CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
J1124

Project Title
The Sun Sets in the Yeast: Comparing the Effectiveness and Cost of Different Sunscreen Brands and SPF Ratings

Abstract

Objectives/Goals
Ultraviolet light can cause sunburns and damage skin cell DNA which may eventually lead to skin cancer. Commercials make claims of the superior effectiveness of their sunscreen brand. This project's objective was to determine whether brand name and cost make a difference in how effective sunscreens are at blocking ultraviolet radiation, and whether the higher the Sun Protection Factor rating, the more effective the sunscreen is in reducing damaging UV effects.

Methods/Materials
A diluted UV-sensitive baker's yeast culture solution was applied to 20 agar plates, and 4 different sunscreens (a SPF 15 and 30 each for a "natural" and 3 "commercial" brands) were spread on the plate lids. Exposed and unexposed controls were made and the entire procedure repeated to give 2 exact replications. Plates covered with sunscreened lids were exposed to a UV light for 10 minutes each. After 4 days of incubation, the number of surviving yeast colonies in each plate were counted.

Results
Results showed unpredicted large differences between sunscreens (with the natural brand performing worst), and predicted differences between SPF ratings (but not a much as expected). The results also showed that price is not a reliable indicator of brand effectiveness.

Conclusions/Discussion
Some practical conclusions follow from the results: "Commercial" brands tend to be more effective than "natural" sunscreen brands. A higher SPF rating is more protective but not by as much as the rating difference implies. Consumers should choose the least expensive commercial brand. Also, since most sunscreens contain the same active ingredients (octyl methoxycinnamate), other "added ingredients" may account for differences in effectiveness and should be isolated and studied.

Summary Statement
This project examined the relationship between sunscreen effectiveness against ultraviolet radiation and brand, SPF rating, and cost.

Help Received
Father helped me get the UV-sensitive baker's yeast and UV lamp and my teacher approved of my design.