

Brief Report

# Do cosmetics have a role in melasma? Preliminary results of a pilot study of patch testing in melasma

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Received : 27 April 2023  
Accepted : 07 June 2023  
Published : 21 June 2023

DOI  
10.25259/CSDM\_95\_2023

Quick Response Code:



## ABSTRACT

**Objectives:** Melasma can be associated with pigmented contact dermatitis (PCD) that often goes unrecognized. The concept of cosmetic contact sensitivity in melasma is relatively less studied. In this era of overwhelming use of cosmetics among both men and women, the role of various cosmetic products in melasma and PCD needs to be extensively explored. Patch test in melasma patients can help recognize this cosmetic contact sensitivity in melasma patients. Thus, our study was to find the role of cosmetics in melasma patients.

**Material and Methods:** A hospital-based, pilot study conducted in the Dermatology outpatient department of All India Institute of Medical Sciences, Rishikesh, Uttarakhand from January 2020 to February 2020. Seventeen consecutive patients with melasma were patch tested with Indian cosmetic series procured from the Systopic Pharmaceutical Ltd., standard set of commercial cosmetic products and patient products, if applicable. Day 3 and 5 readings were recorded.

**Results:** Patch test was positive in 15 (88.2%) patients, with a relevance of 66.7%. Thiomersal was the most common allergen (53.3%) observed in our study population.

**Conclusion:** Thiomersal in cosmetic products may be an important allergen to cause melasma.

**Keywords:** Melasma, Patch test, Cosmetics, Contact sensitivity, Allergen

## INTRODUCTION

Melasma is a common acquired condition of symmetric hyperpigmentation, typically occurring on the face, with higher prevalence in females and darker skin types.<sup>[1]</sup> An insight into the triggers of the disease is essential to plan the therapeutics that precisely aim the disease process and prevent relapses.<sup>[2]</sup> Occurrence and persistence of melasma in non-pregnant, non-lactating females, and recent rising trend, kindle minds of many researchers. Today, the use of cosmetics and skin care products has tremendously increased. Pigmented cosmetic dermatitis, as proposed by Nakayama *et al.*,<sup>[3]</sup> is a variant of pigmented contact dermatitis where cosmetic ingredients are the primary allergens and the face is involved predominantly. Clinically, diffuse or patchy brown hyperpigmentation occurs over cheeks and/or forehead or the entire face making its differentiation difficult from melasma.<sup>[4]</sup> However, this aspect of cosmetic contact sensitivity in melasma remains under reported. In this pilot study, we present our findings on cosmetic contact sensitivity in melasma patients by studying the role of cosmetics in melasma patients.

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## MATERIAL AND METHODS

A hospital-based, pilot study, conducted in the Dermatology outpatient department of All India Institute of Medical Sciences, Rishikesh, Uttarakhand from May 2019 to June 2019. After a written and informed consent, 17 consecutive patients with melasma were patch tested with Indian cosmetic series procured from the Systopic Pharmaceutical Ltd., approved by Contact and Occupational Forum of India, standard set of commercial cosmetic products and patient products, if applicable. Day 3 and day 5 readings were noted and documented [Table 1]. Data were tabulated and analyzed.

## RESULTS

Seventeen cases of melasma, aged 20–46 years, were patch tested. Mean age was 34.2 years. Majority of the cases were female ( $n = 13$ , 76.4%). Mean disease duration was 39 months (2 months to 9 years). Centrofacial pattern of melasma was the most common (76.5%) followed by the malar pattern (17.6%) and 0.05% mandibular pattern. Patch test was positive in 15 (88.2%) patients, with a relevance of 66.7%. Common contact sensitizers were thiomersal (53.3%), cosmetic creams (40%), phenyl salicylate (26.7%),

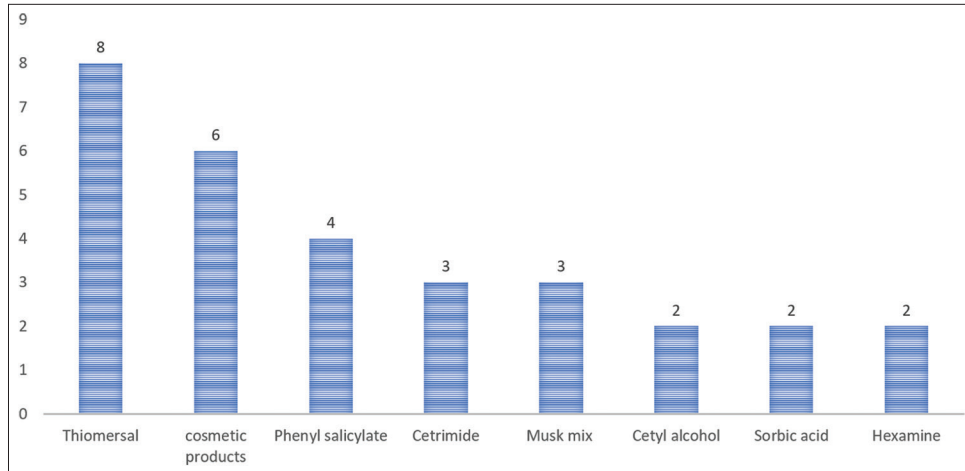
and cetrimide (20%) [Figure 1]. Angry back phenomenon was seen in one case [Figure 2], severe tape reaction in two cases, and irritant reaction in three cases [Figures 3-5].

## DISCUSSION

Melasma is an acquired hypermelanosis with long-standing effect on psychology and quality of life.<sup>[4]</sup> It accounts for 0.25–4% of the patients seen in dermatology clinics in South East Asia and is also a common pigmentary disorder among Indians.<sup>[5,6]</sup> Genetic predisposition, pregnancy, oral contraceptives, endocrine dysfunction, hormone treatments, or exposure to UV light are the most implicated etiologic factors in melasma.<sup>[7]</sup> Cosmetics have been rarely considered in causation of melasma. Thiomersal, an organic mercury compound used as preservative in many cosmetics, was the most common allergen tested positive in this study [Figure 5]. In a similar study by Prabha *et al.*,<sup>[4]</sup> cetrimide was the most common allergen followed by gallate mix and thiomersal with positive reaction in patients using fairness cream. Mercury is a rarely listed ingredient in many cosmetic products. Al-Saleh *et al.*<sup>[8]</sup> analyzed “Fair and Lovely” fairness cream and found traces of mercury that was otherwise not listed component. Phenyl salicylate is another common preservative found in face and hand creams.<sup>[9]</sup> Prabha *et al.*<sup>[4]</sup>

**Table 1:** Patch test results of all seventeen patients recruited in the study.

Patient number	1+ positive	2+ positive	3+ positive	Irritant reaction
Patient 1	Butyl hydrate, Sorbitan sesquioleate, hexamine, Fair and Lovely cream, Patanjali cream	Thiomersal		
Patient 2	Musk mix, PPD			
Patient 3	Thiomersal, musk mix, rose oil, jasmine absolute, cetyl alcohol, Germall 115, benzotriazole, benzyl salicylate, phenyl salicylate, chlorhexidine, sorbic acid	Triclosan		
Patient 4	Cetrimide, thiomersal			
Patient 5	Thiomersal, sorbic acid, hexamine, phenyl salicylate, lavender absolute, musk mix			
Patient 6	Angry back phenomenon			
Patient 7	Fair and Lovely cream, Vicco turmeric cream, Patanjali cream			
Patient 8	Phenyl salicylate, PPD			
Patient 9	Butyl hydrate, thiomersal			Himalaya face wash
Patient 10	Himalaya face wash			
Patient 11	-	-	-	-
Patient 12	Thiomersal			
Patient 13			Thiomersal	Severe tape reaction
Patient 14	Germall II, Fair and Lovely cream, Patanjali cream	Vicco turmeric cream, Pond's cream		Himalaya face wash
Patient 15	Thiomersal, cetrimide			
Patient 16	Cetyl alcohol, Fair and lovely cream, Himalaya face wash			
Patient 17	Phenyl salicylate, cetrimide, Fair and lovely cream, Vicco turmeric cream			



**Figure 1:** Graphical representation of the allergens tested positive in our patients.



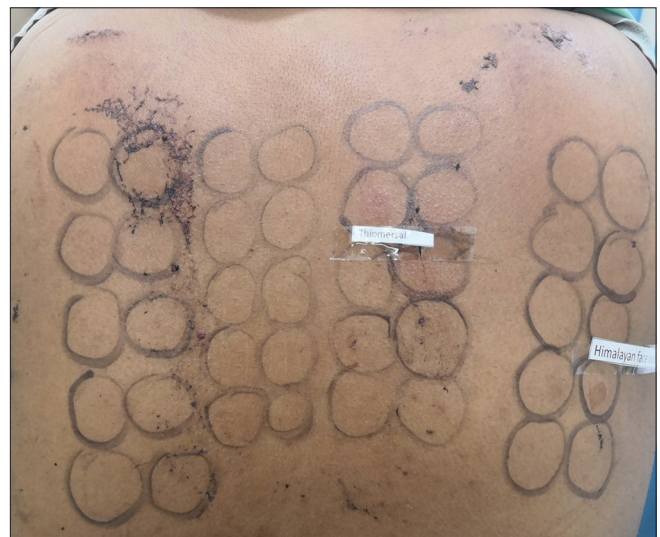
**Figure 2:** Angry back phenomenon.



**Figure 4:** Centropfacial melasma with relevant positive test.



**Figure 3:** Centropfacial melasma with relevant positive test to butyl hydrate and thiomersal (use of ponds cream).



**Figure 5:** 1+ to thiomersal and irritant reaction to Himalaya face wash.

observed a patient with positive reaction to phenyl salicylate using more than five face creams. In our study, four patients tested positive to phenyl salicylate and were using more

than three fairness creams. Butyl hydrate is an ingredient in ponds cream which was tested positive in two patients with relevance in one of them. Cetrimide, an antiseptic and major formulation excipient chemical in cosmetics, is reported to elicit positive reactions in 12% of 50 patients with cosmetic dermatitis.<sup>[10]</sup> In our study, cetrimide was tested positive in

three patients (4<sup>th</sup> common allergen) among those using fairness creams. Hexamine is a solvent in cosmetics and was tested positive in two patients using “Fair and Lovely” fairness and “Vicco turmeric” creams. Patient 3 who was using “Fair and Lovely” cream and Patanjali face wash tested positive to multiple allergens [Table 1]. Among them, cetyl alcohol and sorbic acid are one of the ingredients of “Fair and Lovely” cream. This patient, however, did not test positive with the creams as such. This can be explained by the fact that the ingredients are present in lower concentrations in finished products.

Cosmetic contact sensitivity may be an important cause of melasma. Positive patch test in such cases could be coincidental, but high relevance noted in our study warrants a reconsideration. Manufacturers do not list most of the ingredients in a cosmetic product, so relevance of positive reactions may not possibly be ascertained in all cases. Avoidance of cosmetic contact hypersensitivity could be an essential step in preventing/treating melasma.

#### Limitations

Small sample size and limited number of cosmetic products were only patch tested.

#### CONCLUSION

Cosmetic contact sensitivity may be an important cause of melasma. Thiomersal in cosmetic products may be an important allergen to cause melasma.

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

#### Financial support and sponsorship

Nil.

#### Conflicts of interest

There are no conflicts of interest.

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**How to cite this article:** Divyalakshmi C, Bhatia R, Hazarika N. Do cosmetics have a role in melasma? Preliminary results of a pilot study of patch testing in melasma. *CosmoDerma* 2023;3:99.