

Contact dermatitis because of antimicrobial coating desk mat

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Key words: 2,3,5,6-Tetrachloro-4-(methylsulfonyl) pyridine; allergic contact dermatitis; antimicrobial; desk mat; patch test.

We report 2 cases of contact dermatitis because of antimicrobial coating desk mat. The allergen is 2,3,5,6-tetrachloro-4 (methylsulfonyl) pyridine (TCMSP). There have been some previous reports of contact dermatitis because of TCMSP.

Case Report

Case 1

A 65-year-old man developed itchy oedematous erythema on the extensor surface of bilateral forearms for 6 months. He was a guard by profession, who wrote a log everyday on a desk with a desk mat.

Patch testing (PT) was performed with the Japanese standard series,

rubber series, resin series, and the desk mat by the Finn Chamber[®] technique. The patches were removed from the back after 2 D, and readings were taken on day (D) 2, 3, and 7 according to the International Contact Dermatitis Research Group (ICDRG) guidelines. PT with the desk mat showed strong positive (++) reaction at D2, D3, and D7.

Case 2

A 33-year-old man developed itchy oedematous erythema on the extensor surface of bilateral forearms for a year. He was working at an industrial waste disposal institute. There were desk mats on the desks in his section, and his arms were constantly touching the desk mat. No other colleague had a similar problem.

PT was performed as for case 1. There was extreme positive (+++) reaction with the desk mat at D2, D3, and D7.

The manufacturer of the desk mat of case 1 was the same as those in previous reports (1–3). The allergen was strongly suspected to be 2,3,5,6-tetrachloro-4-(methylsulfonyl) pyridine (TCMSP). The manufacturer of the desk mat of case 2 was unknown. We then inquired the National Institute of Technology and Evaluation to analyse the components of the desk mat. Using gas chromatography/mass spectrometry, we obtained extracts of the components of the mat. Results of PT with the extracts are shown in Table 1. Triphenyl phosphate (TPP), di(2-ethylhexyl)phthalate (DMP) (DEHP), dimethyl phthalate, and TCMSP were identified in extracts 0, 3, and 4. Among those components, TPP, DMP and DEHP showed negative PT reactions. TCMSP was also the expected allergen of the desk mat contact dermatitis in case 2.

To confirm the expectation and the minimal eliciting concentration (MEC), the cases were patch tested with a dilution series (0.001%, 0.005%, 0.01%, and 0.1% pet.) of TCMSP (Table 2). Accordingly, the MEC was 0.01% pet.; 20 normal controls were negative to the MEC and the extracts 0, 3, and 4.

Discussion

TCMSP is a pyridine compound, used as a pesticide in agrichemicals.

Table 1. Components of the desk mat and PT results

Extract No.	Solvent	Substance analysed	Concentration of vehicle (% pet.)	D2	D3	D7
0	Acetone, methanol-extracted material	DMP, TPP, DEHP and TCMSP	5.0	++	++	++
1	Hexane-extracted material	Not detected	1.0	—	—	—
2	Hexane:chloroform-extracted material	Not detected	1.0	—	—	—
3	Chloroform-extracted material	TPP, DEHP and TCMSP	1.0	++	++	+
4	Chloroform:methanol-extracted material	TPP, DEHP and TCMSP	1.0	++	++	+
5	Methanol-extracted material	Not detected	1.0	—	—	—
		DMP (chemotechnique)	2.0	—	—	—
		DEHP (chemotechnique)	2.0	—	—	—
		TPP (chemotechnique)	5.0	—	—	—

D, day; DMP, dimethyl phthalate; DEHP, di(2-ethylhexyl)phthalate; PT, patch testing; TCMSP, 2,3,5,6-tetrachloro-4-(methylsulfonyl) pyridine; TPP, triphenyl phosphate.

Table 2. PT results of TCMSP

Component	Concentration of vehicle (% pet.)	Case 1			Case 2		
		D2	D3	D7	D2	D3	D7
TCMSP	0.001	—	—	—	—	—	—
TCMSP	0.005	—	—	—	+	+	+
TCMSP	0.01	++	+	+	+	+	+
TCMSP	0.1	++	++	++	++	++	++

D, day; PT, patch testing; TCMSP, 2,3,5,6-tetrachloro-4-(methylsulfonyl) pyridine.

Although specified as an environmentally poisonous substance according to United Nation classification, it is present in many materials in our daily environment, such as antifouling agents, paints, and adhesives. Allergic contact dermatitis because of antimicrobial and deodorized chairs (4), and antimicrobial desk mats (1–3) (for which the manufacturer was the same as case 1), happened in succession. The specified allergen was TCMSP. After the report of the first case, the manufacturer of the desk mat changed the antimicrobial agent in 2001. Despite this, reports of allergic contact dermatitis because of the desk mat continued. The manufacturer recalled the desk mat in December 2006.

This manufacturer of the mat is only one such company; however, there might be similar products of other unknown companies, like in case 2. It may be impossible to recall the desk mat, and new patients may present in the future. Although TCMSP was patched with various concentrations and vehicles (1%, 5%, and 10% olive oil) in previous reports, we must be careful of the patch concentration because of its strong sensitizing ability (5). In our case, the MEC was 0.01% pet.

References

1. Nomi A, Hagari Y, Mihara M. A case of contact dermatitis from antimicrobial desk pad with 2,3,5,6-tetrachloro-4(methyl sulphonyl)pyridine. *Environ Dermatol* 2000; 7: 91–94.
2. Gushi A, Kanekura T, Katahira Y, Miyoshi H, Kanzaki T. Contact dermatitis from the antimicrobial coating of a desk mat. *Contact Dermatitis* 2003; 48: 347–348.
3. Oi M, Sumi K, Yokozeki H. Occupational allergy in office workers caused by the antifouling desk mat. *Contact Dermatitis* 2006; 54: 60–61.
4. Huh W K, Masuji Y, Tada J, Arata J, Kaniwa M. Allergic contact dermatitis from a pyridine derivative in polyvinyl chloride leather. *Am J Contact Dermat* 2001; 12: 35–37.
5. Noda T, Yamano T, Ooshima T, Shimizu M. Contact allergenicity and cross reactivity of 2,3,5,6-tetrachloro-4-(methylsulfonyl)pyridine in guinea pig maximization test. *Seikatsu Eisei* 2006; 50: 76–83 (in Japanese).

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