



## It's all in the mix: allergy to fenugreek in a boy with known sumac nut sensitization

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### Background

Food allergies (FA) are common, and allergic reactions after the consumption of spices are also well known. In Switzerland, 2–6% of children are diagnosed with FA [1]. Taking a reliable history and subsequent objective FA diagnostics including oral food challenges (OFC) can be challenging, especially in children [2]. We present a case of a 3-year-old boy with allergy to fenugreek that was confirmed by specific immunoglobulin (sIgE) detection and open OFC in addition to pre-existing FAs to sumac and further tree nuts but not to legumes or seeds. Written informed consent was obtained from the parents.

### Case representation

#### Medical history

The patient presented to our outpatient clinic for routine follow-up of atopic dermatitis (AD) and confirmed FA to sumac nut cashew (sensitization to extract and Ana o3; index reaction with skin symptoms and oral exposure to cashew) and due to botanical relationship presumed but not yet tested FA to sumac

nut pistachio (sensitization to extract). A prior OFC had ruled an additional FA to hazelnut (sensitization to extract and Cor a14, Cor a1/a9 negative; OFC with skin symptoms and vomiting). Moreover, FA to walnut (skin reaction after oral exposure) and pecan (sensitization to extract, skin reaction only during OFC) had been diagnosed in the past. Further OFCs in the past had ruled out FA to peanut, macadamia and Brazil nut with no sensitization each.

Earlier that day, the parents noticed wheals and pruritus spreading from the neck to the upper trunk, which developed within 30 min after a convenience store meal consisting of noodles, ginger, soy sauce, and chicken broth, but no known FA triggers. No additional respiratory, cardiovascular, or gastrointestinal symptoms were observed. Both wheals and pruritus resolved within 30 min after oral betamethasone and levocetirizine as part of the emergency kit and according to the action plan. Comparable reactions were observed to store-prepared seasoned chicken and curry soup. Already known FA triggers had been avoided since the last consultation.

#### General findings

The child was of normal height and weight, in good general condition, and free of signs of other allergic comorbidities. Clinical examination revealed only mild eczematous lesions due to AD on both thighs.

#### Laboratory findings

Same-day sIgE levels were only elevated for curry and fenugreek seeds (Table 1). Serum tryptase levels were not determined.

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**Table 1** Laboratory findings of total and specific IgE levels. We found elevated sIgE levels to curry and fenugreek seeds but no other abnormal findings

	Reference	(s)IgE level
Total IgE [kU/L]	<70	22
<i>Specific IgE [kU/L]</i>		
Spice mixture 1 (tarragon, thyme, marjoram, lovage)	–	0.05
Spice mixture 2 (caraway, mace, cardamom, clove)	–	0.00
Spice mixture 3 (basil, fennel, ginger, aniseed)	–	0.12
Celery	–	0.03
Coriander	–	0.03
Curry	–	<b>0.45</b>
Fennel	–	0.02
Fennel seeds	–	0.02
Fenugreek seeds	–	<b>0.47</b>
Garlic	–	0.04
Ginger	–	0.17
Mustard	–	0.03
Peanut	–	0.08
rAra h2	–	0.00
rAra h8	–	0.00
rAra h9	–	0.00
<i>Ara h</i> <i>Arachis hypogaea</i> , <i>r</i> recombinant		

### Diagnostic allergy testing

Six months later, open OFCs to (i) a curry mix regularly used by the parents and (ii) fenugreek seeds were performed without a subsequent cumulative dose provocation due to pragmatic reasons, otherwise following the PRACTALL guidelines [3]. While there was no reaction to the curry mix, we observed food refusal, oral pruritus, and urticarial flare with wheals on neck and trunk without further anaphylactic symptoms upon the second highest dose of fenugreek seeds (dosage 4.35 g, equivalent to 1000 mg food protein, cumulative dose of 6.26 g). After treatment with oral betamethasone and levocetirizine, symptoms resolved and the patient was discharged in good health after an observational period of several hours.

### Treatment and course

In addition to the pre-existing AD and confirmed FAs, the clinically relevant reaction to fenugreek seeds was documented in both allergy pass and action plan. The family was instructed to also eliminate fenugreek from the patient's diet.

### Discussion and conclusion

Fenugreek (*Trigonella foenum-graecum*) is a legume traditionally used as spice in Asian foods and cheese preparations as well as an aromatic condiment and naturopathic remedy [4]. While especially anaphylac-

tic reactions to fenugreek are rare, there have been several reports on patients sensitized to peanut with IgE-mediated allergic reactions after consuming food containing fenugreek seeds [5].

Both peanut and fenugreek belong to the *fabaceae* family and homology between IgE-binding epitopes of fenugreek proteins and major peanut allergen components, especially storage proteins (e.g., Tri fg1 and Ara h1 [7S vicilin-like globulin], Tri fg2 and Ara h2/h6/h7 [2S albumin], Tri fg3 and Ara h3/h4 [11S albumin], and Tri fg4 and Ara h8 [PR-10 protein]) is known to facilitate secondary fenugreek allergy by cross-reactivity [4]. Other, lipophilic peanut allergens (e.g., oleosins Ara h10 and h11 and defensins Ara h12 and h13) may also play a role in cross-reactivity, but are not available for routine diagnostic testing based on aqueous allergen extracts while prick-to-prick tests may give positive results. However, fenugreek allergy in a peanut-tolerant patient as in our case is rare. Interestingly, our patient had neither a history of peanut allergy nor displayed any sensitization to peanut extract as well as storage proteins (Table 1). Detailed work-up with regard to FA to peanut and tree nuts were performed as mentioned above due to the high proportion of co-allergy to other nuts in the case of presumed or confirmed FA to any index nut [6].

As the declaration of fenugreek is not mandatory in Europe including Switzerland, fenugreek allergic individuals face a challenging situation when eliminating fenugreek from their diet. Special care should be taken with spice mixtures, as fenugreek may be present in many other mixtures besides curry (e.g., mehia, asafoetida, mah mee, or chakalaka).

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### Declarations

**Conflict of interest** M.-A. Oestreich and O. Fuchs declare that they have no competing interests.

**Ethical standards** The family consented to participate in scientific work in general and in particular to participate in this case report and its publication. Further approval by the Ethics Committee of the Canton of Bern, Switzerland was not required.

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## References

1. Keller UBRE, Beer M, Darioli R, Meyer K, Renggli A, Römer-Lüthi C, et al. Sechster Schweizerischer Ernährungsbericht. Bern: Bundesamt für Gesundheit (BAG); No. 3-905782-70-7 978-3-905782-70-7; 2012.
2. Worm M, Reese I, Ballmer-Weber B, Beyer K, Bischoff SC, Bohle B, et al. Update of the s2k guideline on the management of ige-mediated food allergies. *Allergol Select.* 2021;5:195–243.
3. Sampson HA, Gerth Van Wijk R, Bindslev-Jensen C, Sicherer S, Teuber SS, Burks AW, et al. Standardizing double-blind, placebo-controlled oral food challenges: American academy of allergy, asthma & immunology—european academy of allergy and clinical immunology practall consensus report. *J Allergy Clin Immunol.* 2012;130:1260–74.
4. Fæste CK, Christians U, Egaas E, Jonscher KR. Characterization of potential allergens in fenugreek (*trigonella foenum-graecum*) using patient sera and ms-based proteomic analysis. *J Proteomics.* 2010;73:1321–33.
5. Che CT, Douglas L, Liem J. Case reports of peanut-fenugreek and cashew-sumac cross-reactivity. *J Allergy Clin Immunol Pract.* 2017;5:510–1.
6. Brough HA, Caubet J-C, Mazon A, Haddad D, Bergmann MM, Wassenberg J, et al. Defining challenge-proven coexistent nut and sesame seed allergy: A prospective multicenter european study. *J Allergy Clin Immunol.* 2020;145:1231–9.