

Hazards of Ethyl Methacrylate

To the Editor:

This letter is in response to the commentary of Dr. Edward M. Jackson in the March 1999 issue of the *American Journal of Contact Dermatitis*.¹ In his commentary, Dr. Jackson suggests that the hazards of ethyl methacrylate are overstated. We would like to respond.

Dr. Jackson states that a National Institute for Occupational Safety and Health (NIOSH) report (Spencer et al²) "contains opinion and editorializing that is unsupported by the scientific and medical literature" in describing ethyl methacrylate as a *potent* sensitizer. Sandmeyer and Kirwin³ state, "Although methyl, ethyl, and butyl methacrylates are potent sensitizers, experimental simulation proved rather difficult, owing to the rapid evaporation on the materials tested." Chung and Giles⁴ state, "The data obtained with guinea pigs in the present study corroborate the reports that methacrylate monomers are very potent sensitizers in humans." We realize these are both broad statements that include methyl and ethyl methacrylates and should probably not be applied to ethyl methacrylate alone. In addition, the terms "potent" and "weak," as applied to sensitizers, have their limitations because these descriptors are neither clearly nor objectively defined. Still, we note that ethyl methacrylate is a sensitizer, as is methyl methacrylate. The best available data for etiologies of contact dermatitis in the United States come from the North American Contact Dermatitis Group, which from 1987 to 1989 found 18 of 228 patients to be allergic to methyl methacrylate and 15 of 228 patients to be allergic to ethyl methacrylate (Marks and DeLeo⁵). Therefore, both methyl methacrylate and ethyl methacrylate can cause allergic contact dermatitis as well as asthma. Although threshold doses for sensitization and elicitation are unknown, an exposure or "dose large enough" would cause allergic reactions in susceptible individuals. It is important that workers exposed to these chemicals be aware of this and that primary or secondary prevention strategies be emphasized in these workplaces.

Dr. Jackson cites a NIOSH report (Spencer et al²) as an example of the "legal/regulatory literature." As a clarification, NIOSH reports are not part of the "legal/regulatory literature," but are intended to alert workers, employers, and health and safety professionals of potential hazards in the workplace and provide recommendations to prevent and reduce work-related illnesses and injuries.

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References

1. Jackson EM: Commentary: The sensitization potential of methyl methacrylate and ethyl methacrylate. *Am J Contact Dermat* 10:49-50, 1999
2. Spencer AB, Estill CF, McCammon JB, et al: Controlling chemical hazards in the nail salon industry. National Institute for Occupational Safety and Health Report No. ECTB 171-05v, Cincinnati, OH
3. Sandmeyer EE, Kirwin CJ: Toxicology, Clayton GD, Clayton FE (eds): in *Patty's Industrial Hygiene and Toxicology*, (ed 3). New York, NY, Wiley-Interscience, 1981, pp. 2298-2302
4. Chung CW, Giles AL: Sensitization potentials of methyl, ethyl, and *n*-butyl methacrylates and mutual cross-sensitivity in guinea pigs. *J Invest Dermatol* 68:187-190, 1977
5. Marks JG, DeLeo VA: *Contact and Occupational Dermatology*. St. Louis, MO, Mosby Yearbook, 1992, p. 141

Response

To the Editor:

We appreciate the opportunity to reply to the response of Dr. Lushniak, Ms. Estill, Ms. McCammon, and Mr. Estill to our commentary on methyl methacrylate and ethyl methacrylate, which appeared in the *American Journal of Contact Dermatitis* (10:49-50, 1999). It is important to have this kind of dialog to continue to clarify the contact dermatitis potential of ethyl methacrylate.

The Sandmeyer and Kirwin (1981) reference unfortunately contains outdated information that has been supplanted by a series of guinea pig sensitization tests performed in the late 1980s, the 1990s, and as recently as 1999. These data, taken as a whole, clearly show that ethyl methacrylate is an intermediate and weak sensitizer (see Table 1 of reference 1).

In addition, in 1999, we conducted human patch testing that showed that ethyl methacrylate did not induce sensitization in an experimental contact dermatitis test protocol. This human sensitization testing is referenced in the recently updated and expanded Final Report on the Safety of Ethyl Methacrylate. The revised ethyl methacrylate report was accepted by the Cosmetic Ingredient Review Expert Panel at their December 20, 1999 meeting in Washington, D.C.²

The Chung and Giles (1977) reference exemplifies the confusion in the earlier literature on methacrylates, in which the term *potent* is applied across the board to the methacrylate class of chemicals. Although *potent* sometimes is used in describing results from guinea pig sensitization testing, the terms *strong* and *weak* are appropriate descriptors as exemplified by the contact dermatitis literature, which is almost always based on actual human experimental contact dermatitis testing or case reports from practicing clinicians.

In regard to dose, the human patch testing we conducted² was performed at a ethyl methacrylate concentration of 100%. Medical alerts from government agencies should be based on a complete review of all the available and scientific data available. The National Institute for Occupational Safety and Health (NIOSH) report we referenced in our commentary³ and its subsequent publication elsewhere⁴ do not use, and, therefore, do not reference the important review by the Dutch Expert Committee on Occupational Standards⁵ nor the original Expert Panel Report on the Safety of Methyl Methacrylate,⁶ which has now been revised and expanded.¹

In conclusion, all the available published scientific and medical information available on ethyl methacrylate show that it is a weak sensitizer as we originally reported in our commentary.

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References

1. Amended final report on the safety assessment of ethyl methacrylate, approved for publication by the Expert Panel of the Cosmetic Review, Washington, DC, December 20, 1999
2. Jackson EM: Patch test results on ethylmethacrylate. Unpublished data submitted by the Nail Manufacturers' Council to the Expert Panel of the Cosmetic Ingredient Review, Washington, DC, March 2, 1999.
3. Spencer AB, Estill CF, McCammon JB, et al: Controlling chemical hazards in the nail salon industry, National Institute for Occupational Safety and Health Report No. ECTB 171-05v, Washington, DC, April 22, 1997
4. Spencer AB, Estill CF, McCammon JB, et al: Control of ethyl methacrylate during the application of artificial fingernails. *Am Ind Hyg Assoc J* 58:214-218, 1997
5. Ethyl Methacrylate, n-butyl methacrylate, and isobutyl methacrylate, Health Based Recommended Occupational Exposure Limit, Report of the Dutch Expert Committee on Occupational Standards, Gezondheidsraad, Holland, November, 1994
6. The Cosmetic Ingredient Review Expert Panel Final Report on Ethyl Methacrylate, *J Am Coll Toxicol* 14:452-467, 1995