CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
J1107

Project Title
Determining if the Application of a Sun Protection Factor to Fabric Can Increase Its Ability to Block UV Radiation

Abstract

Objectives/Goals
My goal was to try to find a way to make my fathers work clothing safer. My father is a farmer who spends a lot of time in the sun, and has already been a victim of skin cancer. My hypothesis was that a natural fiber fabric treated with a SPF would provide a better barrier against UVR than a SPF treated man-made fiber fabric.

Methods/Materials
I used a total of 13 different fabric samples. Fabric content and weight were recorded for each sample. Each test trial required 27 - 30ml test tubes (TT). Thirteen TTs were wrapped with one sample each of untreated fabric, and 13 wrapped with SPF 30 treated fabric. The last TT was left unwrapped for my control. Each TT was filled with 15ml of apple juice and 2 drops of active yeast. All TT#s were exposed to direct sunlight for 5 hours. My control TT was boiled for 10 minutes to kill the active yeast. After exposure each TT was unwrapped, gently shaken and placed into a spectrometer to measure its light transmission % against the control blank. The greater the yeast growth, the greater the protection from UVR. Test results were recorded for each trial, and a total of 4 trials were conducted

Results
All natural fiber fabrics treated with a SPF showed an increase in UVR protection. The 100% wool provided the best UVR protection of all natural fiber fabrics tested. The man-made fiber fabric samples showed little difference between the SPF treated and untreated samples. The 100% polyester fleece fabric provided the best UVR blocking of all samples tested. The man-made and natural fiber blends tested all showed an increase in UVR blocking with the application of a SPF. An overall observation was that the greater the fabrics weight, the greater its ability to block UVR.

Conclusions/Discussion
In conclusion I have learned that a heavier weighted natural fiber fabric treated with a SPF 30 will increase that fabrics ability to block UVR. My hypothesis was correct. The natural fiber fabrics treated with a SPF did provide a greater increase in UVR protection over the man-made fiber fabrics. My results would suggest that I could make my fathers work clothes safer by the application of a SPF.

Summary Statement
My project was done to determine if the application of a Sun Protection Factor to fabric could increase its ability to block harmful ultraviolet radiation.

Help Received
My mother took pictures and helped with proof reading and the layout of my board. Mr. Nathen Wittington (H.S. Science Teacher) allowed me to borrow a spectrometer and test tubes to conduct my experiment.