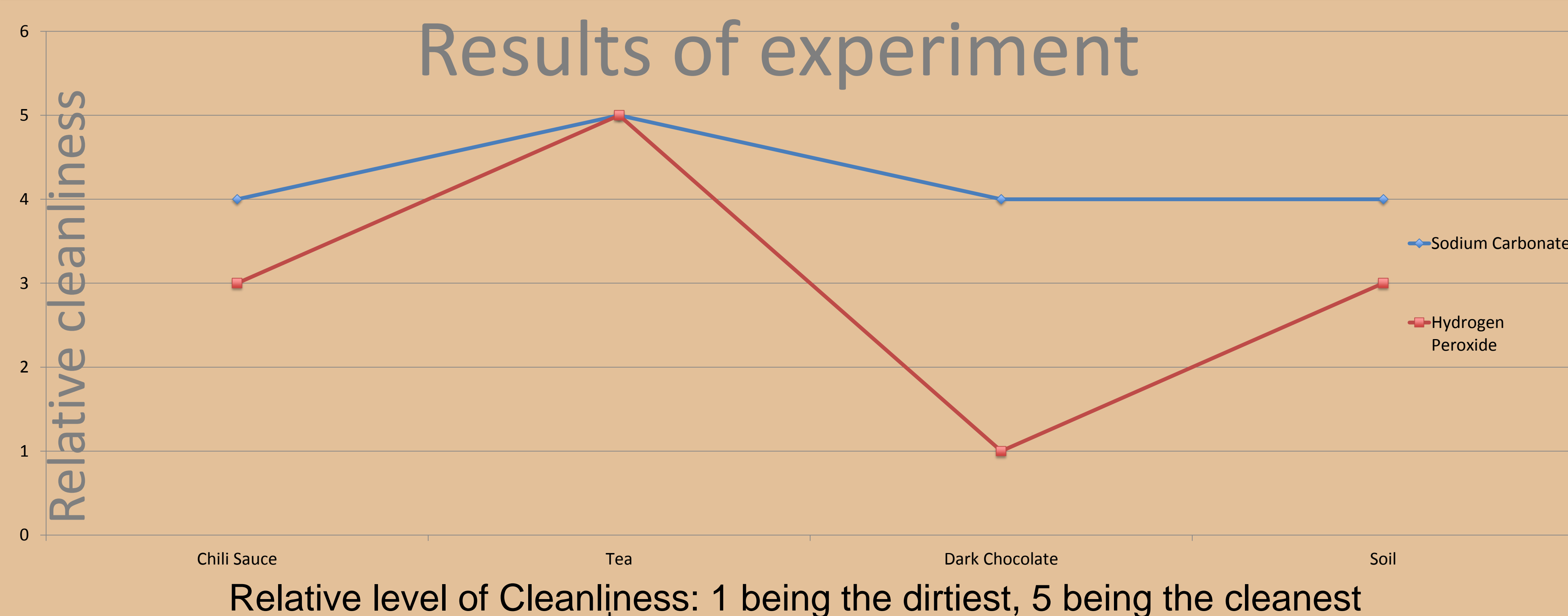
Explanation and Conclusion:

Based on the results, we conclude that sodium carbonate has a stronger cleaning power as compared to hydrogen peroxide. This is because based on our findings, the results of the level of cleanliness for sodium carbonate is mostly higher than that of hydrogen peroxide. Moreover, most commonly found stains are acidic and based on research, sodium carbonate is alkaline by nature and therefore able to neutralise the acidic based stains and remove them. However, hydrogen peroxide is acidic by nature and is unable to neutralise the acidic based stains and remove them. Therefore, we can conclude that sodium carbonate has a stronger cleaning power than hydrogen peroxide as sodium carbonate is able to remove stains better based on sight.

However, both chemicals sodium carbonate and hydrogen peroxide are responsible for removing stains on clothes. This is because based on research, hydrogen peroxide breaks down colour-causing sections of chemical structures because as an oxidising agent, it introduces oxygen to the chemical which breaks down colour-causing sections of chemical structures, and this removes the appearance of the stain, while sodium carbonate neutralises the acidic based stains because of its alkaline pH and removes the stains. Thus, both have the ability to remove stains or the appearance of it. Moreover, because in the results above, both chemicals were able to increase the level of cleanliness and therefore proves that both chemicals has the ability to remove stains although sodium carbonate is better in removing stains.

Based on our results, we have concluded that both sodium carbonate and hydrogen peroxide are important components of washing detergents. However, seeing as sodium carbonate is better at removing stains than hydrogen peroxide, we think that when producing washing detergents, there should be a higher percentage of sodium carbonate compared to hydrogen peroxide.

Results of experiment

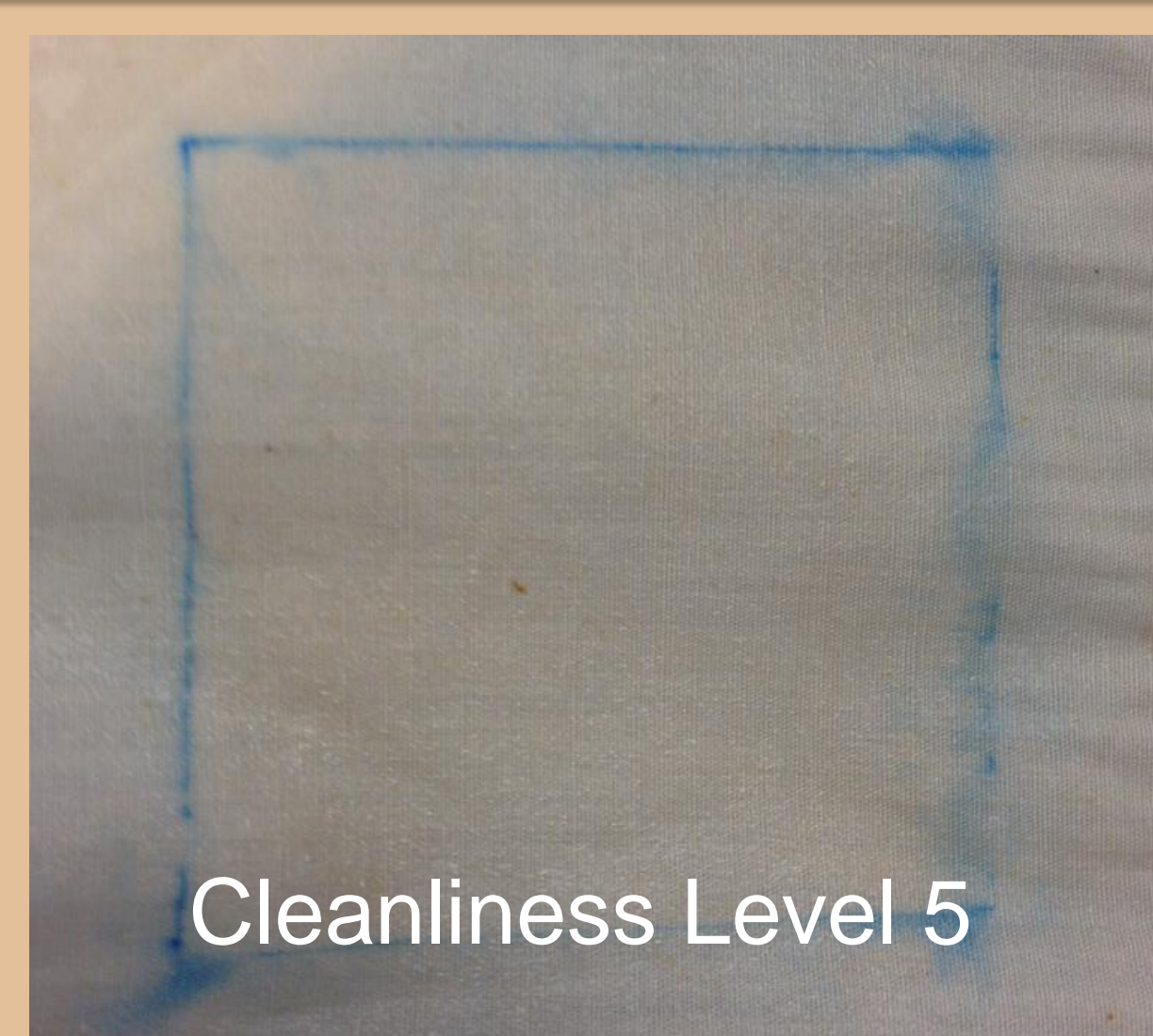


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References:

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What is Washing Soda and Do I Need Some? (n.d.). Retrieved April, 2016, from (how sodium carbonate removes stains) <http://laundry.about.com/od/definitions/g/Washing-Soda.htm>