

Volatile organic compound emissions from green and regular fragranced consumer products

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Introduction

Fragranced consumer products emit numerous volatile organic compounds (VOCs), some classified as potentially hazardous. However, fragranced products are exempt from full ingredient disclosure. Further, so-called green fragranced products may lack substantiation for claims. Thus, the public lacks information on emissions and potential hazards. This study investigates VOCs emitted from 212 fragranced consumer products, including personal care products, air fresheners, cleaning supplies, laundry products, sunscreens, baby products, essential oils, and car air fresheners. Products were selected based on two categories, green and regular. The Green category in this study refers to products with claims of green, natural, or organic.

Methods

Headspace GC/MS was used to identify VOCs emitted from 212 fragranced products. All identified VOCs from products were examined for their classification as potentially hazardous under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Results

According to results, across the 212 fragranced products, 3357 VOCs were emitted, representing 878 potentially hazardous VOCs. The most prevalent VOCs among these 212 products, both green and regular, are presented in Table 1. The most common VOCs were limonene (in 66% of products), ethanol (in 49% of products), acetaldehyde (in 44% of products), and alpha-pinene (in 35% of products).

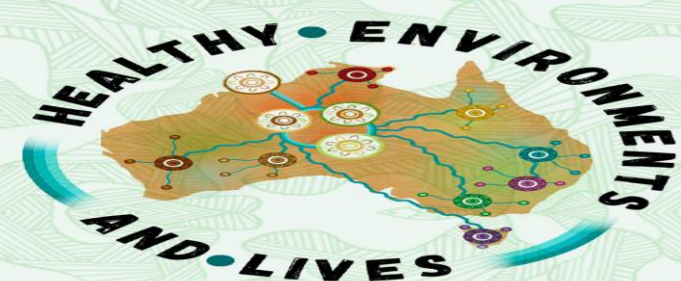
Table 1: Most prevalent compounds emitted from the products

Compound	CAS #	Prevalence (# of 212 products)
Limonene*	138-86-3	139
Ethanol*	64-17-5	103
Acetaldehyde*	75-07-0	94
alpha-Pinene	80-56-8	75
Acetone*	67-64-1	64
Methanol*	67-56-1	38
Isopropyl alcohol*	67-63-0	32
Butane*	106-97-8	27

*Classified as potentially hazardous under the Globally Harmonized System of Classification and Labelling of Chemicals

Discussion:

Over 95% of all green and regular products emitted one or more potentially hazardous VOCs, such as limonene, ethanol, and acetaldehyde. Moreover, emissions of potentially hazardous VOCs from green products were not significantly different from regular products. Fewer than 3% of all VOCs and 7% of potentially hazardous VOCs were listed on any product label, safety data sheet, or website. Results of this study can contribute to improved awareness of emissions, product ingredients, product claims of green, and potential exposures and effects on air quality and health.



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