

Carcinogenic materials in synthetic braids: an unrecognized risk of hair products for Black women

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Black women across the United States are commonly exposed to carcinogens due to inadequate regulation of substances involved in hair braiding, an important cultural beauty practice. While public awareness of harmful ingredients in Black hair products has slowly been increasing,¹ synthetic extensions as a source of toxins has not been an area of focus. Hair extensions used for braiding consist of either human hair or synthetic fibers. Synthetic extensions tend to be used more frequently due to affordability. Extensions are typically worn for at least 4–6 weeks, with continuous exposure to carcinogenic ingredients for those who subsequently reinstall their braids throughout the year. This exposure is taking place in a population already plagued with high rates of endocrine disorders, breast cancer mortality, and uterine disease.¹ Therefore, further research is required to investigate a causal relationship, especially since other Black hair care products have already been associated with negative health outcomes.¹ In the interim, public health practitioners should educate individuals seeking synthetic braids, braiding professionals, and health care providers about potential exposure to carcinogenic compounds, as well as advocate for regulation of synthetic extension ingredients.

By 2028, the global hair wig and extension market is expected to surpass USD 19.12 billion.² Black women in the United States, along with women in continental Africa, are the largest consumer group of this industry.² In 2022, 34% of adult American Black female internet users stated they wore braids with synthetic extensions within the last 3 years.³ Synthetic braids were also the second most popular hairstyle among American Black women aged 18–34.³ Amongst the United States' 16.1 million adult Black women,⁴ 5.5 million (34%) are potentially exposed; however, this is likely an underestimation, as many preteens and teenagers in the Black community frequently wear synthetic braids as well. Given the vast demand and consumption of synthetic braids, intervention is critical.

The current lack of governmental regulation has resulted in the exposure of Black women to toxins in these readily accessible and popular synthetic extensions. For instance, the affordable modacrylic fiber Kanekalon is utilized by many well-known synthetic

braiding extension brands and is commonly recommended by professional braiders due to its resemblance to Afro-textured hair and resistance to unraveling.⁵ Modacrylic fiber is composed of acrylonitrile and vinyl chloride, both of which are toxic to humans. The Environmental Protection Agency classifies acrylonitrile as a probable human carcinogen.⁶ The National Cancer Institute directly links vinyl chloride with leukemia, lymphoma, and rare forms of liver, brain, and lung cancers.⁷ The Occupational Safety and Health Administration's maximum permissible exposure limits of acrylonitrile and vinyl chloride over an 8-h time-weighted average are 2 ppm (0.002 g/L) and 1 ppm (0.001 g/L), respectively.⁸ To braid a full head of hair, stylists typically use eight, 26-inch extension packs. This equates to continuous exposure to 800 g of modacrylic fiber for up to 6 weeks.

Synthetic extensions also contain and emit other concerning substances, including volatile organic compounds (VOCs) upon heat exposure.⁹ Most braiders seal the ends of synthetic braids with hot water treatments or a curling iron to prevent unraveling. Long-term exposure to VOCs may exacerbate asthma in Black communities.⁹ Another concern is that synthetic extensions contain flame retardant fibers—relatively cheap chemicals used to meet fire safety law performance standards—though flame retardants themselves are not required by fire safety laws.¹⁰ In January 2022, New York State joined four other states (Delaware, Georgia, Iowa, and West Virginia) in banning flame retardants due to their adverse health effects, including cancer and reproductive organ toxicity.¹¹ There is currently no ban on flame retardants at the federal level, leaving synthetic hair users at risk. Both stricter enforcement of current flame-retardant bans and enactment of a federal-level flame retardant ban would be regulatory steps toward protecting consumers.

Professional braiders should also be educated in the chemical makeup and potential risks of synthetic braids. One way to achieve this is by standardizing cosmetology education requirements, which may help reduce exposure of consumers and hair braiding professionals, who are also exposed to carcinogenic compounds in synthetic extensions during the 5–8-h installation process. Currently, professional braiders face differing cosmetology curricula by state.¹² Many states do not require braiding to be covered in cosmetology curricula, and curricula that do include braiding often focus on styling methods over chemical components of extensions.¹²



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Even if cosmetology programs were modified, there may still be discrepancies in knowledge across professionals in different states, as training and licensing laws vary.^{12,13} While some may argue for a nationwide cosmetology licensing requirement to braid, this policy would adversely affect professional braiders with lower incomes.¹³ Not all content taught in cosmetology school is applicable to this field, so this unnecessary expense could threaten the supply of professional braiders in low income communities. Despite these challenges, professional braiders, consumers, and other stakeholders would benefit from a minimum standard of understanding imposed at the educational policy level. Exploring smaller scale ways to provide safety education to unlicensed braiders may be appropriate.

Ultimately, consumers implicitly believe the products they purchase are safe. However, exposure to harmful ingredients in synthetic braids is likely creating an underrecognized and unaddressed public health issue for Black communities. Hair care involving synthetic braids is integral to Black culture, especially as Black women pursue alternatives to products used to conform to harmful Eurocentric beauty standards. Unfortunately, current research and policy efforts fall short of defining the extent of risk and protecting individuals who value and engage in this practice. Immediate public health intervention and research are urgently warranted to protect consumers from toxic ingredients linked to adverse outcomes in human health.

Contributors

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Declaration of interests

I declare no competing interests.

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