

New Sunscreens on the Block: An Evaluation of the Online Sunscreen Market in the United States

To the Editor:

Although the US Food and Drug Administration (FDA) has not approved new ultraviolet (UV) filters for over a decade, non-US sunscreen manufacturers have access to newer filters; these products can be purchased online by US consumers.¹ Little is known about the use of non-FDA-approved UV filters in the United States. As adverse reactions to sunscreens are of concern, dermatologists should be cognizant of market trends.² This study aimed to determine the prevalence of UV filters found in the US online facial sunscreen market.

We searched the top 100 best-selling facial sunscreens on Amazon.com in September 2019 and July 2020. Ultraviolet filters were categorized by US FDA approval. Although an ecamsule-containing formulation was approved through the New Drug Application, ecamsule is not currently approved for widespread use.² Therefore, ecamsule was considered non-FDA approved. A translator was used for non-English product labels. If a sunscreen's ingredients were not available on

Amazon.com, the sunscreen brand's official website was reviewed. Duplicates and products without SPF were excluded.

Each search included 84 and 93 sunscreens, respectively. Although Amazon's best-sellers list updates hourly, 50.6% of identified sunscreens remained top sellers, yielding 122 unique products. Of 14 identified UV filters, 6 (42.9%) were not FDA approved (Table 1). Overall, zinc oxide was the most prevalent filter (53.3%). The most common non-FDA-approved filter was bemotrizinol (Tinosorb S; BASF Corporation, Florham Park, NJ; 6.56%). Non-FDA-approved filters were consistently used in best-selling sunscreens (September 2019: 12/84 [14%]; July 2020: 11/93 [12%]).

This study demonstrates that sunscreens containing non-FDA-approved filters are readily available online for US consumers. Although the current literature suggests that these newer UV filters rarely cause photoallergic and allergic contact dermatitis, the European Taskforce for Photopatch Testing updated the European Photopatch Test Baseline Series (Chemotechnique Diagnostics, Vellinge, Sweden) to include 5 of the 6 non-FDA-approved filters identified in our study.^{3,4} Meanwhile, the North American Photopatch Test Series (Dormer Laboratories, Toronto, Canada), the photoallergen panel most commonly used by

TABLE 1. Percentage of Sunscreens Containing Each Identified UV Filter Stratified by FDA Approval Status and UV Protection

FDA Approval Status	UV Filter	UV Protection	Products From September 19, 2019, n = 84, n (%)	Products From July 11, 2020, n = 93, n (%)	Combined Search, n = 122, n (%)
FDA approved	Zinc oxide	UVB, UVA1, UVA2	41 (49)	52 (56)	65 (53.3)
	Octisalate	UVB	35 (42)	40 (43)	54 (44.3)
	Octocrylene	UVB	28 (33)	38 (41)	48 (39.3)
	Octinoxate	UVB	34 (40)	32 (34)	46 (37.7)
	Avobenzone	UVA1	31 (37)	33 (35)	44 (36.1)
	Homosalate	UVB	23 (27)	31 (33)	39 (32.0)
	Titanium dioxide	UVB, UVA2	21 (25)	23 (25)	29 (23.8)
	Oxybenzone	UVB, UVA2	18 (21)	15 (16)	24 (19.7)
Not FDA approved	Bemotrizinol (Tinosorb S)	UVB, UVA1	7 (8.3)	7 (7.5)	8 (6.56)
	Diethylamino hydroxybenzoyl hexyl benzoate (Uvinul A Plus)	UVA2	7 (8.3)	4 (4.3)	7 (5.74)
	Octyl triazone (Uvinul T150)	UVB	3 (3.6)	4 (4.3)	4 (3.28)
	Amiloxate	UVB	2 (2.4)	3 (3.2)	3 (2.46)
	Bisoctrazole (Tinosorb M)	UVB, UVA1	0	1 (1.1)	1 (0.820)
	Ecamsule (Mexoryl SX)	UVA1, UVA2	1 (1.2)	1 (1.1)	1 (0.820)

FDA, Food and Drug Administration; UV, ultraviolet; UVA, ultraviolet A; UVB, ultraviolet B.

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American Contact Dermatitis Society members, does not test for any of these filters, and dermatologists in North America have yet to enact similar changes to a standardized photopatch test series.⁵ As the use of newer UV filters increases, the

incidence of allergic and photoallergic contact dermatitis to these filters will likely also increase, necessitating a need for an updated photopatch test series in the United States.

This study is limited because the proportion of consumers who purchase sunscreens online versus in-store is unknown. Consequently, the sunscreen filters identified in this study may not be reflective of those used by patients seen in clinic.

With increased awareness of the current sunscreen market, dermatologists are better equipped to discuss sunscreen ingredients, including those not yet FDA approved. To track potential adverse reactions to these newer UV filters, an updated North American Photopatch Test Series analogous to the European Photopatch Test Baseline Series may become necessary. Dermatologists should be mindful of emerging sunscreen ingredients when evaluating patients and recommending products for photoprotection.

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