

# CONTACT DERMATITIS DUE TO COSMETIC INGREDIENTS

**K. Remaut**

Per O. Thune Professor MD Ullevål sykehus Department of Dermatology  
0407 OSLO Norway

*Received: March 20, 1991*

*Key words: Cosmetics; Allergy; Dermatitis; Adverse Reactions*

---

## Synopsis

In a retrospective study among 310 patients with ordinary contact dermatitis, 115 were found to have allergic contact dermatitis caused by cosmetic products. The most commonly involved sites were hands (including fingers) and face. The most frequently identified sensitizers were fragrances, including lichen and compositae extracts, preservatives and balsam of Peru. About 28% of the cutaneous reactions occurred among patients 20-29 years of age.

---

## Riassunto

In uno studio retrospettivo effettuato su 310 pazienti affetti da una normale dermatite da contatto, è stato verificato che la causa di questa dermatite era rappresentata al 50% circa dall'uso dei cosmetici. Le zone più comunemente affette erano le mani ed il volto. I sensibilizzanti più frequentemente identificati erano i profumi (composti ed estratti dal lichene), i conservanti ed il balsamo del Perù. Circa il 28% delle reazioni cutanee si sono verificate in pazienti di età compresa tra 20 e 29 anni.

It is commonly believed that allergy towards cosmetic products is unusual.

Lay people very frequently quote promotional phrases such as "allergytested" or "allergen-free" not knowing that this is nonsense since all products on the market are tested for allergenic potential and, in principle, any compounds can still give rise to allergy regardless of previous testing, though they may differ in their potentiality to do so (1).

The incidence of unwanted side effects from cosmetics per million units sold have varied from 2 to 680 in various reports (2,3). In the USA, for example, this would give an average of one reaction to a cosmetic per person every 13,3 years (4). Adverse reactions with subjective complaints of irritation such as burning, stinging and itching, are mostly non-allergic and not so frequently seen by dermatologists. Real allergic reactions are, in fact, rare and account for perhaps only 10% of all unwanted effects from cosmetic products (2,5). In one study from Stockholm only 141 cases of contact dermatitis from cosmetics were diagnosed during the years 1973-1979 in a catchment population of 250 000 people (3). In various studies the prevalence rates of sensitization to cosmetics were 2-4% among patients seen in dermatologic clinics (2,7,8,9), but this percentage is increasing.

During recent years many of the ingredients in cosmetic products have gradually been replaced by others, and it is therefore important that studies on the incidence of allergic reactions and the occurrence of specific allergens continue to be regularly performed.

The present retrospective uncontrolled survey was conducted to evaluate the importance of cosmetic reactions seen at the department of dermatology, Ullevaal hospital, which is the city hospital for Oslo with a catchment population of about 500 000 people.

## MATERIALS AND METHODS

In total, 310 records from all patients registered in 1987 and 1988 as cases of contact dermatitis, were evaluated. In 115 the patients had positive patch tests to cosmetics or cosmetic ingredients. Patch tests were performed with the European standard test series, specially composed perfume series, hairdresser series and plant series (table 1). Thirtythree patients were also tested with their own cosmetic products.

The plant series consisted of purified extracts and isolated compounds obtained from various species of lichens and compositae by crystallization, filtration, steam distillation or high vacuum distillation (NLH, Norway).

The purity was controlled by various methods such as HPLC/HPGC/Mass spectrometry, IR-or UV-spectroscopy. (Y. Solberg).

The tests were carried out with Finn Chambers (Epitest, Ltd., Hyryla, Finland) which were fixed to the upper portion of the back with Scanpore paper tape (Norgesplaster A/S, Oslo, Norway). The patch tests were removed at 48 hours and readings were made at 48 and 72 hours. Each positive reaction was assessed for its clinical relevance.

## RESULTS

The results of patch testing the patients with cosmetic related contact allergy are shown in tables 1 and 2. One hundred and fifteen patients (91 females and 24 males) out of 310 cases (37%) were identified as having cosmetically related contact allergy and showed allergic reactions to one or more of the compounds contained in cosmetic products (table 1). The fragrance mix was the most important cause of cosmetic allergy  $n=32$  (table 1), followed by the preservatives,  $n=29$ , which included the following ingredients: formaldehyde,  $n=12$ , Kathon CG (chloromethylisothiazofinone),  $n=8$ , parabens,  $n=7$  and

quaternium, n=2. Next were balsam of Peru, n=19, Colophony, n=18, wool alcohols, n=11 and p-phenylenediamine dihydrochloride, n=4. Patch testing with various perfume ingredients showed that most of the reactions were caused by oak moss abs, n=8, and jasmine synthetic, n=7, followed by cinnamic aldehyde, n=7. Almost one third of the reactions to fragrance mix were interpreted as being irritant. Patch tests with hairdressing compounds revealed nine allergic reactions with glycerol monoethoxyglycolate as the most important allergen, n=5, while ammonium persulphate caused only two. Patch testing with various other compounds showed 41 allergic and 11 irritant reactions to various lichen compounds in 34 patients to various compositae extracts. In all, 225 reactions were evaluated as being due to sensitization while 58 were considered as irritant.

Thirtytwo patients were tested with their own products (table 2). Twentysix of them showed allergic reactions while in six the reactions were interpreted as irritant (table 2). The majority of the allergic contact reactions were caused by skin care products.

The large majority of the patients were Norwegians (113), only two had other ethnic backgrounds. About 27,8% of the cutaneous reactions occurred among patients 20-29 years of age. At the same time, the frequency of skin reactions among the various other age groups, was surprisingly constant: 30-39 year (n=17), 40-49 years (n=17), 60-69 years (n=17), 70-79 years (n=13), while it was lower in the age group 50-59 years (n=10), below 19 years (n=2) and above 80 years (n=7).

In several of the patients more than one area was involved. The localizations of the dermatitis were as follows: the hands (including the fingers) 46%, face 45,2%, the forearms 23,50 the legs 21,7%. In 21 patients the dermatitis was caused exclusively by allergy to cosmetics while the rest of the patients also showed positive patch test reactions to other non-cosmetic ingredients.

Several of these patients had one or more skin diseases in addition to contact dermatitis: Atopic dermatitis n=32, leg eczema n=13, light dermatosis n=5 and various conditions such as psoriasis, urticaria, seborrheic dermatitis - n=7. In six patients the contact dermatitis was occupationally related (hair-dressers or hairdresser apprentices).

## DISCUSSION

Our purpose was to evaluate the cases of cosmetically induced contact dermatitis. About 37% (115/300) of our patients with contact dermatitis were allergic to cosmetics or cosmetic ingredients. As in other studies (2,6,8) fragrance mixtures and individual fragrance ingredients were the most important cosmetic allergens. But this was also the category with the highest number of irritant reactions. Preservatives were the second most frequent cause of reactions. Formaldehyde and Kathon CG were the preservative ingredients which caused the greatest number of reactions. This study confirms that Kathon CG is an important cause of cosmetic allergy (10,11,12,13), but this preservative does not seem to be our most important contact allergen.

In the Netherlands (8) Kathon CG caused cosmetic allergy in 27,7% of the patients. In other studies (11) the incidence of Kathon sensitivity ranged from 0,78% to 8,7%. The recommended test concentration of Kathon CG is 100 ppm active ingredients in water which is the concentration used at our department.

We found 11 patients who had positive reactions to Kathon. As in other studies we also noticed an increasing sensitivity rate to this preservative. Only two patients showed positive reactions in 1987, while nine reacted in 1988.

We observed that only women reacted to Kathon. This preponderance of women has been reported in other studies (12). Unfortunately,

Table II

## COSMETIC PRODUCTS CAUSING CUTANEOUS REACTIONS IN 32 PATIENTS

	Sensitization	Irritation	Sum
Skin care products	10	0	10
Perfumes	3	0	3
Suntan or sunscreen products	1	0	1
Nail preparations	1	0	1
Eye makeupproducts	1	0	1
Hair preparations (incl. colors)	1	2	3
Oralhygieneproducts	1	0	2
Shampo	1	1	2
Deodorant	3	0	0
Soap	4	3	7
	26	6	32

## REFERENCES

1. Doooms-Goossens A. (1985): "Hypo-Allergic products." *J. Appl. Cosmetol.*; **3**:153-157
2. North American Contact Dermatitis Group: Eiermann H.J., Larsen W., Maibach H.I., Taylor J.S. (1982): "Prospective study of cosmetic reactions 1977-1980." *J. Am. Acad.*; **6**:909-917.
3. Skog E. (1980): "Incidence of cosmetic dermatitis." *Contact Dermatitis*; **6**:449-451.
4. Menkart J. (1979): "An analysis of adverse reactions to cosmetics." *Cutis*; **24**:599-600.
5. Pelfini C. (1987): "Cosmetics in dermatological practice: An inquiry on the use and induced side-effects." *J. Appl. Cosmetol.*; **5**:1-36.
6. Adams R.M., Maibach H.I. (1985): "A five year study of cosmetic reactions." *J. Am. Acad. Dermatol.*; **13**:1062-1069.
7. De Groot A.C., Beverdam E., Tjong Ayong C., Coemaads P.Y., Nater P.Y. (1988): "The role of contact allergy in the spectrum of adverse effects caused by cosmetics and toiletries." *Contact Dermatitis*; **19**:195-201.
8. De Groot A.C., Bruynzeel D.P., Bos J.D., van der Meeren H.L.M., van Joest T.H., Jagtman B.A., Weyland J.W. (1988): "The allergens in Cosmetics." *Arch Dermatol*; **124**:1525- 1529.
9. Nac D.G. (1989): "Prevalence and relevance of allergic reactions in patients patch tested in North America 1984 to 1985." *J Am Acad Dermatol*; **20**:1038-1045.
10. De Groot A.C., Bruynzeel D.P. (1988): "Kathon CG: risk of sensitisation." *J. Appl. Cosmetol.*; **6**:161-168.
11. Fransway A.F. (1988): "Sensitivity to Kathon CG: findings in 365 consecutive patients." *Contacts Dermatitis*; **19**:342-347.

12. Cronin E., Hannuksela M., Lachapelle J.M., Maibach H.I., Malten K., Meneghini C.L. (1988): "Frequency of sensitization to the preservative Kathon CG." *Contact Dermatitis*; **18**:274-279.
13. Bardazzi F., Meliono M., Veronesi S. (1988): "Relevance of patch test reactions to preservatives." *J. Appl. Cosmetol.*; **6**:157-160.
14. Menné, Hjorth N. (1988): "Routine patch testing with paraben esters." *Contact Dermatitis*; **19**:189-191.
15. De Groot A.C. (1990): "Labelling cosmetics with their ingredients." *Brit. Med J.*; **300**:1636-1638.
16. Broeckx W., Blondeel A., Dooms-Goossens A., Achten G. (1987): "Cosmetic intolerance." *Contact Dermatitis*; **16**:189-194.