

## CASE REPORT

## Beer anaphylaxis due to coriander as hidden allergen

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**SUMMARY**

Beer is one of the most widely consumed alcoholic beverage all over the world. Although the production and consumption of this beverage is diffuse, allergic reactions are very uncommonly reported, mainly due to wheat, yeast or hops allergy. More recently, many foods and drinks have been flavoured with spices, with a reported increase in allergic reactions. We report on a case of a young woman who experienced anaphylaxis due to coriander-flavoured beer. This is the first case of beer anaphylaxis due to coriander, which had been added to the beer as aromatising substance. As the presence of flavours is not always reported, they may be considered hidden allergens, whenever they are the cause of anaphylaxis to foods or beverages, the patient usually tolerated. In conclusion, allergic reactions to spices have to be considered in the patients with 'idiopathic' anaphylaxis induced by common foods, where spices had been hidden.

**BACKGROUND**

Although beer is one of the most widely consumed alcoholic beverage all over the world, allergic reactions are very uncommonly reported,<sup>1</sup> mainly due to wheat, yeast or hops allergy.<sup>2</sup>

In the last years, many common foods and drinks are prepared with natural flavours and spices, like seeds derived from Umbelliferae family, such as coriander, dill, celery, fennel and caraway.

Along with the increase in the production of aromatised beverages and foods, an increase has been observed in allergic reactions, due not only to the expected known allergens, but also related to the aromatising substances which are often hidden allergens.<sup>3–5</sup>

Here, we report on a case of beer anaphylaxis, due to coriander.

**CASE PRESENTATION**

A 29-year-old woman was referred to allergy department in November 2016, following an episode of anaphylaxis occurred a few minutes after beer ingestion.

Her medical history was relevant for recurrent wheezing as a child, birch and hazel trees pollen allergic rhinitis, grass sensitisation and no previous food allergy. She was not taking any drug on a regular basis, except for estroprogestin pill.

Two months previously, immediately after swallowing a sip of blond beer, she reported sneezing, watery rhinorrhoea, palpebral angioedema and dyspnoea, followed by intense and diffuse itching and urticaria. She was successfully treated at

Emergency Department (ED) with oral antihistamine (cetirizine 10 mg) and glucocorticoid (prednisone 25 mg), and all the symptoms waned within an hour. The patient was used to drink beer, which she continued to drink even after the anaphylactic episode. She suspected that it had been the specific brand of beer to have caused her allergic reaction and she came to our department bringing an image of the bottle of that beer. The label of the beer reported that it contained Pils and Maris Otter malts, Magnum, Amarillo and Centennial hops, without any indication of flavours.

Due to the convincing history of anaphylactic reaction to a very specific beer brand, we decided to contact the craft brewery to obtain more information about possible ingredients of that type of beer, which had not been reported into the label. Actually coriander powder, obtained by ground coriander seeds, and no additives, was present in that type of beer, which had caused the anaphylactic reaction of our patient. One litre beer recipe requires 1 g coriander seeds.

For diagnostic evaluation, skin prick tests, specific IgE antibodies and oral challenge test were performed.

Prick tests were carried out with commercially available extracts of yeast (Bial Aristegui Italia, concentration 10 mg/mL) and hop (Bial, concentration 5% p/v), as well as skin prick test for common inhaled and food allergens (Bial, concentration 5% p/v).

Skin tests with native foods were performed: barley malt, two beer brands (blond beer and coriander-flavoured beer) and crushed coriander seeds.

Histamine phosphate at 10 mg/mL and normal saline were used as positive and negative controls, respectively. A weal with a mean diameter 3 mm or greater with erythema larger than 5 mm, occurring 20 min after testing, was defined as a positive reaction, the skin prick test with the saline being negative at the same time.

Specific IgE was performed for coriander seeds (f317 ThermoScientific), Bet v1, Bet v2 considering positive a serum level >0.35 KUA/L.

Skin tests with native products (beer and coriander) were also performed on five healthy volunteers, enrolled as negative controls, and informed consent was obtained from both the patient and controls.

Skin prick test results with standard series of common aeroallergens and food allergens, including wheat, were positive only to birch, hazelnut and grass pollen. The results of skin test with native materials were negative for barley malt and blond beer and positive for craft coriander-flavoured beer



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**Figure 1** Skin tests were positive for craft coriander-flavoured beer (B) and coriander seeds (Cor) (+ and – indicate histamine and normal saline, used as positive and negative controls, respectively).

(weal 5 mm, erythema 12 mm diameters) and coriander seeds (weal 8 mm, erythema 20 mm diameters) (figure 1).

Specific IgEs were positive for coriander (2.12 KUA/L) and Bet v1 (3.69 KUA/L), being negative Bet v2.

An open food challenge was performed with crushed coriander seeds at the doses of 5, 50 and 100 mg. Fifteen minutes after the 50 mg dose, the patient had nasal congestion, rhinorrhoea and visible lip angioedema, general itching urticarial rash and a tight sensation in her throat. Following 0.3 mL intramuscular epinephrine, all symptoms subsided.

### OUTCOME AND FOLLOW-UP

The patient was equipped with autoinjectable epinephrine, and she was invited to avoid ingestion of coriander, also when contained in small quantities. Oral provocation test with beer was not performed, because the patient had returned to ingest the usual non-flavoured beer soon after the anaphylactic episode.

At the 6 monthly follow-up visit, the patient did not report any allergic reaction.

### DISCUSSION

This is the first case of beer anaphylaxis due to coriander, which had been added to the beer as aromatising substance. She was successfully treated at ED with oral antihistamine and glucocorticoid, but it is important to underline that, according to guidelines, the patient did not receive the most appropriate treatment, because she did not receive epinephrine, although her systemic reaction was clearly anaphylactic. Unfortunately, epinephrine is still underused even in the emergency room setting, despite guidelines recommend epinephrine administration ‘sooner rather than later,’ that is, when the initial signs and symptoms of anaphylaxis occur, regardless of their severity, because fatalities in anaphylaxis usually result from delayed or inadequate administration of epinephrine.<sup>6</sup>

The cases of beer anaphylaxis reported in the literature have been related more commonly to barley,<sup>7</sup> hops,<sup>8</sup> yeasts<sup>9</sup> and in one case to wheat.<sup>10</sup> The role of alcohol as cofactor of beer anaphylaxis cannot be excluded.

Spices are increasingly used with purpose of aromatising foods and beverages. As their presence is not always reported, they may be considered hidden allergens, whenever they are the cause of anaphylaxis to foods or beverages, the patient usually tolerated, as the case we have reported.

Coriander anaphylaxis is a rare occurrence, described in literature mostly in relation to occupational allergy<sup>11</sup> or to ingestion as hidden allergen, contained in teriyaki sauce<sup>12</sup> or in Birmanian preparation of chicken<sup>13</sup> and in one case after ingesting fresh bruschetta bread with coriander leaves.<sup>14</sup> Coriander seeds are sometimes used in brewing certain styles of beer, particularly some Belgian witbier and German Hefeweizens. Many traditional dishes are prepared with coriander seeds, such as Yemeni-Israeli spicy sauce used as an accompaniment for falafel or the Mexican ‘Pescado En Cilantro’—essentially fish cooked in a coriander sauce, with chilli, onion and fresh lime juice.

Clinical observations indicate that mugwort and birch pollen allergy are frequently associated to coriander anaphylaxis, as in our patient, who was allergic to birch pollen. It has also been well described the cross reaction between birch allergy, confirmed with Bet v1 or Bet v2 sensitisation, and coriander reaction.<sup>15</sup>

Specific IgE to Bet v1, a protein of pathogen related (PR-10) family, were present in our patient, but we do not think that a coriander PR-10 analogue was the responsible allergen, because PR-10 proteins are labile to heat, so that they are denatured in pasteurised beverages like beer. Other thermo-resistant allergens were probably responsible for the anaphylaxis of our patient.

### Learning points

- ▶ Allergic reactions to spices have to be considered in the patients with ‘idiopathic’ anaphylaxis induced by common foods, where spices had been hidden. In this case report, we showed evidence of allergy to coriander in a patient with beer anaphylaxis.
- ▶ Testing for spices is a challenge to the allergist because of the lack of reliable commercially available extracts, so that it is necessary to test with fresh foods. In our case, when the craft beer became the prime suspect, it was important to identify the exact ingredient responsible, through skin prick tests with native foods, specific IgE antibodies and oral challenge. If the patient had been instructed to avoid the craft beer only, she could have ingested coriander in some other food in the future and experienced another reaction.
- ▶ Patients with food allergy should be educated to read the whole food and beverage labelling, where all the ingredients should be listed in order of weight, with the main ingredient first. This is particularly important whenever the specific allergen the patient must avoid, as the coriander in our case, is not included in the list of 14 allergens food ingredients that must be declared as allergens in the European Union (EU).

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