

Occupational contact urticaria due to pennyroyal (*Mentha pulegium*)

Contact Dermatitis 2007; 57: 285–286

Remedios Pérez-Calderón¹, Angeles Gonzalo-Garijo¹, Borja Bartolomé-Zavala², Ana Lamilla-Yerga¹ and Iñigo Moreno-Gastón¹

¹Department of Allergology, Infanta Cristina University Hospital, Badajoz and ²R&D Department, Bial-Aristegui, Bilbao, Spain

Key words: contact urticaria; Lamiaceae; *Mentha pulegium*; occupational; patch tests; pennyroyal.

Mentha pulegium (pennyroyal) is a member of the Lamiaceae family (formerly Labiateae), which also includes other plants of the same genus such as *Mentha sativa* or *spicata* (spearmint) and *Mentha piperita* (peppermint), and some of the different genera such as *Thymus vulgaris* (thyme), *Rosmarinus officinalis* (rosemary), *Ocimum basilicum* (basil), and *Origanum vulgare* (oregano) (1). Pennyroyal leaves are used both as a tea brewing and as flavouring in salads or cooked foods.

Case Report

A 25-year-old woman working as a cook in a restaurant was referred to our department for several episodes of pruriginous wheal-and-flare eruptions on her hands and forearms within 5–10 min of stripping the leaves off the pennyroyal plant. Her symptoms disappeared within 10–15 min with the cessation of contact. The patient had no history of dermatitis. She has been working at the same place for 5 years. Symptoms began 2 years ago and have been gradually worsening. The patient does not handle other fresh species, but tolerates the contact with fruits and vegetables. After the last reaction, she has tolerated the ingestion of meals, which contain oregano, thyme, and pennyroyal tea.

Routine skin prick tests with inhalant and food allergens proved to be negative. Total immunoglobulin E (IgE) was normal (45 IU/ml). The patient had no detectable specific IgE to pennyroyal, spearmint, peppermint, basil, rosemary, and oregano (CAP System; Pharmacia, Uppsala, Sweden). Prick-by-prick testing with fresh pennyroyal leaves gave negative results at 15 min. Prick test (20 mg/ml) with protein extracts and patch test with protein (20 mg/ml) and lipid extracts (0.01% and 0.05% pet.) obtained from fresh pennyroyal and the other plants mentioned above were performed. Prick tests proved negative for all of them. Open patch tests were applied both on the volar aspect of the forearm and on the back. At 15 min, we found a positive reaction to both types of patch test, protein and lipid extracts, from pennyroyal and peppermint (pruritus, erythema, and papules), lasting 20 min; the rest of the allergens proved to be negative [and remained negative at day 2 (D2) and D4 after 2 days of occlusion]. 5 control patients were negative. Use test was performed with pennyroyal fresh leaves. 3 min after handling this plant, the patient developed pruritus, erythema, and papules on the forearms and hands, disappearing within 15 min. The IgE reactivity of pennyroyal protein extract was also analysed by sodium dodecyl sulfate–polyacrylamide gel electrophoresis immunoblotting with the patient's serum, and no IgE-binding proteins were detected. Prick test and open patch test with menthol 1% pet. proved to be negative, but ROAT

(repeated open application test) was positive on the third day.

Discussion

The genus *Mentha* includes about 20–30 true species, but because of hybridization, there are numerous variations. The best-known hybrids are *M. piperita* (results from a cross between *M. aquatica* and *M. spicata*) and *M. spicata* (hybrid between *M. suaveolens* and *M. longifolia*). They accumulate terpenes and a range of other components (such as flavonoids, carotenoids, tannin, etc.) in the epidermal glands of leaves, stems, and reproductive structures. Their essential oils are used for medicinal, cosmetic, and culinary purposes. It has been shown that both the quantity and the essential oil content depend on harvest time and environmental factors (2, 3). Monoterpenes comprise the major components of the essential oils of the mint family. The main chemical components of pennyroyal oil are pulegone, menthone, isomenthone, and neomenthone; and in peppermint oil are menthol, menthyl acetate, menthone, menthofuran, pulegone, limonene, eucalyptol, isomenthol, and isomenthone (2, 4). Unlike peppermint, spearmint does not contain high amounts of menthol; their main chemical components are carvone, α -pinene, β -pinene, 1,8-cineole, linalool, limonene, myrcene, and caryophyllene (3).

Contact urticaria from pennyroyal has not been previously reported. There is a single case report of it causing a contact dermatitis after picking their leaves (5). We present a case of contact urticaria, and noticed the occupational character of the illness. Although the clinical history and use test suggested the diagnosis of hypersensitivity to pennyroyal, the results of prick tests, serum-specific IgE and immunoblotting allow ruling out this diagnosis, and a non-IgE-mediated contact urticaria would be most probable. Menthol could be responsible for the reaction, but other components could be also involved. We point out that only peppermint, but not spearmint, was positive at patch test. Regarding the result of ROAT with menthol, a possible explanation could be the lower content of menthol in spearmint. In addition to that, both pennyroyal and peppermint contain pulegone, not identified in spearmint.

References

1. Lamiaceae. (available from <http://www.en.wikipedia.org/wiki/Lamiaceae>). Accessed 23 January 2007.
2. Kizil S, Tonger O. Influence of different harvest times on the yield and oil composition of spearmint (*Mentha spicata* L. var. *spicata*). *J Food Agric Environ* 2006; 4: 135–137.
3. Stengele M, Stahl-Biskup E. *Seasonal Variation of the Essential Oil of European Pennyroyal* (*Mentha pulegium* L.) (available from http://www.actahort.org/books/344/344_5.htm). Accessed 23 January 2007.
4. Mint. (available from <http://www.dermnetnz.org/dermatitis/plants/mint.html>). Accessed 23 January 2007.
5. Roe E, Serra-Baldrich E, Dalmau J, Peramiquel L, Pérez M, Granel C, Alomar A. *Mentha pulegium* contact dermatitis. *Contact Dermatitis* 2005; 53: 355.

Address:

Dr M. Angeles Gonzalo-Garijo
Hospital Universitario Infanta Cristina
Servicio de Alergología
Carretera de Portugal s/n
06080 Badajoz
Spain
Tel: +34 924 21 81 00
Fax: +34 924 21 81 10
e-mail: magonzalog@telefonica.net