

EDITORIALS

Airborne exposure to preservative methylisothiazolinone causes severe allergic reactions

Risk of contact dermatitis is already clear but now non-contact exposure is a growing problem, particularly with paint

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Chemicals usually cause allergic reactions through direct contact with the skin. For example, a person may develop an allergic reaction from the use of cosmetic products containing allergenic fragrance ingredients or preservatives. The result is allergic contact dermatitis—a type IV immune reaction. Until recently, airborne exposure to allergens—for example, plant allergens such as *compositae* or industrial chemicals such as isocyanates—was a well known but rare cause of allergic skin reaction. The introduction of a new preservative, methylisothiazolinone, which is now extensively used in products such as cosmetics and paints, has changed this.¹

An alarming increase in allergic skin reactions after airborne exposure to methylisothiazolinone has been seen in several countries. In Denmark, allergic reactions to this compound in patients with eczema rose from 1.4% in 2009 to 3.1% in 2011 (55 positive reactions to methylisothiazolinone in 2470 patch tested patients; data not yet published). Half of the patients had been exposed to methylisothiazolinone through cosmetic products and more than a third through paint. Three quarters of the patients with exposure through paint presented with airborne allergic dermatitis, sometimes accompanied by asthma, after painting their homes or staying or working in newly painted rooms. The presenting features were dermatitis at skin sites not covered by clothes, such as the face and neck (airborne contact dermatitis), sometimes accompanied by asthma symptoms, or systemic contact allergic reactions with rash in the popliteal and antecubital fossa and flare-up reactions, such as hand eczema. Early reports on methylisothiazolinone contact allergy show a one year prevalence of 0.9-1.8% in patch tested patients.²⁻⁴ Exposure was mainly from cosmetics (such as wet wipes) and paint.³ Recent publications have shown that methylisothiazolinone emissions from paint can elicit systemic allergic reactions that require hospital admission and can even sensitise healthy non-allergic people.⁵⁻⁶ Moreover, methylisothiazolinone exposure was recently noted to be one

of the most common causes of occupational contact dermatitis in painters.⁷

In an ongoing study, we found that 17 different wall paints purchased in Denmark all contained methylisothiazolinone in concentrations between 10 and 300 parts per million (ppm).⁸ In an experimental situation, emission of methylisothiazolinone from painted glass plates was measurable for at least 26 days.⁹ The emission of methylisothiazolinone from painted gypsum boards in a closed chamber is currently being studied.

Methylisothiazolinone has been used in a 1:3 combination with methylchloroisothiazolinone since the early 1980s. Since then, this combination has been one of the most common causes of contact allergy to preservatives. It has been regulated several times and is now limited to 15 ppm in cosmetics. In 2000, methylisothiazolinone alone, which is claimed not to be as potent a sensitiser as methylchloroisothiazolinone, with an estimated EC3 value of 1.9% (which corresponds to a moderate sensitiser),¹⁰ was released on the market. It was first used in occupational products, such as paint and lacquers, where the introduction of new chemicals is less strictly regulated. The first cases of methylisothiazolinone contact allergy caused by occupational exposure were published in 2004.¹¹

In 2005, methylisothiazolinone was permitted in cosmetics in both the European Union and the United States at a maximum concentration of 100 ppm—more than 25 times greater than that allowed in the methylchloroisothiazolinone-methylisothiazolinone combination.

The increase in methylisothiazolinone contact allergy is similar to that seen for methyldibromo glutaronitrile in a 2002 study,¹² which led to methyldibromo glutaronitrile being banned in cosmetic products. However, the increase in methylisothiazolinone contact allergy seems to be more rapid, and the severe reactions associated with airborne exposure are alarming. Currently, there are no legal restrictions or labelling demands for methylisothiazolinone in products other than

cosmetics and household cleaning products, making it difficult for consumers and workers to consciously avoid exposure to methylisothiazolinone. A major concern is that products containing this preservative are now being used extensively in public, domestic, and occupational settings, increasing overall exposure and thereby the risk of developing dermatitis.

It is unacceptable that a commonly used chemical should be allowed to pose a threat to human health through airborne exposure in many environments. We suggest that the existing risk assessments for cosmetic and industrial products that contain methylisothiazolinone should be re-evaluated. In addition, regulators should consider immediately lowering the allowed concentration of this compound in all types of products until a safe concentration is established or methylisothiazolinone is completely banned from all consumer and occupational products.

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- 1 Lundov MD, Krøngaard T, Menné T, Johansen JD. Methylisothiazolinone contact allergy: a review. *Br J Dermatol* 2011;165:1178-82.
- 2 Schnuch A, Lessmann H, Geier J, Uter W. Contact allergy to preservatives. Analysis of IVDK data 1996-2009. *Br J Dermatol* 2011;164:203-11.
- 3 Lundov MD, Thyssen JP, Zachariae C, Johansen JD. Prevalence and cause of methylisothiazolinone contact allergy. *Contact Dermatitis* 2010;63:164-7.
- 4 Ackermann L, Aalto-Korte K, Alanko K, Hasan T, Jolanki R, Lammintausta K, et al. Contact sensitization to methylisothiazolinone in Finland—a multicentre study. *Contact Dermatitis* 2011;64:49-53.
- 5 Lundov MD, Mosbech H, Thyssen JP, Menné T, Zachariae C. Two cases of airborne contact dermatitis caused by methylisothiazolinone in wall paint. *Contact Dermatitis* 2011;65:176-9.
- 6 Kaae J, Menné T, Thyssen JP. Presumed primary contact sensitization to methylisothiazolinone from paint: a chemical that became airborne. *Contact Dermatitis* 2012;66:341-2.
- 7 Mose AP, Lundov MD, Zachariae C, Menné T, Veien NK, Laurberg G, et al. Occupational contact dermatitis in painters - an analysis of patch test data from the Danish Contact Dermatitis Group. *Contact Dermatitis* 2012;67:293-7.
- 8 Lundov MD, Bossi R, Kolarik B, Gunnarsen L, Johansen JD. Methylisothiazolinone—direct and airborne exposure from paint. *Contact Dermatitis* 2012;66(suppl 2):30-1.
- 9 Bohn S, Niederer M, Brehm K, Bircher AJ. Airborne contact dermatitis from methylchloroisothiazolinone in wall paint. Abolition of symptoms by chemical allergen inactivation. *Contact Dermatitis* 2000;42:196-201.
- 10 Gerberick GF, Ryan CA, Kern PS, Schlatter H, Dearman RJ, Kimber I, et al. Compilation of historical local lymph node data for evaluation of skin sensitization alternative methods. *Dermatitis* 2005;16:157-202.
- 11 Isaksson M, Gruvberger B, Bruze M. Occupational contact allergy and dermatitis from methylisothiazolinone after contact with wallcovering glue and after a chemical burn from a biocide. *Dermatitis* 2004;15:201-5.
- 12 Wilkinson JD, Shaw S, Andersen KE, Brandao FM, Bruynzeel DP, Bruze M, et al. Monitoring levels of preservative sensitivity in Europe. A 10-year overview (1991-2000). *Contact Dermatitis* 2002;46:207-10.

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