Contact Dermatitis, 1998, 38, 168–169
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CONTACT DERMATITIS
ISSN 0105-1873

Short Communication

Positive patch test to cocamidopropyl betaine in a hairdresser

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Key words: allergic contact dermatitis; hairdresser; occupational; cocamidopropyl betaine; surfactants. © Munksgaard, 1998.

Case Report

A 47-year-old woman, who had been a hairdresser for 30 years, presented with itchy erythema over the hands for 4 years, with no family or personal history of atopy. Examination showed erythematous, irregularly shaped, lichenified plaques over the extensor aspects of the fingers and flexor aspect of the right wrist.

Patch tests with the European standard series, a hairdressing series, and 5% aq. and 1% aq. of shampoos and 5% of hair dyes that the patient brought with her were performed. She showed positive reactions to para-phenylenediamine dihydrochloride, benzocaine, quinoline, colophony, 3-aminophenol (1%), cocamidopropyl betaine, and a hair dye preparation that she brought with her (Tables 1, 2).

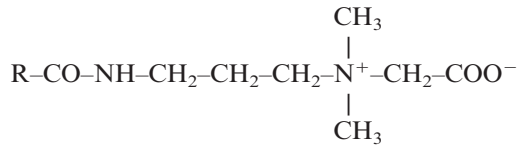
Table 1. Patch test results with European standard series, hairdressers' series and hair preparations

Agents	D2	D4
p-phenylenediamine dihydrochloride	++	++
quinoline	+	++
benzocaine	−	++
colophony	++	++
3-aminophenol	+	++
cocamidopropyl betaine	−	++/+++
hair dye preparation 1% aq.	−	−
hair dye preparation 5% aq.	−	+++
shampoo 5% aq.	−	+

Discussion

Cocamidopropyl betaine (CAPB) is a widely used amphoteric surfactant in the cosmetics field. Shampoo dermatitis with a positive test to it was reported by Van Haute et al. (1). Several cases have been reported since (2, 5–7). Eyelid dermatitis has also been reported due to CAPB in an eye make-up remover (3) and in a hard contact lens solution (4).

CAPB is a zwitterionic (inner salt) ammonium compound with the formula:



$R=C_{14}\sim C_{16}$ alkyl radicals derived from coconut fatty acids (7). The agent is used in various types of cosmetic emulsions and solutions, creams, cleansing milks, moisturizing and peeling masks, acne treatments, shampoos, bath foams, toothpastes, deodorants, eye-washes, hair dyes and hair-styling products (7).

It was suggested by Peter & Hoting (6) that modified production processes may have led to impurities and

Table 2. Review of contact dermatitis with positive patch test to cocamidopropyl betaine

Year	No. patients	Location	Source	Ref.
1983	2	hands, scalp, face	shampoo	(1)
1984	2	scalp	shampoo	(2)
1991	1	eyelid	eye make-up remover	(3)
1991	2	eyelid	hard contact lens solution	(4)
1992	4	scalp, arms, hands	shampoo	(14)
1992	1	hands, fingers, forearms	shampoo	(5)
1992	6	not specified	not specified	(6)
1993	12	head and neck, hands	shampoo, body wash, bath gel	(15)
1995	46	not specified	not specified	(8)
1995	20	not specified	shampoo, shower gel	(16)
1997	1	hands	hair preparations	this study

that these impurities might be the cause of allergy to CAPB. Angelini et al. (7) reported that 3-dimethylaminopropylamine (DMPA) was the impurity responsible for CAPB allergy. Further details as to DMPA were presented in their later report (8).

It is common that multiple positive patch test reactions are noted in contact dermatitis related to hairdressing (9–13). Without knowledge as to the source of CAPB sensitization in this patient, its importance in the aetiology of her hairdressers' dermatitis cannot be assessed, though it is a relatively rare finding.

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