

Essential Oils from Citrus Peel as Causes of Occupational Contact Dermatitis: A Case Report

Bernaola Marta^{1*}, Bernaola Gonzalo²

¹Allergy Department, Hospital Central de la Defensa Gómez Ulla, Madrid, Spain

²Allergy Department, Hospital Universitario de Galdácano, Vizcaya, Spain

Citation: Bernaola Marta, Bernaola Gonzalo. Essential Oils from Citrus Peel as Causes of Occupational Contact Dermatitis: A Case Report. *Int Clin Med Case Rep Jour.* 2025;4(10):1-4.

Received Date: 18 October 2025; **Accepted Date:** 19 October 2025; **Published Date:** 20 October 2025

***Corresponding author:** Bernaola Marta, ¹Allergy Department, Hospital Central de la Defensa Gómez Ulla, Madrid, Spain

Copyright: Bernaola Marta, Open Access 2025. This article, published in *Int Clin Med Case Rep Jour* (ICMC RJ) (Attribution 4.0 International), as described by <http://creativecommons.org/licenses/by/4.0/>

ABSTRACT

Occupational contact dermatitis is a common condition among individuals who handle plant-based substances, yet reports involving citrus essential oils in food and beverage workers are scarce. We present a 47-year-old bartender with a 19-year history of chronic hand eczema, improving only during vacation periods. Patch testing revealed positive reactions to lemongrass, lemon essence, neroli essence, and geraniol, implicating lemon and orange peel essential oils as causative agents. The lesions' distribution corresponded to the patient's handling of citrus fruits, and perioral involvement was likely due to airborne particles. Management with topical corticosteroids, oral antihistamines, and protective measures resulted in clinical improvement. This case highlights the need to consider citrus essential oil sensitization in individuals with chronic hand eczema exposed to citrus fruits, including cooks, bartenders, and fruit handlers.

Keywords: Essential oil; Lemon grass; Limonene; Occupational contact dermatitis; Geraniol

INTRODUCTION

Dermatitis is the most frequent occupational skin disease. Its diagnosis requires concordance between clinical history, lesion distribution, proven exposure to the suspected allergen, and confirmation through patch testing. Plants can induce contact dermatitis via irritant, allergenic, or mixed mechanisms. Immunologically mediated reactions include immediate and delayed hypersensitivity, with variable prevalence across populations. In North America, *Rhus toxicodendron* affects 25–60% of the population, whereas in Europe, *Primula obconica* is the primary cause. In Spain, plant-induced contact dermatitis may account for 2.4% of all contact eczema.

Sensitizing substances in plants are often concentrated in the oleoresins fraction, where essential oils, terpenes, resins, phenols, and camphor are present. Citrus fruits contain terpene-rich essential oils, predominantly limonene, in the peel (exocarp), whereas the mesocarp and endocarp are free of these substances. Essential oils are volatile, fragrant, and can cause accidental contact upon crushing or breaking plant material.

CASE REPORT

A 47-year-old man, with no relevant medical history, previously worked as a cook for ten years and is currently employed as a bartender. As a hobby, he tends an orchard with fruit trees and vegetables. He presented with a 19-year history of chronic hand eczema, partially responsive to various treatments. Symptoms improved only during vacation periods when he avoided handling fruits at work or at home. Lesions recurred 2–4 days after resuming usual activities, beginning with pruritic micro papules that progressed to oozing, desquamation, and fissures. Occasionally, he developed perioral vesicular lesions, lip edema, and axillary pruritus. He avoided aftershave-type lotions due to facial lesion exacerbation.

Examination revealed asymmetric chronic eczema on both palms, affecting the thenar eminence, thumb, and first palmar crease of the right hand, and the mid-palm region and fingertips of the left hand. Interdigital micro vesicles and dystrophic nail changes were observed. Perioral erythematous micro vesicular lesions were also present.

Patch testing with the TRUE TEST standard series and kitchen vegetables using non-commercial extracts, including garlic, leek, carrot, artichoke, chard, spinach, parsley, and onion was negative at 48- and 96-hour readings. Using the essential oils and fragrance series (Marti Tor), positive reactions were observed at 2 and 4 days to lemongrass and lemon essence (++) and to neroli essence and geraniol (+). Lemon and orange peel essential oils were considered responsible for hand lesions and perioral dermatitis due to airborne particles. Treatment with topical corticosteroids, oral antihistamines, and hand protection measures resulted in clinical improvement.^[1-9]

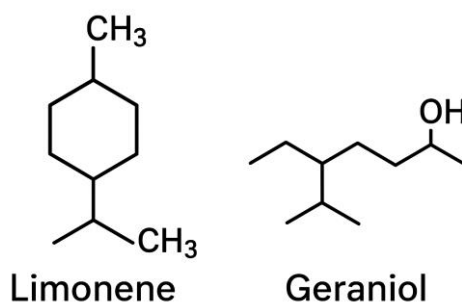


Figure 1: Limonene has a chemical structure of $C_{10}H_{16}$ and is a cyclic monoterpene composed of two isoprene units. Its IUPAC name is 1-methyl-4-(1-methylethenyl)-cyclohexene. It possesses a chiral center, giving rise to two optical isomers: (R)-limonene, which has a lemon-like odor, and (S)-limonene, which has a pine-like odor. These isomers differ in the spatial arrangement of their atoms. The chemical structure of geraniol is that of an acyclic monoterpene alcohol with the molecular formula $C_{10}H_{18}O$. Its systematic name is (2E)-3,7-dimethyl-2,6-octadien-1-ol, indicating that it is a ten-carbon alcohol with double bonds at positions 2 and 6, and methyl groups at positions 3 and 7.

DISCUSSION

The hand lesions corresponded to classic chronic contact dermatitis from essential oils of lemon and orange peel, consistent with the patient's handling of citrus fruits. The asymmetric distribution reflected his occupational gestures: the right first palmar crease was affected by handling a knife contaminated with allergens, the left palm by squeezing oranges, and the left fingertips by holding fruits for cutting. Perioral lesions likely resulted from airborne particles released during citrus peel handling, as described by Sutton and Sutton (1953).

Fisher reported contact dermatitis from anti-mold agents and azo dyes in citrus peel, and Schwartz noted that citrus peel can produce irritant reactions in normal skin within one hour. Cases of dermatitis from lemon oil have been reported in Italy. Lemongrass oil (*Cymbopogon* spp.) has previously caused eczematous eruptions among exposed workers, and undiluted oil is irritant; patch testing is performed at 2%. Positive reactions to neroli and geraniol likely reflect cross-reactivity due to limonene content and structural similarity. Peru balsam, related to lemon oil, was negative in this patient. Hydroxy citronellal from the fragrance series was also negative.

There are no previous reports of citrus-related dermatitis in cooks or bartenders, although chronic dermatitis from citrus oils has been described in orange sorters and fruit pickers. Sensitization to citrus essential oils should therefore be considered in patients with chronic hand eczema who handle citrus fruits, including cooks, bartenders, homemakers, and fruit handlers.

CONCLUSIONS

This case emphasizes that chronic hand eczema in individuals exposed to citrus fruits may be caused by essential oils present in lemon and orange peel. Patch testing with essential oils and relevant fragrances can identify the causative agents. Awareness of this occupational risk is essential for diagnosis, prevention, and management. Protective measures and avoidance of direct contact with citrus peel are recommended to reduce recurrence and improve outcomes.

REFERENCES

1. Fisher AA. Contact Dermatitis. 3rd ed. Philadelphia: Lea & Febiger; 1986.
2. Fernández de Corres L, Corrales JL, Muñoz D, Leanizbarrutia. Contact allergic dermatitis caused by plants. Allergol Immunopathol (Madr). 1984;12:313.
3. Dávila González JJ, Jáuregui Presa I, Zubeldia Ortuño JM, Olaguibel Rivera JM. Tratado de Alergología (2ª edición) 2016.
4. Puglisi V. Dermatoses caused by lemons. *Gior Ital Derm Sifilogr.* 1951;92:239.
5. Mitchell I, Roock. Botanical Dermatology: Plants Injurious to the Skin. Vancouver: Greengrass; 1979.
6. Greenberg LA, Lester D. *Handbook of Cosmetic Materials.* New York: Interscience; 1954.
7. Dupuis G, Benezra C. *Allergic Contact Dermatitis to Simple Chemicals: A Molecular Approach.* New York and Basel: Marcel Dekker; 1982.

8. Benezra C, Ducombs G, Sell Y, Foussereau J. Plant Contact Dermatitis. Toronto: Decker; 1985.
9. Falk A, Fisher T, Hagberg M. Purpuric rash caused by dermal exposure to d-limonene. Contact Dermatitis. 1991;25:198–199.