

A Strategic Research Initiative for Extended Research on Furniture Chemical Exposure



Expansion of Furniture Chemical Exposure and Flammability Research on Human Exposure to Flame Retardants: A Survey of Furniture in the Marketplace

Introduction

Flame retardants (FR) are added in consumer products and furnishings to reduce their potential of igniting and sustaining fire. However, studies have found links between human exposure to some FRs and health risks including cancer, thyroid alteration, and developmental disorders. UL Chemical Safety and Human Health and their partners have performed an extensive research project, “A Study of Chemical Exposure Risk and Flammability of Upholstered Furniture and Consumer Electronics,” where results indicated that if FRs are added to furniture, they will be released in the surrounding environment and present for human exposure. Human exposure may occur from air and settled dust exposure as well as skin absorption. Currently in the U.S., some residential furniture products are sold without the presence of FRs, passing the smoldering tests by other means. In general, consumers are not aware of specific FRs and the amount of FRs that are added to products available in the marketplace. Global regulations on the use and type of FRs that can be used in consumer products vary, leading to an unpredictable supply chain of materials and flame retardant chemicals.

Study Objectives

This research expansion will survey current residential products in the marketplace to evaluate if flame retardants are present. Chemical identification and quantification, along with experiments to measure human exposure, will evaluate human health risks. Upholstered chairs will be procured across the regions of the United States to represent mid-priced quality furniture available in the marketplace. The regions are: 1) Pacific; 2) Rocky Mountain; 3) Mid-West; 4) Southwest; 5) Southeast; and 6) Northeast. Additionally, upholstered chairs will be procured from Asia, Canada, the United Kingdom, and the European Union so that upholstered chairs are represented across geographical locations with differing flammability requirements. Specific objectives include:

- Extend studies of FR human exposure levels to a range of furniture products currently in the marketplace, focused on midrange pricing and quality accessible to the public.
- Characterize inhalation, ingestion and dermal exposures of FRs to validate test methods and measure exposure risks.
- Evaluate material composition for FRs and compare to exposure potentials.
- Measure additional chemical exposure potentials including volatile organic compounds (VOCs) and

Science Outcomes

This study will contribute new data to evaluate risk exposure of flame retardants and potential flammability of furniture available in the marketplace. This study seeks to validate methodologies for data collection and analyses to present as a standard practice. Key scientific knowledge to be obtained includes:

1. Defining frequency, identity, quantities, and variability of FR usage in residential furniture across different geographies.
2. Advancing the applicability of exposure methodologies used to determine human exposure potentials and pathways.
3. Developing standards and/or guidelines for methodologies so that consistent and accurate data can be obtained among stakeholders for the evaluation of human risk.

Research Partners

- Debra Harris, RAD Consultants, Baylor University
- Sustainable Furnishings Council
- Duke University
- University of Wisconsin