

2004 TAIWAN INTERNATIONAL SCIENCE FAIR

CATEGORY : Earth & Space Sciences

**PROJECT : Tree'ting Wood Better:Sunscreen for
Trees**

AWARDS : Earth & Space Sciences First Award

SCHOOL : Crofton House

FINALISTS : Stephanie Chong

COUNTRY : Canada

TREE'ting Wood Better: Sunscreen for Trees

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The purpose of this experiment is to determine whether or not wood can be used as an alternative testing method for sunscreens and which species of wood are good for this objective. This will be accomplished by applying varying strengths, or SPF's, of sunscreens onto thin wood veneers. They will then be exposed using a weatherometer, in which real light and sun conditions will be simulated. Using a device called a Pulmac, the samples of wood will be pulled apart from the centre at zero span. Based on the consistency of the strengths, it can be determined how the wood reacts to the sunscreen and whether that species of wood is suitable as a testing medium.

Trees are an important commodity which enrich the lives of many people, particularly those who live in British Columbia. They provide the means of living and recreation for numerous people, whether it is employment, business, housing, or camping. Since trees are a renewable resource, they are convenient and realistic to use for testing.

There are two possible extensions to this project. If the active ingredients in sunscreens can be determined, then we may be able to use these elements to create a new type of stain for fences and other structures. This could make the necessity for painting less frequent, creating cheaper options for the homeowner. The second possible extension of this project is to use the results to as an initiative to reduce the amount of animal and human testing done by manufacturers. This is important, as animal testing not only causes unnecessary pain, but often the results are not very accurate.

Overall, I determined that this method of testing sunscreens would work quite well, especially with the following species, listed in decreasing order.

- 1) Yellow Cedar
- 2) Yellow Poplar
- 3) Maple
- 4) Hemlock

These results were based on how tightly grouped together the means of the strength values were for each species. The closer they were, the more consistent that type of wood and therefore the better they are for testing.

Overall, I think this method of testing sunscreens would work quite well, particularly with the yellow cedar, maple, yellow poplar and hemlock, as they resulted in fairly consistent strength values. Generally, the sunscreens with a high SPF, or Sun Protection Factor, resulted in a lower strength loss than the sunscreen with SPF 15.

In addition to proving that sunscreen is a good method for preventing UV rays from reaching the skin, this experiment has also confirmed that there are other methods of testing sunscreens, which can be researched further.

Along with my main presentation I will be showing various graphs, statistics, and pictures. They will be supplemented by a booklet of "Commonly Asked Questions and Answers" and species descriptions for each type of wood.

評語及建議事項

本作品利用不同之樹木，塗以防曬油欲判斷哪一種木材適合作防曬效用之實驗，各種木材切成片狀(厚度均一致)，照射 UV100 小時後再施以 Tansies test 由 breaking strength 來判斷何種木材適合作防曬 test。結果發現最佳者為 Yellow cedar，其次為 Yellow Poplar，再其次為 Maple，最不適作防曬 test 為 Hemlock。本作品具有創意亦有實用價值，可以代替以動物作防曬實驗。