

Methylisothiazolinone in children's nail polish

Abstract

Isothiazolinones, preservatives including methylisothiazolinone (MI), methylchloroisothiazolinone/methylisothiazolinone (MCI/MI), benzisothiazolinone (BIT), and octylisothiazolinone (OIT), are notorious contact allergens. Pediatric dermatologists are familiar with these preservatives in personal care products, homemade slime recipes, and wet wipes. We present a novel source of MI declared in nail polish marketed to children.

ewg.org/skindeep/) databases list products marketed for children containing MI including shampoos, conditioners and body washes

1 | INTRODUCTION

Isothiazolinone preservatives including methylchloroisothiazolinone/methylisothiazolinone (MCI/MI) and methylisothiazolinone (MI) are well known sensitizers that are responsible for a worldwide epidemic of allergic contact dermatitis; MI was declared the "2013 Allergen of the Year" by the American Contact Dermatitis Society. Recent North American epidemiology data found that MI was the second most common allergen overall (13.4%).¹ In European children <12 years old, it was the third most common allergen (7%).² Some commonly recognized sources of isothiazolinones include homemade slime, wet wipes, and personal care products.

2 | CASE REPORT

We recently patch tested an adult mother with hand dermatitis and MI allergy. Upon examination of all of her (and her family's) products, we found several sources of MI, including a Townley Girl Disney Frozen Non-Toxic Nail Polish, which she applied to her 7-year-old daughter's nails (Figure 1). While MI has been well documented in pediatric skin care products, especially hair products,³ to our knowledge, it has not been reported as an ingredient in nail polish.

Methylisothiazolinone is increasingly used in personal care products for children, because it has been thought to be less sensitizing than MCI/MI. In pediatric skincare products, Schlichte et al³ found a nearly 20% prevalence of MI in 152 products tested from large retail stores. Both the NIH Household Products (<https://healthdata.gov/dataset/household-products-database>) and the EWG (Environmental Working Group) Skin Deep® (<https://www.ewg.org/skindeep/>) databases list products marketed for children containing MI including shampoos, conditioners and body washes



FIGURE 1 A, Townley Girl Disney Frozen Non-Toxic Peel-Off Nail Polish. B, Per packing listed on BabyShop and Desert Cart, contains methylisothiazolinone

TABLE 1 "Hypoallergenic"^a Nail Polish Options for ChildrenLeast allergenic^b

Kid Licks nail polish

Ingredients: Alcohol and confectioner's glaze, and may contain titanium dioxide, blue 1 lake, blue 2 lake, red 3, red 40 lake, yellow 5 lake and yellow 6 lake.

Miss Nella peel-off nail polish

Sample ingredients (Class clown): Water (Aqua), Polyurethane-61, Ppg-2 Methyl ether, Silica, Disiloxane, Peg-150/Decyl Alcohol/SMDI Copolymer, Ethylhexylglycerin, Bentonite, Ammonium hydroxide, Phenoxyethanol, Propylene Glycol, Styrene/Acrylates Copolymer, Tocopherol.

Color Club Watercolors nail polish

Ingredients: Water (Aqua), Polyurethane-1, Propylene glycol, Stearalkonium bentonite. May contain D&C Red 6, D&C Red 7, FD&C Yellow 6, D&C Red 33, FD&C Yellow 5, FD&C Blue 1, D&C Violet 2, Mica, D&C Black 2, Titanium dioxide.

Other options^c

Nailmatic kids nail polish

Sample ingredients (Candy): Aqua (Water), Sodium Styrene/Acrylates copolymer, PPG-3 Methyl ether, Phenoxyethanol, Disiloxane, Sodium bicarbonate, Hectorite, Sodium dehydroacetate, PEG-12 Dimethicone, Propylene glycol, PPG-2 Methyl Ether, PEG-150/Decyl Alcohol/SMDI copolymer, PEG-40 Castor oil, Potassium sulfate, Ethylhexylglycerin, Sodium hydroxide, T-Butyl alcohol, Bentonite, Isooctanol, PPG-30 Butyl ether, Aminomethyl propanol, Silica dimethyl silylate, Tocopherol, CI 77891 (Titanium dioxide), CI 73360 (Red 30 Lake).

Piggy Paint nail polish

Ingredients: Water, acrylates copolymer, neem oil. May contain the following colorants (depending on shade): Red 34 Lake, ultramarines, iron oxide, titanium dioxide, mica, red 28, yellow 10, violet 2, zinc sulfide/copper, copper flake, orange 5, and red 22.

Keeki Pure and Simple nail polish

Sample ingredients (Bubble gum): Water, acrylate copolymer emulsion, glycol ethers. May contain mica (CI 77019), red (CI 15850), blue (CI 77007), white (CI 77891), green (CI 77289) or black (CI 77499) pigments.

Ella+Mila nail polish

Ingredients: Butyl acetate, Ethyl acetate, Nitrocellulose, Isopropyl alcohol, Trimethyl pentanyl diisobutyrate, Acetyl tributyl citrate, Adipic acid/neopentyl glycol/trimellitic anhydride copolymer, Isophorone diamine/isophthalic acid/tromethamine copolymer, Silica, n-Butyl alcohol, Stearalkonium bentonite, Bis(glycidoxyphenyl)propane/bisaminomethylnorbornane copolymer, Acrylates copolymer, Stearalkonium hectorite, Mica, Benzophenone-1, Alumina, Styrene/acrylates copolymer, Trimethylpentanediyl dibenzoate, Polyethylene terephthalate, Polybutylene terephthalate, Polyvinyl butyral, Aluminum hydroxide, Ethylene/VA copolymer, Sucrose acetate isobutyrate, Citric acid, Polyurethane-33. May contain CI 15850, CI 15880, CI 19140, CI 42090, CI 45350, CI 45380, CI 45410, CI 47000, CI 47005, CI 60725, CI 60730, CI 77000, CI 77007, CI 77491, CI 77499, CI 77510, CI 77891.

TABLE 1 (Continued)

Snails water-based nail polish

Ingredients: Water (Aqua), Acrylic polymer, Non-toxic colorants.

Emosa water-based nail polish

Ingredients: Water, Styrene acrylate copolymer, Polyurethane, Propylene glycol, Phenoxyethanol, Polyethylene, Nylon-6, Octane-1,2-diol.

Acquarella nail polish

Sample ingredients (Myrtle): Aqua (CAS: 7732-18-5), Styrene Acrylates copolymer, Acrylates copolymer. May contain: CI 77489 (CAS: 1345-25-1), CI 77492 (CAS: 51274-00-1), Mica (CAS: 12001-26-2), CI 77891 (CAS: 13463-67-7) and/or CI 77499.

^aIngredients listed on manufacturers' websites. As ingredient formulations can frequently change, additional resources to be utilized for more up-to-date listings include the ACDS Contact Allergen Management Program (CAMP), NIH Household Product database, EWG's Skin Deep Database, and FDA Voluntary Cosmetics Registration Program.

^bFree of methylisothiazolinone, tosylamide formaldehyde resin, formaldehyde, toluene, dibutyl phthalate, triphenyl phosphate, and acrylates.

^cFree of methylisothiazolinone, tosylamide formaldehyde resin, formaldehyde, toluene, dibutyl phthalate, triphenyl phosphate. Has acrylate (co)polymers (unlikely to cause sensitization) but no acrylate monomers (high likelihood of sensitization).

manufactured by companies such as Suave, Avon, Aussie, Johnson's, and Dial. Further review of archived products from EWG's Skin Deep Database revealed nine nail polishes by Fing'rs and Piggy Paints that contained MI, though these are no longer marketed. A Google and Amazon search for children's nail polishes found a JoJo Siwa 7-pack nail polish set and a Pure Anada Princess Polish containing MI. Another JoJo Siwa product, a makeup/nail kit sold at Claire's, was recently recalled by the US Food and Drug Administration over the past year after testing positive for asbestos. We found it interesting that despite increased scrutiny of the contents in their products recently, MI has remained an ingredient in the JoJo Siwa nail polish.

While adult nail polishes often contain ingredients such as tosylamide formaldehyde resin, acrylates, formaldehyde, dibutyl phthalate, and triphenyl phosphate, nail polishes marketed for children are often "water-based" and tout the claim of "non-toxic."⁴ However, preservatives such as MI are needed in water-based products to prevent bacterial/fungal growth.

We report this case to raise awareness of a new source of isothiazolinones in children and their family members. Additionally, we have developed a table of currently marketed nail polishes that are "hypoallergenic" and free of MI in addition to other frequently allergenic chemicals, using both product databases and listings on sites such as Amazon (Table 1). While we hope that this table can be a helpful guide for patients, brands do frequently change formulations; therefore, physical examination of individual product labels is critical for assessing relevance and managing allergen avoidance. Over the past few years, baby wipes have been reformulated without MI due to awareness and education.⁵ We hope that continued

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efforts to spotlight potential sources of MI will minimize exposure and predisposition for pediatric allergic contact dermatitis.

KEYWORDS

allergy, contact dermatitis

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