

# ALLERGIES IN THE WORKPLACE

## LETTUCE ALLERGY

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### ABSTRACT

A casual worker in a vegetable-packing plant developed hand and forearm eczema soon after commencing work in the lettuce-packing section. Despite a negative standard battery, targeted patch testing revealed lettuce as the offending agent; this highlights the need to use the patient's own materials identified from an appropriate risk assessment of the workplace in cases of suspected allergy. Development of her eczema may have been facilitated by chronic exposure to water, emphasising the need for workers to have access to gloves, and education about their correct use.

### Presenting complaints

A 35-year-old woman complained of an itchy rash on her fingers, which occurred for the first time 3 months after commencing work at a vegetable-packing plant. The rash then spread to her arms and neck. She had been treated with a variety of topical corticosteroids that temporarily relieved the problem.

### Medical history

She had no known medical history, and had not undergone any surgical procedures. There was no relevant family history. She had no known allergies.



Fig. 1. Iceberg lettuce (*Lactuca sativa* var. *capitata*)

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### Occupational exposure

She worked daily, packaging vegetables. On commencing the job, her initial task was to pack iceberg lettuce (Fig. 1). This involved lifting the lettuce off a conveyer belt, removing it from a polystyrene container, washing it with water, wrapping it in plastic cling film, and finally placing it into a plastic crate. She did not use gloves. One month prior to her consultation with us, she was transferred to a new section of the plant, where she handled spinach, coriander and parsley. She would place them in plastic bags and then seal the bag. Following the transfer, her rash did improve slightly.

### Household exposure

Her personal grooming products included: 'Body on Tap' shampoo/conditioner, 'Lux' soap, 'Shower-to-Shower' underarm roll-on, 'Panache' perfume and 'Dove' cream for her face.

Her household cleaning products included: 'Handy Andy', 'Jik', 'Mr Muscle', 'No-name Hyperama' pot-pourri-fragranced furniture polish, 'Bingo' washing powder, 'Sunlight' liquid fabric softener and 'Agex' dishwasher soap.

### Clinical examination

She had patchy eczema on her fingers. This was most marked on the lateral aspects which were dry, red and fissured. Her forearms were xerotic with patchy post-inflammatory hypopigmentation. There was chronic paronychia of the left third, fourth and fifth fingers. There was also incidental scattered folliculitis of the buttocks and thighs, with two non-fluctuant furuncles on the right thigh.

### Initial assessment

The initial assessment was:

- Hand/forearm eczema, possibly related to lettuce and wet work
- Chronic paronychia, secondary to wet work
- Probable *Staphylococcus aureus* folliculitis and furunculosis.

### Plan

The following drugs were prescribed:

- Betamethasone valerate 0.1% cream for the eczema
- Thymol 2% in chloroform 50% for the chronic paronychia
- Flucloxacillin orally, benzathine penicillin IMI stat and clioquinol 3% in cetamacrogol for the presumed staphylococcal infection.

### Special investigations

A standard battery patch test for 41 common international allergens including sesquiterpene lactone mix was negative. Targeted patch testing was performed with potential allergens identified in her work environment, including lettuce, the water used to wash the lettuce, and the polystyrene and plastic used for packaging. A 3+ positive result was obtained to lettuce sap. A 1+ 'edge effect' was noted for the plastic wrap (Fig. 2).



Fig. 2. Patch test result: 1. lettuce leaf – negative, 2. lettuce sap – 3+, 3. water – negative, 4. polystyrene – negative, 5. plastic wrap – 1+

She was not patch tested against spinach, coriander or parsley.

A pus swab from a pustule grew *Staphylococcus aureus*, sensitive to cloxacillin.

### Clinical course

At follow-up one month after her initial visit, the eczema had completely resolved, as had the superficial skin sepsis. There was, however, residual chronic paronychia of the left third finger.

The patient had been employed at the packaging plant on a casual basis and had resigned during the time between the two appointments.

### Discussion

Iceberg lettuce (*Lactuca sativa* var. *capitata*) is a member of the Compositae (Asteraceae), or daisy, family.<sup>1</sup> Compositae encompass a wide variety of groups of plants that are used for food, e.g. lettuce, chicory and artichoke, in our gardens, e.g. marigolds, chrysanthemums and dahlias, and in medicinal products, e.g. arnica and chamomile. They are also common weeds.<sup>2</sup> The predominant allergens are the sesquiterpene lactone compounds, which cause allergic contact dermatitis. These are 15-carbon atom molecules having the common feature of an exocyclic  $\alpha$ -methylene group attached to a  $\gamma$ -butyrolactone ring (Fig. 3), although occasionally this is not present in some antigenic sesquiterpene lactones.<sup>1</sup> They are found mainly in the leaves, stems, flowers and possibly the pollen of these plants, and do occur in other genera, e.g. liverwort (*Frullania*), tulip tree (*Liriodendron*, Magnoliaceae) and sweet bay (*Lauraceae*). Other compounds in Compositae plants which may be implicated in causing contact dermatitis include oxythymoldiesters and polyacetylenes.<sup>1</sup>

The clinical patterns of Compositae dermatitis include:

- Irritant eczema – this may be mechanical (thistles, burrs) or chemical (sap)<sup>1</sup>
- Contact urticaria<sup>1</sup>
- Allergic contact eczema – in this group, there are four recognised patterns:<sup>1</sup>
  - Localised eczema – younger patients, occupational
  - Exposure eczema – older patients, gardeners. Also known as ‘bush dermatitis’ in Australia, ‘ragweed dermatitis’ in the USA and ‘parthenium dermatitis’ in India<sup>2</sup>
  - Localised vesicular hand eczema, which spreads to become generalised – sudden summer occurrence
  - Localised vesicular hand eczema, with variable spreading – seasonal variation

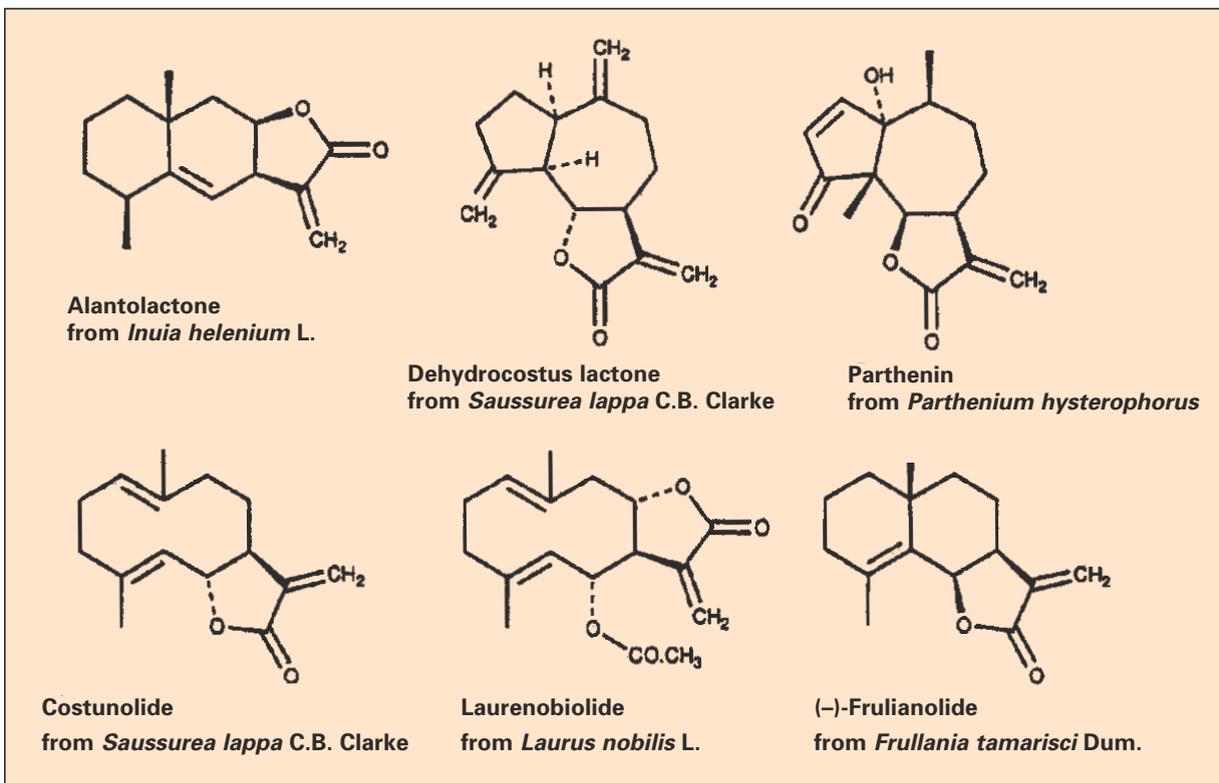


Fig. 3. Examples of some allergenic sesquiterpene lactones from the Compositae, Lauraceae and liverworts.<sup>2</sup>

- Systemic allergic contact dermatitis whereby ingestion of lettuce may aggravate a prior cutaneous contact dermatitis.<sup>3</sup>

Lettuce has been implicated in all of the above major clinical patterns.<sup>1,4,8</sup>

In a group of 190 Danish Compositae-allergic patients, the most common primary sensitisers were chrysanthemum, marguerite and lettuce.<sup>9</sup> The authors note that although lettuce is a weak sensitiser, prolonged, especially work-related exposure, may have contributed to the high prevalence in this study. Importantly, almost 50% of the non-occupationally lettuce-sensitised subjects had unknown relevance of the positive result, indicating cross-reactivity with other Compositae species.<sup>9</sup> This serves to highlight the necessity of interpreting a positive patch test result in each individual patient's context. The doctor needs to make a thorough evaluation using a workplace assessment combined with a careful history to elucidate all possible exposures. The positive allergic findings from tests can then be interpreted with relevance to the patient and clinical findings. Patients may show positive reactions to particular allergens but this may have no relevance to their clinical presentation.

The patch test result on this patient provided for interesting interpretation. The strong 3+ reaction to sap may indicate an irritant reaction as opposed to an allergic reaction, a phenomenon well recognised with Compositae as mentioned above. However, mitigating evidence in favour of an allergic reaction is that the effect was not immediate, there was no 'edge effect' and the erythema, infiltration and vesicopapules extended well beyond the chamber margins. The negative result for the lettuce leaf may be explained by insufficient release of antigen from an unbroken leaf. An alternative explanation for this anomaly is that the sap used for the patch test was not freshly squeezed from the leaf but had been lying in the plastic wrap. This may have allowed for a chemical reaction such as oxidation to occur, thereby increasing its allergenic potential. The weak 1+ positive reaction to the plastic wrap may be explained by sap contamination.

This patient tested negative to sesquiterpene lactone, which is part of the Groote Schuur Hospital standard battery. However, it is recognised that lettuce allergy is not detected by 'sesquiterpene lactone-mix', and may indeed be negative for 'Compositae-mix' too.<sup>9</sup> This probably relates to the specific compounds which are included in these preparations. Furthermore, while it is known that there is common cross-reactivity between the various members of the Compositae, this is neither complete nor predictable.<sup>2</sup> Indeed, only testing with specific lettuce allergens and extracts will display a positive result.<sup>9</sup> During testing, one should be vigilant against false-negative results induced by water and ultraviolet degradation of antigens, and therefore one should use only freshly harvested lettuce.<sup>9</sup> Since most commercial series are inadequate at detecting anything other than common allergens, the importance of test-

ing the patient's own products is highlighted by this case. This should be done by highly skilled specialists to avoid toxic reactions.

Both parsley (*Petroselinum crispum*) and coriander (*Coriander sativum*) are members of the Umbelliferae, or parsley, family. The former usually causes a photodermatitis secondary to naturally occurring psoralens.<sup>10</sup> The latter has been reported to cause protein contact dermatitis, contact urticaria and allergic contact dermatitis.<sup>11</sup> Spinach (*Spinach oleracea*) is a member of the Chenopodiaceae, or goosefoot/saltbush family, and is also a cause of allergic contact dermatitis<sup>12</sup> and protein contact dermatitis.<sup>13</sup> This patient was not tested against these plants as the dermatitis started prior to the transfer away from handling lettuce. Furthermore, we were unable to find any information to suggest cross-reactivity between the Compositae, Umbelliferae and Chenopodiaceae families. The ongoing nature of her symptoms for the month following her transfer to another section and prior to seeing us, may be explained by ongoing exposure to lettuce in the work or home environment, or an irritant effect from the other vegetables and water on her already inflamed skin.

It is likely that the chronic exposure to wet conditions, as evidenced by the chronic paronychia, facilitated the development of the eczema, as a result of compromised barrier function. The appropriate use of dry, cotton-lined rubber gloves with adequate water-insulating properties may have helped prevent her sensitisation to lettuce.

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