CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
Kate A. Harrington

Project Number
J2011

Project Title
The Effect of Sunscreens' Sun Protection Factor (SPF) on Ultraviolet (UV) Solar Beads

Abstract

Objectives/Goals
The objective was to find out if a sunscreen with a high Sun Protection Factor (SPF) is put on Ultra Violet (UV) color-changing beads, then the color of the beads will not change to a dark color when exposed to the sun's UV rays. The color intensity of the UV beads will decrease the higher the SPF value.

Methods/Materials
Sunscreens with SPF 15, 30, 55, 100 containing chemical active ingredients and SPF 30 with the physical active ingredient, Titanium Dioxide, were tested on Solar Active UV beads. Three runs with 5 trials each were conducted for a total of 15 trials. I put the UV beads in clear plastic bags and applied the different sunscreens to each bag and observed the color of the beads after being exposed to the sun. A control bag with no sunscreen applied to it was used on each trial to compare with the other beads' results. The color intensity scale: 4=Dark, 3=Medium, 2=Light, 1=white, was used to record the results.

Results
If the beads were a dark color, according to the color intensity scale, then the sunscreen did not work well. The lighter the beads' color the better the sunscreen worked. Sunscreens with SPF 100 and 55 worked the best with an average color intensity of 2.0 and 2.2 respectively. However, sunscreen with SPF 100 had the most consistent results. Sunscreen with SPF 30 and the sunscreen with SPF 30 containing only the physical active ingredient, Titanium Dioxide, had the same average UV bead color intensity of 2.8. The control beads color intensity was 4.0. No beads remained white in color.

Conclusions/Discussion
My results supported my objective because the experiment's results showed that the highest SPF sunscreens (SPF 100, SPF 55) resulted in a light bead color and the lower SPF sunscreens (SPF 30, SPF 15) resulted in a medium bead color. The sunscreen containing chemical active ingredients worked better than the sunscreen containing the physical active ingredient. This information could benefit people by helping them select the most effective sunscreen.

Summary Statement
My project was to find out what sunscreens' Sun Protection Factor (SPF) works the best and to see if the physical ingredient in sunscreens work better than chemical ingredients in sunscreens using Ultra Violet (UV) color-changing beads.

Help Received
My mother helped me learn Excel to produce my charts and graphs.