Research Paper

Abstract

The UV light that was recoded was inconclusive enough to not show anything that big except that all sunscreens' tests were better than having no sunscreen at all. Most of the data that was collected showed little difference from other data except for the major difference from the data collected for the control group. Some of the major problems in the testing was that the readings were constantly inconsistent based on how much UV light was detected by the sensor and that the testing period was seemingly too short for anything significant to come out in the data. The way I approached the research was probably not the best way and other ways could be found to accumulate more consistent data that might prove something more from the research. The way I approached the research was using a box with two different sized small holes to contain what UV light is read and coated six microscope slides with two different brands of sunscreen and three different SPFs of each brand onto the microscope slides thinly as to not let the thickness of the sunscreen also interfere with the recordings that were being shown. For the bigger hole, I put in the UV light sensor in a way as to detect UV light through the smaller hole but also to read the recordings for the UV light for all the recordings. Using the UV sensor setup I made and all the microscope slides (including one slide without sunscreen for control), I recorded at the start of the experiment and at 20 minute intervals until 120 minutes have passed into the experiment and record how much UV light was getting through the sensor as the slides remained in the sun. In the end of the experiment, the data had shown to remain mostly consistent with the control over the entirety of the testing period and has shown little change throughout the testing period.

Acknowledgements

I would like to thank my parents and teacher for encouraging me to go through the project to the very end of my work on the project and continued support when I struggled at times during the project.

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Introduction

Finding out what different types of sunscreens do to change how much protection comes from different SPFs and different brands in order to help people understand important factors to consider what sunscreen brand to use and at what SPF to use from that brand. The study also helped researchers find some of the main factors that can be tested to create more effective sunscreens while maintaining the established regulations for sunscreen products. This research can also change the way sunscreens are developed or manufactured, because researchers have discovered and made sunscreens more accessible to the public. It may even ask questions or ideas about other products.

Sunscreens are made using a blend of plant ingredients and organic and inorganic UV filters. One such ingredient is “passion fruit seed extract” (DOAJ, Development of sunscreen products containing passion fruit seed extract) used to help protect against UVB. The use of passion fruit seed extract “did not cause skin irritation when assessed in human volunteers” (DOAJ, Development of sunscreen products containing passion fruit seed extract). Most sunscreens use a common mixture of “benzophenone-3, ethylhexyl methoxycinnamate and titanium dioxide at different percentages” (DOAJ, Development and stability studies of sunscreen cream formulations containing three photo-protective filters) that make up 3 photo-protective filters.

Sunscreens also use “metals such as lead and cadmium as preservative and colored elements” (DOAJ, Determination of Cadmium and Lead Concentration in Cosmetics). Researchers found that the Cd density of sunscreens is usually similar between brands, but the density of Pb is higher than that of Cd, and there are differences in Pb between brands. The “levels of Pb and Cd in selected brands of cosmetics were lower than standard limits” (DOAJ, Determination of Cadmium and Lead Concentration in Cosmetics) that could be hazardous to human health. Such hazards may cause allergies, inflammation, skin diseases, cancer, etc. Hence, they should follow regulations when making their products.

The composition of these sunscreens provides “beneficial effects in reducing the incidence of skin disorders” (DOAJ, Recent Trends of Sunscreen Cosmetic: An Update Review). Sunburns were shown to lead to a “higher risk of developing melanoma later in life” (DOAJ, Associations between ultraviolet radiation, tree cover and adolescent sunburns) and were often reported in areas where there is little to no tree line which might reduce the possibility of sunburns. It is hard to associate the connection between sunburns and shade, particularly from tree cover, around adolescent homes and schools. Homes aren’t as often associated with sunburns while schools often have more reports of sunburns as found by researchers.

This research is important because it can show which sunscreens can effectively block UV rays. The research can also help consumers choose more protective sunscreens, which can protect for longer and better resist UV rays. This study may also provide researchers with a way to test sunscreen without the need for human participants. In conclusion, this project could have different effects in the research and development of sunscreens.

Materials

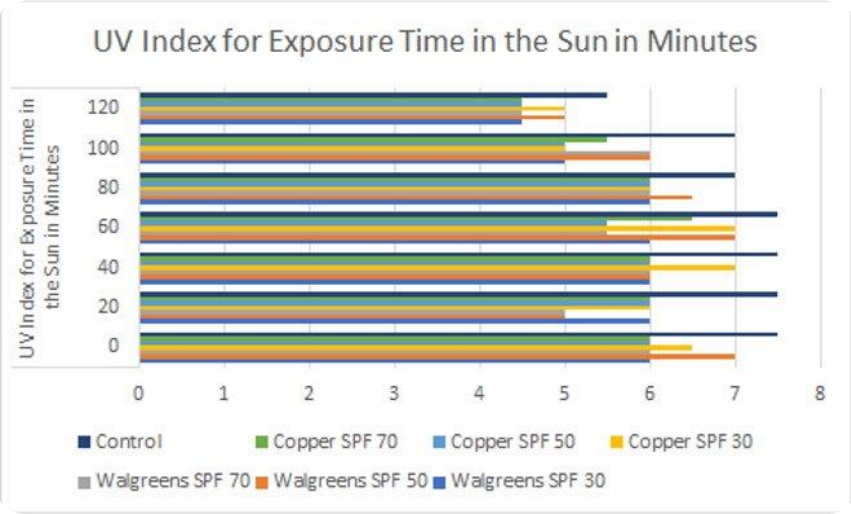
- 6 types of sunscreens (2 different brands, 3 different SPFs (Sun Protection Factor) for each brand) (changes the readings/recordings from the control group)
- 6 Q-tips (to spread sunscreen on 6 of the slides)
- 7Glass microscope slides (about 1in by 3in) (to hold the sunscreen for data recordings)
- Box (larger then 10in X 10in) (to control the UV light that gets detected by the UV sensor)
- Nextav UV Detector (to calculate/record data)
- Timer (to control when data is recorded in even variables)

Procedures

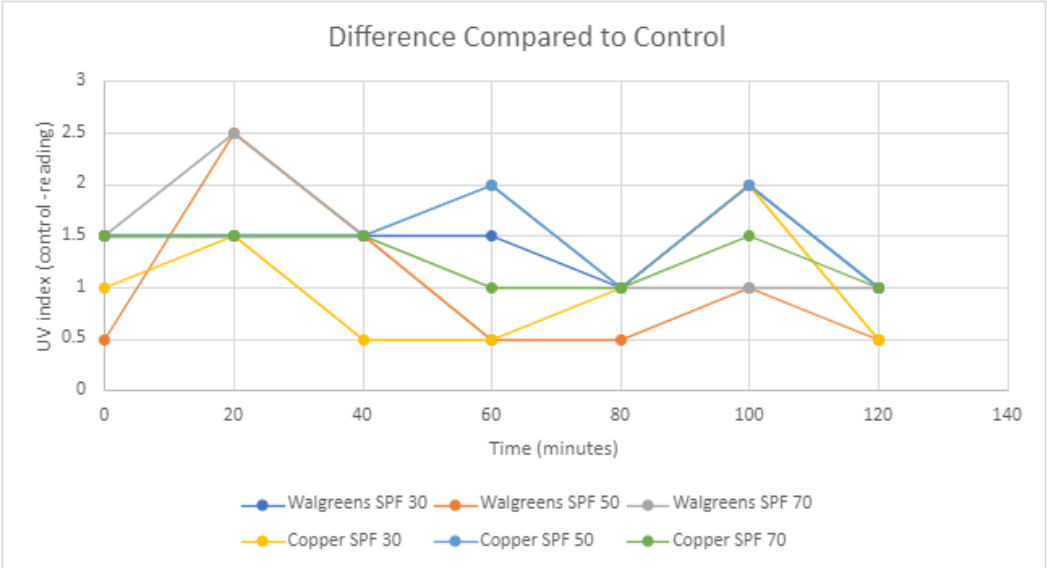
1. Sunscreen was spread on a microscope slide using a Q-tip until it was clear for each sunscreen. One slide was left clean to act as the control group.
2. All 7 slides were set on the box in the sun.
3. A timer was set every 20 minutes.
4. At 20, 40, 60, 80, 100, and 120 minutes (about 2 hours), a UV sensor was used to record the UV rating for each slide and each slide was placed back on the box in the sun for the next interval.

Results

- 7 slides were analyzed over a 2-hour span
    - 6 of the slides contained different brands and SPFs of sunscreens
    - 1 slide was left as a control group



The test readings were subtracted from the control to account for the sun's change in intensity over time.



Discussion

- The testing period was too short for any good data to be found
- The microscope slides reduced the actual reading by 0.5
- The reading was somewhat inconsistent when data was being recorded

Conclusion

Even with the data that was collected, the time period was not big enough to prove anything significant other than the fact that the sunscreens proved to work somewhat against UV light.

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