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Allergenic potential, marketing claims, and pricing of facial moisturizers

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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 allergenic potential of these 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 (denote sun protective factor [SPF] content). In October 2018, the top 100 best-selling products published by Walmart, Target, and Amazon were...
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.

**Table 1. Common allergic ingredients in facial moisturizers.**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Allergen</th>
<th>Prevalence out of top 100 products</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EDTA</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>Phenoxyethanol</td>
<td>57</td>
</tr>
<tr>
<td>3</td>
<td>Cetyl Alcohol</td>
<td>43</td>
</tr>
<tr>
<td>4</td>
<td>Fragrance</td>
<td>36</td>
</tr>
<tr>
<td>5</td>
<td>Panthenol</td>
<td>31</td>
</tr>
<tr>
<td>6</td>
<td>Avobenzoate</td>
<td>26</td>
</tr>
<tr>
<td>7</td>
<td>Stearyl Alcohol</td>
<td>26</td>
</tr>
<tr>
<td>8</td>
<td>Benzoate</td>
<td>22</td>
</tr>
<tr>
<td>9</td>
<td>BHT</td>
<td>22</td>
</tr>
<tr>
<td>10</td>
<td>Aloe</td>
<td>18</td>
</tr>
</tbody>
</table>

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

**References**