

Cinnamon-induced airborne occupational allergic contact dermatitis in a baker: Severe flare-up during patch testing

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Cinnamon (cassia) is a well-known but rarely reported cause of occupational allergic contact dermatitis (OACD) in bakers, who present almost exclusively with hand eczema.^{1–6} There is only one reported case of airborne OACD caused by cinnamon in bakers.² Herein, we report a rare case of cinnamon-induced airborne OACD in a baker who reacted with a severe flare-up during patch testing.

CASE REPORT

A 37-year-old atopic Turkish baker presented with severe eczema on the face and neck (Figure 1A,B), accompanied by swelling of the eyelids. The palmar and dorsal sides of both hands and fingers and forearms were also involved. The patient had been working as baker for 15 years, mainly making and baking cookies and cakes. Most frequently, he had contact with cinnamon, sesame, hazelnut and flour at

work. His complaints started 5 years previously, initially as hand eczema. Later, new lesions had started to develop on the face and neck. The patient had not been wearing protective gloves for the last 2 years, as he suspected that his hand eczema was becoming worse as a result of wearing rubber gloves. He had suffered from atopic skin diathesis, and allergic rhinitis and bronchial asthma since childhood. However, his rhinitis and asthma did not become worse at work. Prick testing showed seasonal pollen allergy and perennial house dust mite allergy. The patient had no symptoms of workplace-related immediate-type allergies. His eczema showed a definite work-related course, with exacerbations during work and remissions during holidays.

Patch testing was performed according to ESCD patch test guidelines.⁷ The results are shown in Table 1. Early readings at 20 to 60 minutes did not show an urticarial reaction. Strong positive patch test reactions were obtained with cinnamyl alcohol

TABLE 1 Patch test results of the patient and their clinical relevance (CR)/occupational relevance (OR)

Patch test substances	20 min	60 min	D2	D3	D4	D7	Relevance
Cinnamyl alcohol 1% pet.	–	–	++	+++	+++	^a	Current CR + OR
Oil of cinnamon 0.5% pet.	–	–	+++	+++	++	^a	Current CR + OR
Fragrance mix I 8% pet. (cinnamyl alcohol, cinnamal, hydroxycitronellal, amyl cinnamal, geraniol, eugenol, isoeugenol, <i>Evernia prunastri</i>)	–	–	+++	+++	++	^a	Indicator of cinnamon allergy in this case No complaint with daily cosmetics; however, past CR with perfumes and deodorants
Cinnamal, eugenol, isoeugenol, and other constituents of fragrance mix I	–	–	–	–	–	^a	
<i>Myroxylon pereirae</i> (balsam of Peru)	–	–	+	++	++	^a	Indicator of cinnamon allergy in this case No complaint with foods or drink rich in <i>M. pereirae</i> (on contact or when consuming)
Workplace material (sesame powder, hazelnut powder, flour moistened with water, “as is”) ^b	–	–	–	–	–	^a	
Thiuram mix 1.0% pet.	–	–	+++	+++	++	^a	Past CR + OR (rubber gloves)
Zinc diethyldithiocarbamate 1.0% pet.	–	–	+++	+++	++	^a	Past CR + OR (rubber gloves)
Methyldibromo glutaronitrile 0.1% pet.	–	–	++	++	+	^a	Currently used cosmetics or cleansing products did not contain this allergen
Nickel sulfate 5% pet.	–	–	++	++	+	^a	Past CR
Other ingredients of the European baseline series, cosmetic series, fragrance series, and bakery series	–	–	–	–	–	^a	

^aPatch testing was stopped on day 4 because of a severe flare-up reaction.

^bCinnamon was not tested because of a suspicion of a severe reaction.



FIGURE 1 Occupational airborne allergic contact dermatitis caused by cinnamon in a baker. (A,B) Severe eczematous reaction on the face and neck involving the skin creases and the retroauricular area. (C,D) +++ positive patch reactions to cinnamyl alcohol (1% pet.) (C) and oil of cinnamon (0.5% pet.) (D) on day 3

(Figure 1C), oil of cinnamon (Figure 1D), fragrance mix I, and rubber allergens. Patch testing was stopped on day 4 upon development of a severe flare-up, especially on the face, causing eyelid oedema. The reaction resolved within 10 days on treatment with systemic and topical corticosteroids. The patient left his job, and remained free of lesions following avoidance of contact with cinnamon in a 10-month follow-up.

DISCUSSION

Cinnamon-induced airborne allergic contact dermatitis was diagnosed according to history, clinical and patch test findings, and the severe

flare-up during patch testing. The patient had concomitant rubber allergy, probably occupationally acquired, but it was not considered to be the cause of his current eczema, owing to lack of current contact with protective gloves.

Occupational contact dermatitis is common among bakers, mainly presenting as irritant contact dermatitis of the hands⁸ resulting from exposure to irritants such as wet dough, fruit juices, bleaching agents, and various flavours. OACD is also an important problem for bakers, owing to various occupational contact allergens, including spices such as cinnamon, cardamom, cloves, nutmeg, and vanilla, flour additives such as α -amylase, and antioxidants such as benzoyl peroxide, gallates, and sorbic acid.^{3,4} Cinnamon is one of the best-known spices causing OACD in bakers, almost exclusively on the hands.¹⁻⁶ There is only one reported

case of airborne OACD caused by cinnamon, on the face and neck in a baker.² Spices may cause irritant patch test reactions when tested “as is,” so it is recommended to test with dilution series.^{2,9} Spices, flour and α -amylase may also cause contact urticaria.³ Oil of cinnamon contains strong contact sensitizers such as cinnamal, cinnamyl alcohol, and eugenol.² Cinnamyl alcohol is regarded as a prohaptan, with cinnamal being its main metabolite.¹⁰ However, as in the presented case, patients who are allergic to cinnamyl alcohol do not always react to cinnamal¹⁰ (Table 1). Concomitant positive patch test reactions are usually seen with fragrance mix I and *Myroxylon pereirae*, as they contain the same allergens as are present in oil of cinnamon, or allergens related to these.

In conclusion, this is a rare case of airborne OACD caused by cinnamon in a baker with an unusually negative patch test result with cinnamal. The severe flare-up during patch testing was a striking finding supporting the clinical relevance. Cinnamon might be considered among the eliciting causes of severe face and neck dermatitis in bakers.

CONFLICTS OF INTEREST

The author has no conflicts of interest to report.

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