

Allergic contact dermatitis caused by isopropyl methylphenol, a new hapten

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Isopropyl methylphenol (synonym: o-cymen-5-ol, Biosol; CAS no. 3228-02-2) (Figure 1) is used as an anti-mould agent and general antimicrobial agent, as a preservative, and as an antioxidant. It is found in many pharmaceuticals, including over-the-counter (OTC) drugs, quasi-drugs, and cosmetics, because it is non-irritating to the skin and is considered not to be a sensitizer.¹ However, three cases of allergic contact dermatitis caused by isopropyl methylphenol were reported in Japan in the 1980s.^{2,3} Since then, no further cases have been reported around the world. Herein, we present three additional cases of allergic contact dermatitis caused by isopropyl methylphenol.

CASE REPORTS

Case 1: A 92-year-old Japanese female consulted because of severe itching and oozing from her genital area, and pain during urination. She

had experienced genital itching 3 years before her first visit, and had applied an OTC ointment (ointment A, which included 1.5% isopropyl methylphenol) for a year. Her clinical findings included marked redness, swelling, and infiltration; ulcers were scattered over the treated site.

Case 2: A 59-year-old Japanese female noticed a superficial wound on the medial side of her left ankle 10 days before her first visit to our clinic. She applied an OTC sterilization spray (spray B, with 0.15% isopropyl methylphenol) to the wound. The wound became exudative after 5 days of treatment with spray B. At her first visit, a localized infiltrative plaque with erosion at its centre was present at the treated site.

Case 3: A 55-year-old Japanese female sometimes experienced dermatitis after applying a compress. She fell down on asphalt and hit her knees and upper abdomen 3 days before her first visit to our clinic. She applied an OTC compress (compress C, which included an unknown concentration of isopropyl methylphenol as an additive), and developed pain within 3 hours. At our outpatient clinic, sharply demarcated erythematous lesions were seen at the sites to which the compress had been applied.

Patch tests were performed with Finn Chambers (SmartPractice, Phoenix, Arizona) on Scanpor tape (Norgesplaster, Vennesla, Norway) on the outer aspects of the patients' upper arms. After 2 days of exposure, readings were performed on day (D) 2, D3, and D7, according to ICDRG criteria. The patch test results are shown in Supporting Information Table S1. The OTC products "as is" and isopropyl methylphenol diluted in pet. produced + to ++ reactions, with concentrations of

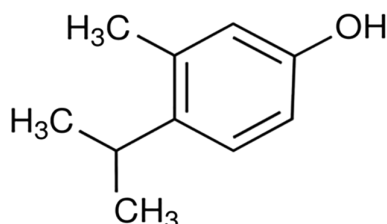


FIGURE 1 Chemical structure of isopropyl methylphenol

isopropyl methylphenol of 1.5% (case 1), 0.15% to 1.5% (case 2), and 0.001% to 1% (case 3). No positive reactions were detected in 10 healthy individuals (five males and five females) patch tested with methylphenol 1.5% pet. We thus diagnosed all patients with allergic contact dermatitis caused by isopropyl methylphenol. Their dermatitis subsided after use of the products was stopped and steroid ointments were applied.

DISCUSSION

Isopropyl methylphenol is a substituted phenol with the formula $C_{10}H_{14}O$.¹ The maximum isopropyl methylphenol concentration for products applied to the skin is set at $\leq 3.0\%$ for ointments, $\leq 1.5\%$ for creams, $\leq 1.0\%$ for patches, and $\leq 0.1\%$ for lotions, gels, and liniments.

In studies on sensitization to isopropyl methylphenol, the substance was found to have "very slight allergenicity" or "no sensitization potential" in the guinea-pig maximization test. Also, in human studies no evidence of skin sensitization was found at concentrations of 1% and 0.1%.

The patients in cases 1 and 2 became sensitized to isopropyl methylphenol during application of the aforementioned OTC products, and the patient in case 3 became sensitized to it during her previous use of isopropyl methylphenol-containing products. In these three cases, the patients' skin had been damaged by scratching (case 1), wounding (case 2), or trauma (case 3); thus, the damaged skin might have facilitated sensitization to isopropyl methylphenol. We have shown that isopropyl methylphenol is allergenic, and this is the first report on this issue in the English-language literature.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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