

Occupational contact allergy to the epoxy resin hardener 2-methylpentane-1,5-diamine

Susanne Darr-Foit¹, Johannes Geier², Peter Elsner¹ and Sibylle Schliemann¹

¹Department of Dermatology, University Hospital, D-07743 Jena, Germany and ²Information Network of Departments of Dermatology (IVDK), University of Goettingen, D-37075 Goettingen, Germany

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Epoxy resin systems are mainly composed of resins, reactive diluents, and hardeners. Sensitization may occur to all of these components, with *m*-xylene diamine (MXDA) being the most frequent allergen among the hardeners (1, 2). We recently observed a case of contact allergy to the hardener 2-methylpentane-1,5-diamine (MPMD; CAS no. 15520-10-2).

Case Report

A 63-year-old painter and varnisher presented with a 4-year history of work-related contact dermatitis affecting the dorsal surfaces of his hands, forearms, and face. He reported itching, burning and oozing when he occupationally handled epoxy resin systems.

Patch testing was performed by the use of small Finn Chambers[®] on Scanpor[®] tape (SmartPractice Europe, Reinbek, Germany) with the baseline, rubber, resins/adhesives, ointment base, preservative and industrial biocides series, as recommended by the guideline of the German Contact Dermatitis Research Group (3), and with ingredients of the patient's working material: epoxy resin based on diglycidyl ether of bisphenol F (0.25% pet.), 4-tert-butylphenol (1% pet.), polyoxypropylene diamine (1% pet.), 1-methoxy-2-propanol (5% pet.), and MPMD (0.25% pet.). The exposure time was 2 days. Non-negative test reactions are shown in Table 1.

Discussion

MPMD (syn. 2-methyl pentamethylene diamine) is an aliphatic amine hardener used in epoxy resin systems

Table 1. Non-negative patch test reactions

Substance and test concentration	D2	D3	D6
2-Methylpentane-1,5-diamine 0.25%	?	++	+++
<i>m</i> -Xylene diamine 0.1%	–	–	+
DGEBA epoxy resin 0.25%	?	?	?
DGEBA epoxy resin 1.0%	?	?	?
Fragrance mix 8.0%	++	+	?
Hydroxyisohexyl 3-cyclohexene carboxaldehyde 5.0%	+	+	+
Fragrance mix II 14.0%	–	+	+

DGEBA, diglycidyl ether of bisphenol A; DGEBAF, diglycidyl ether of bisphenol F.

The vehicle was pet. throughout.

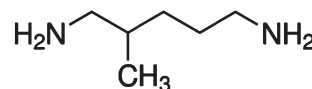


Fig. 1. Chemical structure of 2-methylpentane-1,5 diamine (MPMD; CAS no. 15520-10-2).

(Fig. 1). MPMD is not widely used in epoxy resin systems in Germany. It was found in only 48 of 1850 products for which material safety data sheets are registered at the 'Hazardous Material Information System' of the statutory accident insurance of the construction industry (Gefahrstoff-Informationssystem der BG BAU; GISBAU; www.bgbau.de/gisbau) (K Kersting, pers. comm., GISBAU, Frankfurt, Germany). MPMD is marked as corrosive (H314), but not as sensitizing (H317). In the 1980s, sensitization tests on guinea-pigs were performed, with negative results. However, these experiments were not reported and published in detail (4). To the best of our knowledge, there are no reports of contact sensitization to MPMD in humans. As our patient handled an epoxy resin system containing both MPMD and *m*-xylene diamine, it is probable that he

Correspondence: Susanne Darr-Foit, Department of Dermatology, University Hospital Jena, Erfurter Straße 35, D-07743 Jena, Germany. Tel: +49 3641/93 73 50; Fax: +49 3641/93 73 43. E-mail: Susanne.Darr-Foit@med.uni-jena.de

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was co-sensitized by co-exposure to both compounds. Remarkably, he did not show clear-cut positive reactions

to the resin compounds. We suggest patch testing with MPMD in exposed cases.

References

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