CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

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Project Number

22086

Project Title

Will the Clothes You Have on Engulf You in Flames?

Abstract

Objectives/Goals

The objective is to find out if there are fabrics worn in everyday clothing one would not want to wear d| to their reaction to flame. If the composition of a fabric is related to burn speed (ignitability) then fabrics with artificial blends will have the fastest burn speed or ignitability.

Methods/Materials

A small light back-packing stove with a compressed fuel canister containing a mixture of propane and butane was placed in the center of an upside-down aluminum cake bundt pan to create a stable source of flame. A #10 coffee can with both ends removed was used as the testing chamber with a fabric swatch cut from a garment, stretched and fastened with a clamp over one end of the can. The flame was set to a specific level and the can was lowered and left to sit for 3 minutes on top of two spacers between the c| and the bundt pan to provide oxygen flow. Observations were carefully noted. Although the test design doesn't take into account or simulate skin tissue or body mass it provided a method to observe the reaction of fabric to flame.

Results

Upon averaging the several properties of reaction measured in each fabric garment sample, one fabric sample rated near 100% in its' ignitability, disintegrative property and quick reaction to flame and thr| more rated in the 75% range or higher. These top four were comprised of synthetic or synthetic blends.

Conclusions/Discussion

Tests conclusively show that fabrics composed of artificial materials reacted the most to flame. The tes| show that artificial or synthetic blends are worse with regards to fire safety compared to natural blends. Currently extremely flammable fabrics need no labeling or warning of any kind with the exception of children's sleepwear from size nine months to size 14 to be in compliance with the current Flammability Standards Act of 1953, however Congress most recently repealed that labeling requirement. Technology and chemicals exist to make garments safer at the cost of a few pennies per item. Manufacturer's should| be encouraged to exceed the minimal requirements of the Flammability Standards Act and use the advantage of reducing the risk of burn injuries in their marketing techniques. Consequently, future action should be directed to the public by labeling and warning of all flammable fabrics for any age, gender or| size to improve the safety of garments for all human beings.

Summary Statement

Determining the ignitability and reaction of different fabric samples from garments when exposed to flame.

Help Received

My mom took down my dictation while I was observing the fabric to the flame on all 14 samples, she also brought me to Goodwill so I could purchase a few more garments and took me to the sporting goods store so I could purchase new fuel cannisters for my back-packing stove.

Preliminary