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Allergenic potential, marketing claims, and pricing of facial moisturizers

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Abstract

Ingredients found in facial moisturizers can impact a myriad of skin conditions, including sensitive skin syndrome and contact dermatitis. There is a paucity of evidence on the allergenic potential and marketing claims of facial moisturizers, posing challenges to clinician recommendation and consumer selection. In this study, we systematically evaluate the 100 top-selling sun protective facial moisturizers that claim to be natural, fragrance free, expert-approved, age preventing, beneficial for sensitive skin, and sun protective. Allergenic potential of these moisturizers is evaluated based on ingredients used and prices and consumer ratings are compared. Accordingly, 75 of 100 marketed at least one additional benefit. "Anti-aging" products had the highest average price (\$14.99/oz) and "expert-approved" had the lowest (\$5.91/oz). Consumer rating was highest for facial moisturizers that were "fragrance-free" (4.35/5.00) whereas products that were "natural" received the lowest ratings (3.49/5.00). The most prevalent allergens found in these moisturizers were ethylenediamine tetraacetic acid (EDTA), phenoxyethanol, and cetyl alcohol. "Expert-approved" products had the fewest average allergens in their ingredient lists ($P=0.033$), whereas products advertising "SPF" had significantly more ($P<0.001$). Marketing claims play a role in product sales and ratings. When recommending products, physicians should balance allergenic risk with affordability and consumer preferences.

Keywords: facial moisturizer, sensitive skin syndrome, contact dermatitis, allergenic potential

To the Editor:

Mobile searches in the United States for the "best" face lotion and moisturizer have more than doubled from 2015 to 2017, demonstrating increasing consumer interest in high-quality facial moisturizers [1]. Sensitive skin syndrome (SSS), the development of unpleasant neurocutaneous symptoms in response to innocuous environmental triggers, occurs in up to 51.4% of the population and ingredients in facial moisturizers can significantly impact SSS management [2]. Facial moisturizers often claim to reverse aging, decrease skin sensitivity, and contain natural ingredients, among other purported benefits. However, there is limited research evaluating the allergenicity of these products and the influence of marketing claims on consumer activity and satisfaction. The purpose of this study is to systematically evaluate the allergenic potential, consumer rating, and pricing of the top 100 best-selling facial moisturizers that claim to be natural, fragrance free, expert-approved, age preventing, beneficial for sensitive skin, and sun protective (denote sun protective factor [SPF] content).

In October 2018, the top 100 best-selling products published by Walmart, Target, and Amazon were

Table 1. Common allergic ingredients in facial moisturizers.

Top 10 Most Prevalent Allergens in Facial Moisturizers		
Rank	Allergen	Prevalence out of top 100 products
1	EDTA	62
2	Phenoxyethanol	57
3	Cetyl Alcohol	43
4	Fragrance	36
5	Panthenol	31
6	Avobenzoate	26
7	Stearyl Alcohol	26
8	Benzoate	22
9	BHT	22
10	Aloe	18

Abbreviations: EDTA, ethylenediamine tetraacetic acid; BHT, butylated hydroxytoluene.

recorded and a single list of 100 top-selling products was developed by averaging the rank across retailers. Ingredient lists, average price per ounce, average customer rating, and product claims were recorded. To establish allergenic potential of facial moisturizers, listed ingredients were cross-checked against the American Contact Dermatitis Society's Contact Allergen Management Program database (ACDS-CAMP) using an automated search algorithm created in Matlab. Linear regression was used to evaluate the statistical significance ($P < 0.05$) of product claims and the number of allergens.

Of the products examined, 75 had at least one marketing claim. Products with anti-aging claims had the highest average price (\$14.99/oz) and those stating, "expert-approved" had the lowest (\$5.91/oz). "Fragrance-free" claim had the highest average customer rating (4.35/5.00), and "natural" (3.49/5.00) had the lowest. Products with SPF claims had the highest average allergen number (6.88/product) and "expert-approved" had the lowest (3.86/product). The most prevalent allergens were ethylenediamine tetraacetic acid (EDTA), phenoxyethanol, and cetyl

alcohol (**Table 1**). "Expert-approved" products had significantly fewer allergens ($t = -2.17$, $P = 0.033$), whereas "SPF" products had significantly more allergens ($t = 4.19$, $P < 0.001$).

This study is limited by the use of a single database and the inability to determine specific customer rating criteria. Additionally, the presence of allergenic ingredients does not necessarily confer a clinical reaction.

Marketing claims play an important role in product sales and consumer rating. With growing consumer interest in anti-aging therapy, such labeling may contribute to why anti-aging creams are more expensive compared to their counterparts [3]. Specific allergenic ingredients may be common to many facial moisturizers for compound stabilization. Ethylenediamine tetraacetic acid acts as a chelator to prevent product oxidative deterioration, maintain clarity, protect fragrance, and prevent rancidity [4]. Phenoxyethanol has antimicrobial properties and cetyl alcohol stabilizes emulsions to prevent oil and liquid phase separation [4, 5]. Notably, three products reviewed do not contain these common allergens, demonstrating that there are ways to successfully eliminate these seemingly necessary ingredients. Physicians should balance allergenic risk with affordability and consumer preferences when recommending products.

Potential conflicts of interest

Vivian Shi is a stockholder of Learn Health, and has served as a consultant or investigator for or has received research funding from Sanofi/Regeneron, Eli Lilly, Dermira, Novartis, AbbVie, SUN Pharma, Pfizer, Leo, Menlo Therapeutics, Altus Lab, Burt's Bees, GpSkin, and Skin Actives Scientific. The remaining authors declare no conflicts of interest.

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