

CONTACT POINT

Immunologic contact urticaria from phenoxyethanol in cosmetics

María A. Pastor-Nieto^{1,2}  | María I. Peña-Arellano³ | María E. Gatica-Ortega⁴ 

¹Department of Dermatology, Hospital Universitario de Guadalajara, Guadalajara, Spain

²Universidad de Alcalá, Alcalá de Henares, Spain

³Department of Allergy, Hospital Universitario de Guadalajara, Guadalajara, Spain

⁴Department of Dermatology, Complejo Hospitalario Universitario de Toledo, Toledo, Spain

Correspondence

María A. Pastor-Nieto, Department of Dermatology, Hospital Universitario de Guadalajara, Calle Donantes de Sangre s.n., 19002 Guadalajara, Spain.

Email: mapastornieto@gmail.com

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2-Phenoxyethanol (CAS no. 122-99-6) is a broad-spectrum preservative authorized in cosmetics at a maximum concentration of 1%.¹

CASE REPORT

A 20-year-old atopic woman presented with immediate pruritic erythematous reactions with hives at the areas where she applied several cosmetics over the last year without systemic symptoms (Figure 1). Physical stimuli such as water alone or cold triggered no reactions.

We found four common ingredients in the cosmetics provided by the patient, namely, water, glycerin, sodium hydroxide, and phenoxyethanol. We performed open tests with four moisturizers and one scrub “as is,” as well as phenoxyethanol 1% pet. (Chemotechnique Diagnostics, Vellinge, Sweden). All triggered erythematous pruritic reactions after 20 minutes (Figure 1), lasting 45 minutes. A prick-by-prick test with phenoxyethanol 1% pet. and an ice cube test were negative. Open tests to phenoxyethanol 1% pet. in 10 controls were negative. The patient remained asymptomatic for 2 years with the avoidance of cosmetics with phenoxyethanol except for rare occasions when reactions recurred upon accidental exposures.

DISCUSSION

According to our research regarding preservatives in consumer goods in Spain, phenoxyethanol was labeled in 43%, 23%, and 14.5% of cosmetics sold in the pharmacies, supermarkets, and herbal stores, respectively, and rarely in topical medications (1.6%)

and domestic cleaning products (1.9%).² Phenoxyethanol was also labeled in 23.9% cosmetics in the United States.³ Two vaccines marketed in Spain contain phenoxyethanol, namely Triaxis (diphtheria-tetanus-pertussis) and Synflorix (pneumococcal polysaccharide conjugate).

Despite its widespread use, only six cases of contact urticaria in response to phenoxyethanol have been reported, involving five women and one man (Table S1).^{4–9} The mean age at diagnosis was 37.5 years. In most patients, reactions were triggered by numerous cosmetics. Only one patient presented systemic symptoms. The most commonly performed diagnostic tests were open tests alone (two cases), open tests plus prick-by-prick (two cases), and prick by prick alone (one case). No positive prick-by-prick test was detected in 17 controls (three publications). The presence of serum-specific immunoglobulin E (IgE) was explored in only one case with experimental reagents without success. Prick-by-prick test for phenoxyethanol 1% pet. was negative in our case; this could be explained by our use as preparation in petrolatum, which is not an optimal vehicle for prick testing.

Both immunologic contact urticaria (ICU) and non-immunologic contact urticaria (NICU) from cosmetics may result from multiple substances and are likely underdiagnosed.¹⁰ Contact urticaria to phenoxyethanol has been designated as ICU¹⁰; it is rare, controls are negative, and it occasionally may give rise to systemic symptoms. Because phenoxyethanol is ubiquitous, the fact that a patient reacts to a wide variety of cosmetics may be an important diagnostic clue.

Although systemic symptoms are rare, sensitized patients should be warned of the particular risks posed by widespread cutaneous, mucosal, or parenteral exposures to phenoxyethanol in cosmetics, medications, or vaccines.

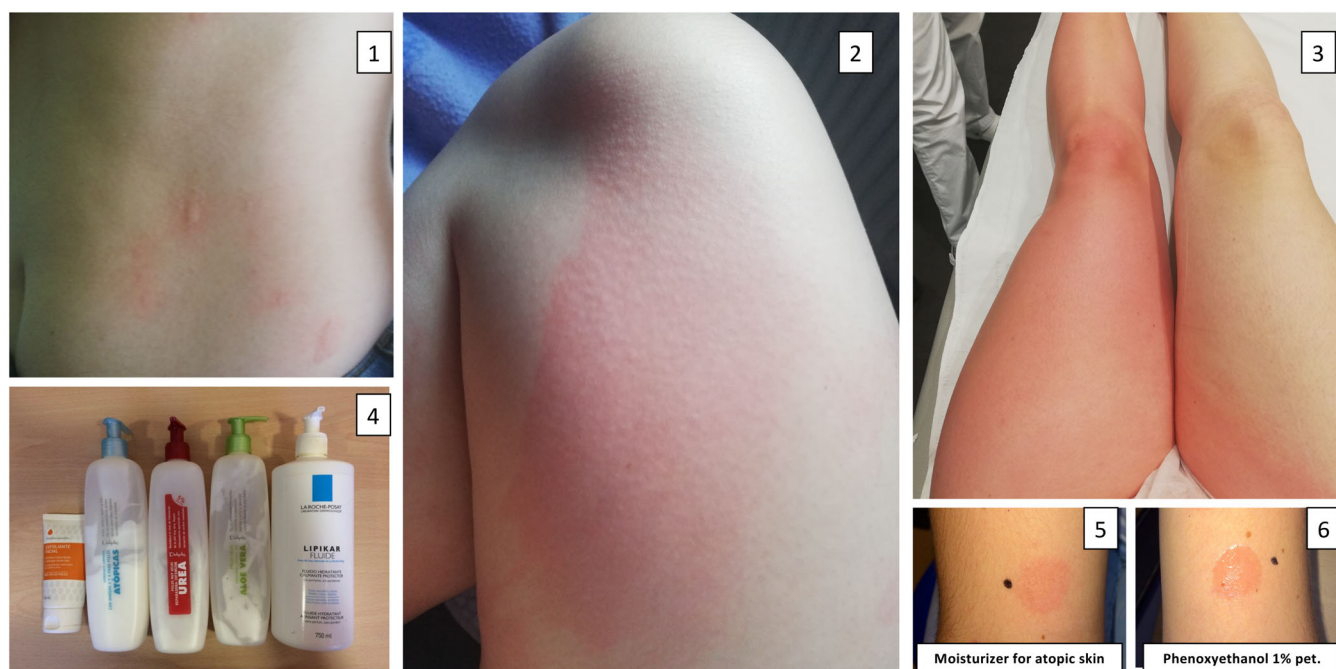


FIGURE 1 Erythema with occasional minute hives (1-3) circumscribed to the areas where cosmetics containing phenoxyethanol (4) had been applied (1-3). Erythematous pruritic reactions could be observed 20 minutes at the area where open tests were performed with cosmetics containing phenoxyethanol causing the reactions (5) as well as with a sample of phenoxyethanol 1% pet. (6)

CONFLICTS OF INTEREST

Authors do not have any conflicts of interests to declare.

AUTHOR CONTRIBUTIONS

María Pastor-Nieto: Conceptualization; data curation; formal analysis; investigation; methodology; validation; visualization; writing-original draft; writing-review & editing. **María Pena-Arellano:** Investigation. **María-Elena Gatica-Ortega:** Conceptualization; data curation; formal analysis; investigation; methodology; supervision; validation; visualization; writing-original draft; writing-review & editing.

ORCID

María A. Pastor-Nieto  <https://orcid.org/0000-0001-8382-5419>

María E. Gatica-Ortega  <https://orcid.org/0000-0002-8203-5834>

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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TABLES

TABLE 1. CASES OF CONTACT URTICARIA TO PHENOXYETHANOL (ONLINE SUPPLEMENTAL).

Author	Sex	Age	Systemic symptoms	Sources of exposure	Open tests	Prick tests	Patch tests	Scratch tests	IgE Total and Specific IgE anti PE
Bohn (2001/ Switzerland)	F	24	Generalized urticarial reaction	Body lotion	PE (body lotion ingredient): strong with pseudopods (for 30 min.)	Body lotion: +++; Euxyl K 400 1% in pet.: ++; 1% PE: +; 5% PE: +; 10% PE: ++ (aqueous solution). Two controls neg.	Single components of the body lotion: neg. except PE (time reading not specified)	NP	Total IgE slightly elevated (75.10 kU/l). IgE against PE not confirmed (experimental prototype reagents)

Hernández (2002/ Spain)	F	44	No	19 toiletries (17 with declared PE): emollients, make up, shampoos, soaps.	All toiletries (19) pos. at 20 min	Euxyl K400 1.5% pet. and 2-PE 1% pet.: +. Ten controls neg.	Euxyl K400 1.5% pet.; 2- PE 1% pet.; and toiletries <i>as</i> <i>is</i> pos. at 20 min.: neg. on D3 and D7.	NP	Total IgE normal (92 IU/mL). Specific IgE not available
Birnie (2006/UK)	F	11	No	'age defying' moisturizer	NP	NP	NP	2-PE and moisturizer positive at 10 min.	NP
Luján (2009/ Spain)	M	38	No	Aftershave product	2-PE 1% pet at 20 min. Use test with	NP	Euxyl K400: pos. at 30'	NP	NP

					aftershave strongly pos.		(neg. on D2 and D4)		
Núñez Orjales (2010/ Spain)	F	42	Rhinorrhea, dyspnea, and dizziness	Moisturizers, sun-care products, skin cleansing solutions, shampoos, toothpaste	One moisturizer: pos.; Euxyl-K 400 0.1% pet.: minimal pos.; PE 1% pet. clear pos.; blue ink pen (used to mark the skin test): hives. Dermographism: neg.	Vaccine Infanrix-Hib (2-PE 5 mg/mL): pos. Five controls neg.	NP	NP	NP
Aranzabal (2019/ Spain)	F	80		Ultrasound gel, moisturizers, wet wipes	Ultrasound gel and PE (1% pet.)	NP	NP	NP	NP

					pos. at 10 min reading				
Pastor-Nieto (2021/ Spain)	F	24		5 own cosmetics	5 cosmetics and PE (1% pet.) pos. at 20 min. Ten controls neg. Ice cube test: neg.	PE 1% pet: neg.	NP	NP	NP

Abbreviations: D: day; neg: negative; NP: not performed; PE: phenoxyethanol; pet: petrolatum; pos: positive.

