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Unveiling risk of the fragrant realm: the health and environmental implications of scented candles

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Abstract

For millennia, scented candles have been an integral part of human culture, enriching living environments, facilitating rituals, and evoking pleasure or emotions. Despite their widespread appeal and the escalating international demand driven by their ability to foster ambiance and enhance overall well-being, concerns have emerged regarding their potential ramifications on indoor air quality, human health, and ecological balance. Addressing these multifaceted challenges requires prioritizing transparency, sustainability, and evidence-based decision-making among consumers, manufacturers, and regulatory agencies.

Keywords: *scented candles, human health, environmental impact, consumer awareness Category: Environmental Health*

Editorial

In this contemporary era, scented candles have seamlessly integrated into the realm of holistic well-being, surpassing their role as mere olfactory enhancers. Their luxurious ability to craft a transformative ambience has driven a substantial surge in the global market. The Global Scented Candles Market is expected to leap from 12.1 billion to 18.31 billion US dollars between 2022 and 2030. The largest growth of the candle industry is observed in North America at 32%, followed by Europe at 21% globally in 2022. The growing interest in aromatherapy and holistic wellness practices in India has led to an increase in the demand for candles [1]. According to Statista, India will be one of the foremost contributors to global revenue in the candle industry in 2024, ranking within the top five nations **(Figure 1)** [2]. The prevalence of scented candle usage was higher among females than males [3].

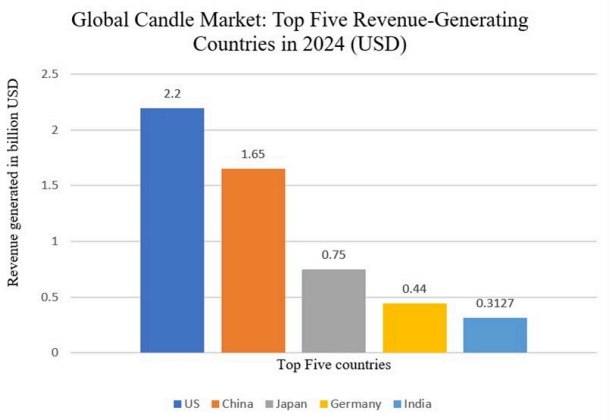

Figure 1. Global Candle Market: Top Five Revenue-Generating Countries in 2024 (USD).

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Cite this Article

G GM, Mohan R, Unveiling risk of the fragrant realm: the health and environmental implications of scented candles. The Evi. 2024:2(1):1-.
DOI:10.61505/evidence.2024.2.1.32
Available From https://the.evidencejournals.com/index.php/j/article/view/32

Received:	2024-02-18
Accepted:	2024-04-25
Published:	2024-05-28

Evidence in Context

• Global scented candle market expected to reach $18.31 billion by 2030 due to wellness trends. • Health risks include respiratory issues and potential cancers from toxic emissions like formaldehyde. • Environmental concerns stem from paraffin wax use, contributing to greenhouse gases and climate change. • Deforestation and biodiversity loss associated with alternative waxes like palm and soy. • Recommends choosing non-toxic materials and using good ventilation to reduce indoor pollution.

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Despite the widespread acknowledgement of scented candles as safe for use and their significant role in improving indoor odour quality, the escalating usage of scented candles has prompted apprehensions regarding potential exposure to their emissions and its subsequent aftermath on indoor atmospheric conditions and the ecological surroundings. An evidence-based study indicates that candles containing fragrance additives emit greater quantities of combustion by-products such as carbon dioxide, carbon monoxide, water, and nitrous oxide than candles without fragrance. The emissions of scented candles encompass diverse aromatic and non-aromatic compounds, such as volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and particulate matter (PM) [4,5]. These compounds have been linked to a spectrum of adverse health effects, including non-specific headaches, respiratory symptoms such as coughing and shortness of breath, migraine headaches, mucosa irritation, eye problems, asthma exacerbations, dermatitis and allergic rhinitis [3,5]. Additionally, phthalates present in scented candles have the potential to permeate the bloodstream through either inhalation or dermal absorption upon their release into the air, thereby exacerbating allergic symptoms, aggravating asthma, and inducing endocrinal hormonal disruptions [6]. Many commonly available scented candles are made from less expensive and low-quality paraffin. Furthermore, they contain formaldehyde and several polycyclic aromatic hydrocarbons recognized as cancer-causing agents, such as anthracene, naphthalene, and pyrene, which have been identified in candle emissions [7]. The prolonged utilization of scented candles within inadequately ventilated enclosed spaces is linked to an elevated risk of bladder cancer and colorectal adenoma due to the presence of VOCs, which are associated with the urothelial carcinogenesis process [8]. Moreover, Katsumi et al. documented a case in which aerosolized paraffin released from candlelight exposed an elderly female to exogenous lipoid pneumonia [9].

Beyond their direct implications for human health, scented candles can exert a broader influence on environmental pollution. Most of them use petroleum-sourced paraffin wax, which emits greenhouse pollutants upon incineration, significantly contributing to climate change. The upsurge in the usage of scented candles has fuelled the need for coconut, soy, and palm wax, which in turn exacerbates habitat loss and deforestation endangering many species of animals [10]. Therefore, consumers should be vigilant when selecting scented candles, minimising their use wherever possible, and opting for candles crafted from natural, non-toxic materials like beeswax infused with natural essential oils. These alternatives are generally considered to have smaller environmental footprints and be more sustainable compared to candles relying on synthetic fragrances. They have the right to transparency regarding the products they introduce into their living spaces. Adequate ventilation is crucial to minimise indoor air pollution during candle usage. Scented candles ought to be used judiciously, especially in enclosed spaces, and avoided in the vicinity of vulnerable populations, including children, expectant mothers, the elderly, individuals with existing allergies or heart and lung conditions, as well as pets. Numerous studies have linked phthalates to reproductive health issues, including decreased sperm counts and an increased risk of pregnancy loss, with reported associations to attention-deficit/hyperactivity disorder in children [11,12]. Manufacturers of scented candles bear responsibility for the safety of their products and should prioritize the well-being of consumers. Regulatory agencies should consider enhancing standards and mandating comprehensive labelling that discloses all ingredients used in these products.

Supporting information

None

Ethical Considerations

None

Acknowledgments

None

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author contribution statement

Gopika M G: Conceptualization, Writing – original draft, Visualization **Raj Mohan**: Supervision, Visualization, Validation, Writing – review & editing

All authors attest they meet the ICMJE criteria for authorship and gave final approvalforsubmission.

Data availability statement

Data included in article/supp. material/referenced in article.

Additional information

No additional information is available for this paper.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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