



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>Robert J. Bellerose</b>	<b>Project Number</b> <b>S0501</b>
<b>Project Title</b> <b>Development of a Daily-Use Sunscreen Soap</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective was to develop a bar soap (glycerin) with the active sunscreen ingredient octisalate (octyl salicylate). The sunscreen could be used on a daily basis and provide an SPF of at least 15.</p> <p><b>Methods/Materials</b> I surveyed 100 randomly selected individuals to determine if there was a need/desire for this product. I conducted research on the different types of skin cancer and methods of reducing the risk of it. My research led me to select octisalate, a waterproof UVB agent, and glycerin as the base for the bar soap. I created three different concentrations of the active ingredient: 0% (Control), 5%, and 10%. I used a chemical test to determine the effectiveness of the bar soaps compared to known SPFs (4, 15, and 30). I have conducted multiple tests to confirm the results. I created a UV light source to provide a constant level of UV radiation. The solutions I prepared consisted of benzophenone, isopropanol, glacial acetic acid, and mineral oil. A precipitate formed at the bottom of the test tube. The more precipitate, the less effective the product was at absorbing UV rays.</p> <p><b>Results</b> The test tube with the 5% concentration of the active ingredient (applied to its exterior) produced the same amount of precipitate (0.8 grams) as the test tube with SPF 15 sunscreen did. Therefore, the 5% concentration of the active ingredient had an approximate SPF of 15. Concentrations exceeding this amount would not completely incorporate into the glycerin.</p> <p><b>Conclusions/Discussion</b> My conclusion is that regular use of sunscreen soap with an SPF of 15 would significantly decrease the risk of skin cancer. A study indicated that regular use of sunscreen up to age 18 could decrease the risk of contracting skin cancer by 78%. The chemistry of this experiment involves a redox reaction. Benzophenone is reduced to yield benzopicanol (precipitate) and isopropanol is oxidized to form acetone. The stoichiometry of this reaction is 2 molecules of benzophenone to 1 molecule of benzopicanol.</p>	
<b>Summary Statement</b> I created a glycerin bar soap with the active sunscreen ingredient octisalate (designed for daily-use) and chemically tested its effectiveness.	
<b>Help Received</b> Father helped build board; Parents provided financial and logistic support; Mrs. Acquistapace acted as my mentor throughout the project; Ron Tempest discussed the chemical reaction with me	