

Airborne allergic contact dermatitis from 3-iodo-2-propynyl-butylcarbamate at a paint factory

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3-Iodo-2-propynyl-butylcarbamate (IPBC) is a fungicide used in both industrial products and cosmetics. We report the first case of allergic contact dermatitis from airborne exposure to this preservative. A 34-year-old female production worker at a paint factory developed dermatitis on air-exposed skin areas. Patch testing showed a ++ reaction to the preservative IPBC 0.01% in petrolatum. The compound was used as a preservative in wood treatment products manufactured at her work place. Based on animal studies, IPBC is considered safe as a cosmetic preservative. However, widespread use of the chemical might lead to increasing levels of contact allergy, and therefore, close monitoring of IPBC is recommended.

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A case of airborne occupational allergic contact dermatitis from 3-iodo-2-propynyl-butylcarbamate (IPBC) used as a wood preservative is presented.

To avoid fungal decay of wood, fungicides are added to paints and wood treatments to control the growth of microbes. 3-Iodo-2-propynyl-butylcarbamate has been used as a fungicide for wood and paint preservation since the 1970s. 3-Iodo-2-propynyl-butylcarbamate is also used as a preservative in cosmetics, adhesives, textiles, plastics, metalworking fluids, inks, and paper, due to its good antimicrobial, technical, and ecological properties, including very low effective-use levels, and the fact that IPBC in animal studies has shown a low sensitizing capacity. According to the European Cosmetics Directive (1), IPBC is allowed in cosmetics at a maximum concentration of 0.05%. Because of a contribution of iodine from IPBC, products containing the preservative at concentrations above 0.02% must be labelled 'Contains iodine'. A limited number of cases of allergic contact dermatitis from IPBC in cosmetics and in the occupational setting have been published (2–6).

In the US, companies can voluntarily register the use of cosmetic ingredients with the Food and Drug Administration (FDA). In 1996, 122 cosmetic products out of 19 150 were reported to contain IPBC, and in 2001, 170 products out of

16 687 were so reported (7). According to the FDA register, IPBC is the preservative in cosmetics with the fastest growth in use in this 5-year time period.

Case Report

A 34-year-old woman with a history of atopic dermatitis had been working for 6 years at a paint factory when she developed dermatitis on the hands, neck, scalp and face. The dermatitis appeared shortly after she had been transferred to the section of the factory where the ingredients of wood-preservation products were mixed. Our patient handled the liquid biocide product Troysan EX 580 (Troy Corporation, Newark, NJ, USA) containing 20% IPBC, using protective gloves. However, direct skin contact with wood paint occurred. For instance, when our patient carried samples for analysis to the laboratory, some of the wood paint occasionally splashed onto her hands. The wood paint contains 4–5% IPBC and probably caused the sensitization. After a few weeks with continuous worsening of her dermatitis on air-exposed areas, she was moved back to her previous job of canning finished paint products. This work had not previously caused any skin problems, but now she had become sensitized and the same exposure was

sufficient for the skin problems to persist and for the dermatitis to spread to her legs.

Our patient was eventually moved from the production facility to a job as a secretary and her dermatitis disappeared, except on her hands where it continues but is much less severe. During vacation, the eczema clearly improves, so the hand dermatitis is still considered work-related, due to the low-level exposure occurring when she is in the production facility for administrative purposes.

Patch tests with the European standard series (TRUE Test[®] panels 1 and 2 (AlkAbello, Hoersholm, Denmark)) supplemented with petrolatum (pet.)-based patch test preparations (Chemotechnique, Malmö, Sweden) in Finn Chambers[®] (Epitest Oy, Helsinki, Finland) on Scanpor[®] (Alpharma AS, Oslo, Norway) confirmed a previously known allergy to nickel sulfate. She was also tested with selected preservatives and showed a + reaction to methyl dibromoglutaronitrile (MDGN) 0.5% pet. and a doubtful reaction to MDGN 0.3% pet. However, after a careful patient history, these reactions were considered not relevant.

One product used at the paint factory was Troysan Polyphase P100 (Troy Corporation) containing 97% IPBC. A sample was kindly supplied by the paint factory, and the patient was patch tested with 0.1% (recommended patch test concentration), 0.03% and 0.01% IPBC in pet. to determine the degree of sensitivity. The patient showed a ++ reaction to all 3 concentrations, though the reaction to 0.1% was discernibly stronger than to the 2 lower concentrations. Unfortunately, further testing with a dilution series to establish the threshold was not possible.

Discussion

Biocides are biologically reactive chemicals with expected irritant and allergenic potential. Cases of allergic contact dermatitis have been reported from IPBC, and in the case presented here, the dermatitis was located on exposed skin areas such as the face and neck, suggesting that IPBC can cause contact allergic reactions from airborne exposure. Allergic contact dermatitis from airborne exposure to a preservative has previously been described. Methylchloroisothiazolinone/methylisothiazolinone has been reported as the causative agent in several cases where the patient had been exposed to newly painted walls (8–11).

Occupational exposure to IPBC can be minimized by taking precautionary measures and avoiding skin contact with the biocide. However, exposure from cosmetic products is less predictable. Based on animal studies, IPBC has been characterized as a weak sensitizer (12, 13). The chemical is

regarded as one of the safer cosmetic preservatives, and the use of the chemical in cosmetic products is becoming more widespread. However, underestimation of the sensitization potential of chemicals by predictive animal testing has been reported. As an example, the guinea-pig maximization test found MDGN to be a weak sensitizer (14, 15), but as the preservative became increasingly popular, a rise in the frequency of sensitivity to the chemical was registered. Recently, a 10-year analysis showed a rise from 0.7% in 1991 to 3.5% in 2000 in the average frequency of sensitivity to MDGN in eczema patients from 15 European clinics (16). Other predictive guinea-pig test methods and the mouse local lymph node assay found MDGN to be a strong allergen (17, 18), and an urgent evaluation of the use of the preservative in cosmetics is now recommended by the Scientific Committee on Cosmetic Products and Non-Food Products Intended for Consumers (19).

Increased exposure from a widespread use of IPBC will probably result in an increase in the frequency of allergic reactions. The size of this increase is hard to predict; therefore, it is important to monitor the level of allergic reactions to IPBC closely in the near future.

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