

[ORIGINAL RESEARCH]

Part 1 of a 4-part series

Facial Cosmetics: Trends and Alternatives

Data from the American Contact Alternatives Group

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Current data on the prevalence of known cosmetic allergens in cosmetic and skin care products is invaluable information for contact allergy specialists. Knowledge of current ingredient usage is instrumental in choosing relevant allergens for patch testing patients with suspected contact allergy to different types of topical products. In addition, knowledge of the most common potential allergens in each type of topical product allows the patch testing specialist to identify key alternative products that can be used by patients with proven contact allergy to skin, hair, and cosmetic products.

In this four-part series, the American Contact Alternatives Group (ACAG) provides data on the prevalence of cosmetic allergens on the American Contact Dermatitis Society core screening tray of 80 allergens in 5,416 skin, hair, and cosmetic products listed on the CVS website. From this data, suitable potential alternative products are listed for use by patients with proven contact allergy. Part 1 discusses facial cosmetic products, part 2 covers hair care products, part 3 discusses lip and oral care products and part 4 covers miscellaneous categories of topical products. Two additional installments on moisturizers and cleansers will follow at a later date.

ABSTRACT

Objective: To provide updated data on usage of ingredients that are common potential contact allergens in several categories of facial cosmetics. To identify useful alternative products with few or no common contact allergens. **Design:** In November 2009, the full ingredient lists of 5,416 skin, hair, and cosmetic products marketed by the CVS pharmacy chain were copied from CVS.com into Microsoft Word format for analysis. Computer searches were made in Microsoft Word using search/replace and sorting functions to accurately identify the presence of specific allergens in each website product. **Measurements:** Percentages of American Contact Alternatives Group core series allergens were calculated. **Results:** The usage of American Contact Alternatives Group core series allergens in facial cosmetics is reported along with suitable alternative products for individuals with contact allergy. **Conclusion:** Data on allergen usage and alternatives for facial cosmetics is not widely published. This article reviews some of the common potential allergens in facial cosmetics, including blushers and bronzers, concealers, eyeliners, eyeshadows, foundations, loose and pressed powders, and mascaras. Suitable available alternative products for patients with contact allergy are listed.

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In November 2009, the American Contact Alternatives Group (ACAG) collected data from the CVS website,¹ which contains the full ingredient lists for 5,416 skin, hair, and cosmetic products marketed by this pharmacy chain. Evaluation of this data provides a large representative sample of the products currently being marketed in one major drug store chain in the United

States and provides an excellent overview of the ingredients being used in products currently on the market. This type of data is important to help guide which allergens need to be tested in order to identify most cases of contact allergy to topical products. This data also allows easy identification of available alternative products for patients with contact allergy.

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TABLE 1. ACDS core allergens in women's cosmetics

BLUSHER/ BRONZER	Parabens (87%)
	Vitamin E (56%)
	Fragrance (35%)
	BHT (butylated hydroxytoluene) (35%)
	Sorbitan sesquioleate (31%)
	Cetylstearyl alcohol (26%)
	Phenoxyethanol (25%)
	Sorbic acid (22%)
	Chromate pigments (18%)
	Lanolin (2%)
	Propolis (1%)
CONCEALER	Parabens (77%)
	Vitamin E (69%)
	Sorbitan sesquioleate (53%)
	Propylene glycol (31%)
	Fragrance (28%)
	Cetylstearyl alcohol (28%)
	Chromate pigments (18%)
	BHT (butylated hydroxytoluene) (17%)
	Propolis (11%)
	Triethanolamine (11%)
	Lanolin (10%)
EYELINER	Parabens (84%)
	Vitamin E (57%)
	Chromate pigments (41%)
	Fragrance (33%)
	Propolis (32%)
	Sorbitan sesquioleate (30%)
	BHT (butylated hydroxytoluene) (26%)
	Cetylstearyl alcohol (18%)
	Propylene glycol (15%)
	Phenoxyethanol (13%)
	Sorbic acid (12%)
Lanolin (11%)	
Triethanolamine (6%)	
EYESHADOW	Parabens (82%)
	BHT (butylated hydroxytoluene) (41%)
	Phenoxyethanol (38%)
	Chromate pigments (35%)
	Cetylstearyl alcohol (32%)
	Vitamin E (28%)
	Lanolin (24%)
Sorbitan Sesquioleate (21%)	

Finding alternative products free of specific allergens plays a crucial role in obtaining clinical improvement in patients with contact allergy. There have been several papers published previously that discussed contact allergy alternatives.²⁻⁵ Since the earliest articles only provided information for a small number of common allergens,²⁻⁴ information on contact allergy alternatives was sparse for most of the allergens on the North American Contact Dermatitis Group (NACDG) standard screening series. Therefore, ACAG was formed in order to provide periodically updated contact allergy alternatives for a wider array of contact allergens. ACAG has previously published alternatives information for all of the allergens on the 2007 NACDG standard screening tray.⁵

In 2010, the American Contact Dermatitis Society (ACDS) unveiled a recommended core screening tray of contact allergens that would identify a significant proportion of contact allergies.⁶ In this paper, ACAG will discuss the ACDS core screening tray allergens found in various types of facial makeup products and give updated information on available facial cosmetic products that can serve as alternatives for patients with contact allergy to cosmetic ingredients.

METHODS

In November 2009, the full ingredient lists of 5,416 skin, hair, and cosmetic products marketed by the CVS pharmacy chain was copied from CVS.com into Microsoft Office Word 2003 format for analysis. Comparison of CVS website data versus actual product labels showed an occasional discrepancy; however, the vast majority of the information is correct and provides an accurate analysis of overall trends of ingredient usage in products found in CVS stores within a small margin of error. The authors chose to analyze the website data "as is" to avoid researcher bias. However, since there were occasional errors in the CVS website data, all alternative products recommended in this article were rechecked for accuracy using the ingredient lists on the actual product label.

When writing about contact allergen alternatives or designing contact alternative databases,⁷ it is always difficult to decide which additional ingredients to consider as possible cross-reactants. That is, the usefulness of alternatives information is only as good as the definitions that are programmed into the computer. The exact cross-reactant definitions used have not been stated in previously published articles on contact allergy alternatives.^{2-5,7} Unfortunately, there are limited data on allergen cross-reactants, and therefore decisions regarding what to consider as potential cross-reactants are made using the best available information.

In this article, fragrance was defined as the presence of "fragrance," "perfume," any of the components of fragrance mix I or II (Chemotechnique: Malmo, Sweden), or any of the 26 fragrances required to be listed by name in Europe on product labels. In this article, fragrance also included essential oils, which were defined as any plant extract that is described in Wikipedia as having a fragrant odor that

might qualify as a “natural” fragrance ingredient. For cocamidopropyl betaine, we considered betaines, sultaines, and dimethylamines (and related chemicals) to be possible cross-reactants. Lanolin components (e.g., lanolin acid, lanolin oil), “lanolates,” and wool wax derivatives were included as lanolin. Chromium-green pigment was included as potassium dichromate. For propylene glycol, any ingredients containing the exact words “propylene glycol” or “PG” were included as possible cross-reactants. “Rosinates,” abietic acid (and derivatives), and colophony were included as “rosin.” Potassium sorbate was included as sorbic acid. Cosmetic grade beeswax often contains propolis as an impurity and is included as “propolis” in this discussion. The authors defined potential cross-reactants of sorbitan sesquioleate to include sorbic acid, sorbates, sorbitol, sorbitans, and polysorbates. The possible cross-reacts for cetylstearyl alcohol were the most problematic. The authors included cetyl alcohol, cetearyl alcohol, ingredients with the words “ceteth” or “cetareth,” stearyl alcohol, stearic acid, and stearyl ingredients as possible cross-reactants, but not all stearates.

Using the above definitions and known synonyms for individual allergens, computer searches were made in Microsoft Word using search/replace and sorting functions to accurately identify the presence of specific allergens in each website product. Recommended alternatives were chosen that had few ACDS core allergens. These were specifically checked for accuracy by author review of the product ingredient labels.

BLUSHERS AND BRONZERS

The CVS website contained 143 blushers and 38 bronzers. Aside from the pigments used, blushers and bronzers are formulated in a similar manner. Therefore, they will be discussed together.

By far, the most common preservatives in these products are the parabens, which were found in 87 percent of the evaluated products. There were a few products in two lines that contained both parabens and a formaldehyde-releasing preservative (Cover Girl—quaternium 15; Revlon—diazolidinyl urea). The only other preservatives found in evaluated products were phenoxyethanol in 25 percent and sorbic acid in 22 percent of evaluated products.

There are a few other potential allergens in blushers and bronzers. Vitamin E was found in 56 percent of products. Fragrances and butylated hydroxytoluene (BHT) were each identified in 35 percent of evaluated products. Other potential allergens less commonly found were cetylstearyl alcohol derivatives (26%), sorbitan sesquioleate derivatives (31%), chromate pigments (18%), and lanolin (2%). Also, potential exposure to propolis was possible due to the presence of beeswax in one percent of products. Propylene glycol (PG) was not listed as an ingredient in any of the evaluated blushers and was only in one bronzer.

CONCEALERS

The CVS website included 90 concealers. Again,

TABLE 1 Continued. ACDS core allergens in women's cosmetics

EYESHADOW (CONTINUED)	Sorbic Acid (17%)
	Fragrances (14%)
	Propolis (5%)
FOUNDATION	Parabens (85%)
	Vitamin E (62%)
	Fragrance (51%)
	Phenoxyethanol (44%)
	Sorbitan sesquioleate (34%)
	Cetylstearyl alcohol (32%)
	Propylene glycol (29%)
	Diazolidinyl urea (12%)
	BHT (butylated hydroxytoluene) (12%)
	Triethanolamine (11%)
	Sorbic acid (4%)
	Imidazolidinyl urea (2%)
	Quaternium 15 (1%)
LOOSE/ PRESSED POWDER	Parabens (66%)
	Vitamin E (56%)
	BHT (butylated hydroxytoluene) (33%)
	Fragrance (28%)
	Cetylstearyl alcohol (28%)
	Sorbitan sesquioleate (21%)
	Sorbic acid (20%)
	Quaternium 15 (19%)
	Phenoxyethanol (10%)
	Imidazolidinyl urea (5%)
Diazolidinyl urea (3%)	
MASCARAS	Parabens (90%)
	Cetylstearyl alcohol (77%)
	Phenoxyethanol (66%)
	Triethanolamine (65%)
	Propolis (61%)
	Propylene glycol (43%)
	Chromate pigments (43%)
	Vitamin E (32%)
	Sorbitan sesquioleate (26%)
	BHT (butylated hydroxytoluene) (14%)
Imidazolidinyl urea (11%)	
Diazolidinyl urea (5%)	
Quaternium 15 (5%)	

TABLE 2. Alternative women's cosmetics with few or no ACDS core allergens

TYPE OF COSMETIC	COSMETIC BRANDS	ACDS CORE ALLERGENS
BLUSHER	Bare Minerals Blusher	—
	L'Oreal Bare Natural Blush	F
	L'Oreal True Match Blush	P, PH
	Neutrogena Blush	CSA, P, VE
BRONZER	Benefit Hoola Bronzer	P
	Maybelline Mineral Powder Bronzer	CO, VE
	Wet N' Wild Ultimate Minerals Bronzer	CO, SA
CONCEALER	Bare Minerals Miracle Concealer	—
	Benefit Bo-ing Concealer	P, PG, PR
	Dermablend Concealer	SS
	Dermablend Quick Fix Concealer	PR
EYELINER	Josie Maran Eyeliner Pencil	CSA, PR, VE
	L'Oreal Extra Intense Liquid Eyeliner	VE
	Revlon Brow Fantasy Pencil & Gel-Gel	P, SA, SS
	Revlon Brow Fantasy Pencil & Gel-Pencil	BHT, P
EYESHADOW	Benefit Greaseless Cream Shadow Liner	—
	Josie Maran Eye Love You Eyeshadow Palette	L, PH, VE
	Maybelline Brush-On Color	L, P, SS
	Neutrogena Mineral Sheers For Eyes	P, VE
	Revlon 12 Hour Eye Shadow	P, PD, PH
	Revlon Matte Eye Shadow	P, PD, PH
FOUNDATION	Cover Girl TruBlend Minerals Pressed Mineral Foundation	P
	Dermablend Smooth Indulgence Foundation SPF 20	CSA, P, PH
	Josie Maran Argan Serum Foundation	F, PH, SA
	L'Oreal True Match Super-Blendable Compact Makeup	CSA, VE
	Maybelline Dream Matte Mousse Foundation	BHT, CSA, P, PH
LOOSE POWDER	Almay Nearly Naked Loose Powder	F, PH
	Bare Minerals Mineral Veil	—
	Lorac Translucent Touchup Powder	BHT, P
PRESSED POWDER	Almay Clear Complexion Pressed Powder	PH
	Almay Line Smoothing Pressed Powder	PH
	Cover Girl Advanced Radiance Age-Defying Pressed Powder	CSA, P
	Revlon Colorstay Pressed Powder	P, PH
MASCARA	Josie Maran Argan Mascara	PH, PR
	Laura Mercier Long Lash Mascara	CSA, IBC, PH, SS, VE
	L'Oreal Bare Naturale Mascara	BHT, CSA, PD, PH, TEA, VE
	Revlon Fabulash Waterproof Mascara	P, PH, SA, SS, VE

BHT—butylhydroxytoluene; CO—compositae; CSA—cetylstearyl alcohol; F—fragrance; IBC—iodopropynyl butylcarbamate; L—lanolin; P—parabens; PD—potassium dichromate; PG—propylene glycol; PH—phenoxyethanol; PR—propolis; R—rosin; SA—sorbic acid; SS—sorbitan sesquioleate; TEA—triethanolamine; VE—vitamin E

parabens were the most common preservatives and were found in 77 percent of products. There were three product lines with some products containing both parabens and another ACDS core tray preservative (Cover Girl—imidazolidinyl urea; Neutrogena—iodopropynyl butylcarbamate; Physician's Formula—diazolidinyl urea). There were a few Neutrogena concealers containing Kathon CG (methylisothiazolinone, methylchloro-isothiazolinone), which do not contain parabens.

PG was identified in 31 percent of products. These products were all from four lines (Cover Girl, Maybelline, Neutrogena, Physician's Formula). Aside from PG and the preservatives listed above, the remainder of the potential allergens identified are similar to those found in blushers and bronzers. Vitamin E was found in 69 percent, sorbitan sesquioleate derivatives in 53 percent, cetylstearyl alcohol derivatives in 28 percent, fragrance in 28 percent, chromate pigments in 18 percent, BHT in 17 percent, triethanolamine in 11 percent, propolis in 11 percent, and lanolin in 10 percent of evaluated products. Triclosan was found in one product.

EYELINERS

One hundred seventy-four eyeliners were evaluated. Again, the most common preservatives in these products are the parabens, which were in 84 percent of products. Other ACDS core tray preservatives found included phenoxyethanol in 13 percent and sorbic acid in 12 percent of evaluated products. Also, imidazolidinyl urea was found along with parabens in seven products in three lines (L'Oreal, Maybelline, Wet & Wild).

Propolis is a very common constituent of eyeliners and was found in 32 percent of products. Rosin and its derivatives were found in two product lines (Revlon and Physician's Formula). Fragrance was found in 33 percent (but only as essential oils). Other potential allergens found were vitamin E in 57 percent, chromate pigments in 41 percent, sorbitan sesquioleate derivatives in 30 percent, BHT in 26 percent, cetylstearyl alcohol derivatives in 18 percent, PG in 15 percent, lanolin in 11 percent, and triethanolamine in six percent of evaluated products.

EYESHADOWS

Three hundred four eyeshadows were evaluated. Parabens were found in 82 percent, phenoxyethanol was found in 38 percent, and sorbic acid in 17 percent of products. There were also a few products that contained both parabens and either quaternium 15 (Cover Girl) or imidazolidinyl urea (L'Oreal, Maybelline, Physician's Formula).

Chromate pigments are common and were found in 35 percent of eyeshadows due to the frequent use of green inorganic pigments in this type of product. Fragrances were only found in 14 percent of evaluated products. Likewise, PG was only found in a few products in one line (Boots). BHT was in 41 percent, cetylstearyl alcohol derivatives in 32 percent, vitamin E in 28 percent, lanolin

in 24 percent, sorbitan sesquioleate derivatives in 21 percent, and propolis in five percent of products.

FOUNDATIONS

Four hundred fifty-seven foundations were evaluated and 85 percent contained parabens. Many contained parabens along with a formaldehyde releaser: diazolidinyl urea (12%), imidazolidinyl urea (2%), or quaternium 15 (1%). Phenoxyethanol was found in 44 percent and sorbic acid in four percent of evaluated products.

Other common potential allergens found were vitamin E (62%), fragrance (51%), sorbitan sesquioleate derivatives (34%), cetylstearyl alcohol derivatives (32%), PG (29%), BHT (12%), and triethanolamine (11%). Some products in this category contained sunblock. Although the sunblock found in these products is usually a physical agent (titanium dioxide most commonly), some products contained oxybenzone. There were a small number of products with either lanolin, propolis, or rosin derivatives.

LOOSE AND PRESSED POWDERS

Ninety-four loose and 146 pressed powders were evaluated. Parabens were found in 66 percent of these products, but were fairly often combined with quaternium 15 (19%), imidazolidinyl urea (5%), or diazolidinyl urea (3%). There was one Coty pressed powder with imidazolidinyl urea without parabens. Sorbic acid was found in 20 percent and phenoxyethanol in 10 percent of products.

Aside from preservatives, vitamin E was found in 56 percent, BHT in 33 percent, fragrance in 28 percent, cetylstearyl alcohol derivatives in 28 percent, and sorbitan sesquioleate derivatives in 21 percent of evaluated powders. Other allergens found occasionally include lanolin, PG, rosin, and oxybenzone.

MASCARAS

Two hundred fifty-six mascaras were evaluated and the majority contained parabens (90%). Some products contained parabens and a formaldehyde releaser, such as imidazolidinyl urea (11%), diazolidinyl urea (5%), or quaternium 15 (5%). There were a few Laura Mercier and Rimmel products with iodopropynylbutylcarbamate and no parabens, which are important potential alternative products for paraben allergic patients. Also, Revlon Double Twist mascaras were paraben-free. It is interesting that phenoxyethanol was in 66 percent of evaluated products and appears to be an important preservative in mascaras.

Generally, fragrance is not found in mascara. However, several ACDS core allergens were found in very high percentages of mascaras. Cetylstearyl alcohol derivatives were in 77 percent, triethanolamine in 65 percent, propolis in 61 percent, PG in 43 percent, chromate pigments in 43 percent, vitamin E in 32 percent, sorbitan sesquioleate derivatives in 26 percent, and BHT in 14 percent of evaluated products. There were a few products with either rosin derivatives or shellac.

SUMMARY OF DATA AND ALTERNATIVE PRODUCTS

A summary of the allergens found in facial cosmetics is shown in Table 1. Table 2 lists suitable alternative products for patients with contact allergy. The products listed in Table 2 were chosen because they are either free of all or most ACDS core screening tray allergens.

SUMMARY

This study identifies trends in formulation of existing facial cosmetic products on the market and suitable alternative products for patients with contact allergy. As has been reported in other articles, the most frequently encountered allergens in facial cosmetics are parabens and fragrance. Although the identified trends regarding ingredients used in various product types is accurate and useful, the exact percentages of individual ingredients in different product types should be viewed with caution since there are occasional inaccuracies in website data. Also, the data in this study reflect the product inventory found in CVS stores and may differ from similar data for other store chains. The authors recommend that published data and databases for choosing specific contact allergy alternatives use the actual product labels

or data provided directly from the manufacturer to ensure accuracy.

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