CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
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Project Number
J1103

Project Title
Determining if the Application of Scotch-gard and RIT Sun Guard Can Increase a Fabric's Ability to Block UVR: Year Two

Abstract

Objectives/Goals
My objective was to determine if the application of Scotch-gard (fabric protector) and RIT Sun Guard (laundry additive) can increase the ability of a fabric to block ultraviolet radiation. The fabrics I used were the 3 that proved the least effective at blocking UVR when treated with an SPF30 sun screen from my year one study. I hypothesized that the combination treatment of RIT Sun Guard & Scotch-gard would provide the best UV blocking potential to fabric.

Methods/Materials
Fabrics tested were: 1) 100% cotton, (natural fiber); 2) 50% polyester/50% rayon, (man-made fiber); 3) 55% linen/45% rayon, (blend). Each test trial will require 16 -150mL. test tubes (TT). For each of the 3 fabrics tested each test trail will have a sample treated with: 1) RIT Sun Guard, 2) Scotch-gard, 3) RIT Sun Guard & Scotch-gard, 4) SPF30 sun screen, and 5) Untreated fabric. TTs were tightly wrapped with fabric samples and filled with 15mL. of white grape juice. One TT was left unwrapped for my control. Then .10cc of active yeast solution was placed into each TT with a tuberculin syringe and cotton stoppers inserted into tops. TTs were then exposed for 1 hour in UV chamber. After exposure TTs were mixed, placed into a spectrometer to record % light transmission against the control. Test results were recorded and averaged on five trials.

Results
My hypothesis for the combination treatment of RIT Sun Guard & Scotch-gard was that it would outperform all other treatments. This was only true for the 100% cotton, natural fiber fabric. RIT Sun Guard alone outperformed the combination treatment on both the 50% polyester/50% rayon, man-made fiber fabric and the 55% linen/45% rayon, natural & man-made fiber blend fabric. The fabric and treatment which tested to have the worst UV blocking potential was the 100% cotton, natural fiber fabric treated with the SPF30 sun screen.

Conclusions/Discussion
In conclusion I have learned from my investigation this year and last year that the laundry additive, RIT Sun Guard will increase a fabric#s ability to block UVR at a greater rate than the application of an SPF30 sun screen, and that the application of Scotch-gard fabric protector can help increase UV blocking when combined with RIT Sun Guard on a natural fiber fabric.

Summary Statement
My project was done because I want to find a way to safely and economically treat fabric to increase its UVR blocking potential.

Help Received
My mother took pictures and helped with proofreading and the layout of my board. My father helped by turning an old toy box into a UV radiation chamber. Mr. Nathan Wittington (H.S. Biology Teacher) allowed me to borrow a test tube mixer and spectrometer.