CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Ravital Solomon

Project Number
J1529

Project Title
Wishy Washy Water

Abstract

Objectives/Goals
This project was performed to observe the varying effects of hard and soft water on hair.

Methods/Materials
The same type of hair was placed in water with different levels of hardness everyday for an hour for a period of three weeks. The hair was dried daily after finishing the water treatment, and the hard/soft water solution was made once a week.

Results
There is a direct relationship between the hardness of water and damage done to hair. As the hardness of water increases, the split ends also increase in ratio, the hair tends to break much more easily and the red color of the hair decreases. In the soft water, the red color of the hair is still noticeable and vibrant. While, in the hardest water (400 mg/L Calcium Carbonate) the hair appears to be a very dark red, almost a black color.

Once the hair is put under a microscope (0.2 A Nikon), the rough edges on a single strand increase as the hardness does. In 40 mg/L Calcium Carbonate-soft water; there are only 2, 1 and 2 rough edges found in 3 different observations (measured per the microscope area). While in 100 mg/L Calcium Carbonate-hard water, there are 8, 3 and 4 rough edges found. In 400 mg/L Calcium Carbonate-extremely hard water, a big change is seen. Total of 28, 58 and 34 rough edges were found.

Conclusions/Discussion
After the procedure was over, and the observations were recorded, it was concluded that hair washed with hard water faces many negative effects: split ends, loss of color, hair breaks more easily, and increase of rough edges found along a strand. The hair in softer water did not experience as many problems, which supported the hypothesis written Some questions that arose from this project include: If the hair is dyed, does it affect the damage done to hair [by hard water]?, Does the type of hair (curly, straight, wavy) reduce or increase damage done to hair [by hard water]?, Is there a possible formula or substance that can minimize the damage done to hair by hard water?

Summary Statement
This project is aimed towards understanding how hard water and soft water may negatively affect and damage hair.

Help Received
Family member arranged help providing microscope, chemicals, and lab space [to prepare water solutions].