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Occupationally relevant positive patch test reactions in Indonesian batik workers

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Batik is a traditional east-Asian textile printing technique. Artisans are increasingly exposed to synthetic dyes because they are easier and quicker to use than natural (plant-based) dyes.

METHODS

We examined 222 workers employed by 16 small enterprises in the Special Region of Yogyakarta, Indonesia. Of these workers, nine

were suspected of having occupation-related allergic contact dermatitis. All nine workers were patch tested with the European baseline series (Chemotechnique Diagnostics, Vellinge, Sweden), a textile series (Chemotechnique Diagnostics), and the following additional allergens relevant to the batik industry: paraffin (molecular weight ranges 250–400 Da),¹ brown indigosol, soja, and indanthrene in the concentrations and vehicles indicated in Table 1. The patches were covered with Hypafix tape; Vivomed, Northern Ireland, UK and occluded for 48 hours. The results were read at day (D) 3 and D4,

TABLE 1 Patch test results among nine subjects suspected of having occupation-related allergic contact dermatitis

Materials to which workers were exposed	Allergen	Concentration tested (% pet.)	Positive patch test ^a	CAS no.
Malam wax	Paraffin	30.0	2	8002-74-2
	Colophonium	20.0	2	8050-09-7
Dyes	Reactive Red 123	1.0	3	68 959-17-1
	Reactive Red 228	1.0	1	140 876-11-5
	Reactive Red 238	1.0.	2	173 995-81-8
	Reactive Blue 21	1.0	2	12 236-86-1
	Reactive Violet 5	1.0.	2	12 226-38-9
	Reactive Black 5	1.0	1	17 095-24-8
	Brown indigosol	5% pet.	1	4425-36-9
	Soja	1	1	-
	Soja	5	1	-

^aPatients may overlap – see Table 2 for details.

TABLE 2 Workers with occupational allergic contact dermatitis

Gender	Age (years)	Work section		Causes of the skin symptoms	Sensitization
Male	48	Dry work	Wax application (stamping)	Malam wax	Colophonium, Reactive Blue 21, paraffin 30%
Male	35	Dry work	Wax application (stamping)	Malam wax	Colophonium
Male	46	Wet work	Coloring process	Dyes	Reactive Blue 21, soja 1%, soja 5%
Male	20	Wet work	Coloring process	Dyes	Reactive Black 5, Reactive Red 123
Female	43	Wet work	Coloring process	Dyes	Brown indigosol 5%
			Wax removal	Malam wax	Paraffin 30%,
Male	52	Wet work	Coloring process	Dyes	Reactive Red 123 Reactive Red 238 Reactive Red 228 Reactive Violet 5
			Wax removal	-	-
Male	19	All types of work	Pattern making	-	-
			Coloring process	Dyes	Reactive Red 123, Reactive Red 238, Reactive Violet 5
			Wax removal	-	-

FIGURE 1 Traditional batik workers apply malam wax onto the fabrics before the coloring process

following guidelines of the International Contact Dermatitis Research Group.

RESULTS AND DISCUSSION

For a summary of the patch test results see the Tables 1 and 2. Seven out of the nine patch tested workers had a positive reaction to at least one allergen used in the batik industry. The two remaining workers suspected of having occupational allergic contact dermatitis had negative results to all the allergens tested.

Reactive Red 123 was the most frequent relevant sensitizing chemical ($n = 3/7$). Indigosol (positive in one subject) is a Vat dye;

these dyes are water-insoluble and are not common allergens.^{2,3} Soga, a natural brown dye from plants, was positive in one subject.

The natural soga we had patch tested is different from synthetic soga dyes; synthetic soga dyes are naphthol dyes, which are less commonly used in the traditional batik enterprises and have not been patch tested. The main content of soga is tannin.⁴

Malam is a traditional wax that is commonly used in batik processing in Indonesia.⁵ The wax is paraffin based and contains a mixture of colophonium, triterpenoid resin, microcrystalline wax, and beeswax. However, our subjects refused to be directly patch-tested using malam wax because they assumed it would precipitate their skin problems. Therefore, instead of patch testing with malam “as is,” we chose to use the paraffin (30%

dispersed in pet.) on which the malam is based; this was positive in two subjects. Although unexpected in view of its chemical composition, paraffin as a skin sensitizer was reported in 12 workers exposed to neat cutting oil: serial patch testing showed strong positive reactions to the chlorinated paraffin fraction of the oil.⁶ Both the subjects positive to colophonium worked in the stamping process, and were, therefore, in contact with malam wax.

Nickel (II) sulfate, potassium dichromate, and cobalt (II) chloride hexahydrate were positive in some subjects (data not shown). However, those metals are not used in the traditional batik manufacturing process.

In conclusion, our findings show that traditional batik workers might be exposed to several sensitizing materials and, therefore, the appropriate personal protective equipment use is highly recommended (Figure 1).

CONFLICT OF INTERESTS

The authors declare no potential conflicts of interest.

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REFERENCES

1. Brown ME, Gallagher PK. Chapter 15. Thermal analysis and rheology. *Handbook of Thermal Analysis and Calorimetry*. Vol 5. New York: Elsevier; 2008:579-596.
2. Fisher A, Robert R, Fowler J. Textiles and shoes: miscellaneous sources of potential allergy and irritation in clothing. *Fisher's Contact Dermatitis*. 6th ed. PMPH-USA; 2008:349-354.
3. Hatch KL, Motschi H, Maibach HI. Disperse dyes in fabrics of patients patch-test-positive to disperse dyes. *Am J Contact Dermat*. 2003;14(4): 205-212.
4. Jansen PCM, Cardon D. *PROTA 3: Dyes and Tannins*. Wageningen: Backhuys; 2005:53-54.
5. Soebaryo RW. Batik manufacturing workers. *Kanerva's Occupational Dermatology*. Berlin: Springer; 2000:830-841.
6. Scerri L, Dalziel KL. Occupational sensitization to the stabilised chlorinated paraffin fraction in neat cutting oil. *Am J Contact Dermat*. 1996; 7(1):35-37.

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