

Contact dermatitis from 2-butyl-1,2-benzisothiazolin-3-one in a cutting fluid

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Isothiazolinones are well-known preservatives with a broad range of use, cosmetic as well as occupational. Allergic reactions to 2-butyl-1,2-benzisothiazolin-3-one (BBIT, CAS no. 4299-07-4) have scarcely been reported, although this biocide seems to be present in many types of products, even though its use is not permitted in cosmetics.

CASE REPORT

A 56-year-old man working as a grinding operator for 36 years developed bilateral, very itchy hand eczema during the last 18 months. This began shortly after the metalworking fluid had been changed. He did not wear gloves, as this was not possible for the work he was involved in. His eczema was clearing on holidays within a week and recurred in 2-3 days when he returned to work, with intense pruritus. The patient had never had other allergies.

On clinical examination, the eczema was prominently located on the dorsum of his left fingers and somewhat less on his right fingers. The palm and the pulps were nearly clear. The patient explained that his left hand was immersed in the cutting fluid while holding the metal pieces during the grinding process. When coming to our clinic, he brought the liquid from his machine, containing the metalworking fluid at an unknown concentration (theoretically 5%) and the corresponding material safety data sheet.

The patient was patch tested with the European baseline series, a preservative series, a cutting fluid series (all allergens came either from Chemotechnique Diagnostics, Vellinge, Sweden or from Allergeaze, SmartPractice, Phoenix, Arizona) and the patient's machine fluid with the diluted cutting oil "as is." Patch testing was performed with allergEAZE Skin Patch Test Chambers (SmartPractice) covered with Fixomull stretch (BSN Medical, Hamburg, Germany). Readings were performed at day (D) 2 and D4, according to International

Contact Dermatitis Research Group criteria. The tests remained negative, whereas a subsequent repeated open application test (ROAT) with the metalworking fluid yielded a clearly positive reaction after 4 days. (Figure 1).

We were then provided with the metalworking fluid ingredients by the manufacturer. Instead of receiving them separately, one by one, we received 6 "cluster samples," meant to be split up into the separate raw ingredients if there was a reaction. However, after scrutinizing the material safety data sheet then received, a new ingredient, namely BBIT, was identified. Upon request, we were provided with that preservative at different concentrations, but only in water with propylene glycol (ie, the commercial form). The patient reacted to BBIT 0.05% (500 ppm) and 0.005% (50 ppm) (Figure 2) but not in the



FIGURE 1 Positive repeated open application test (ROAT) with the cutting oil "as is"



FIGURE 2 Positive reactions to 2-butyl-1,2-benzisothiazolin-3-one 0.05% and 0.005%

prepared cluster sample (0.01%) (100 ppm). Five controls remained negative with the three test concentrations.

DISCUSSION

BBIT is a biocide from the well-known isothiazolinone family known to be important contact allergens¹; however, BBIT has rarely been reported until now. It is not allowed in cosmetics but has a broad range of use in cutting fluids, polymers (polyvinylchloride and others), detergents, solids, liquids, fibers (mattresses, filters, tents, carpets),

leather, rubber, construction materials, and other types of products.² BBIT does not seem to be used in paints. Dahlin et al described a very similar case in 2015.³ Neither simultaneous reactions nor cross-reactions to the other more common isothiazolinones have been reported. Incomplete information on material safety data sheets, certainly concerning the biocides, is a common problem.⁴

CONFLICT OF INTEREST

None to declare

AUTHOR CONTRIBUTIONS

Marie-Claude Jacobs: writing-original draft. **Anne Herman:** supervision.

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