

Intraoral and respiratory allergy to *Eruca sativa* (Cruciferae family) in a subject with sensitization to pollen allergens

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Eruca sativa (Arugula, Rocket, Roquette; Cruciferae family) is a spontaneous or cultivated plant native to Mediterranean countries (Italy, France, Spain, and Greece), but it is becoming more popular in the United States. This vegetable constitutes a typical Mediterranean food because it is widely used as an uncooked ingredient in many dishes such as salads, pizza, and pasta.

Reactions to fresh *E. sativa* were considered very uncommon in comparison with reaction to other vegetables, even among subjects with pollen allergy. The few available studies show that sensitization to *E. sativa*¹ or other Cruciferae plant allergens^{2,3} is able to induce especially cutaneous or systemic manifestations (e.g., contact urticaria and anaphylactic shock).

In this report we describe an unusual case of *E. sativa* sensitization with only intraoral and respiratory symptoms in a subject with pollen allergy.

CASE REPORT

A 44-year-old man with a history of seasonal rhinoconjunctivitis/bronchial asthma and sensitization to pollen allergens was examined because of the appearance of either intraoral/lip itching and swelling or respiratory symptoms (e.g., cough and wheezing) a few minutes after the ingestion of a salad containing *E. sativa*.

The patient reported successive consumption of different ingredients contained in this salad such as lettuce, radish, and chicory without any problem. Moreover, he had never had reactions after the ingestion of other vegetables belonging to the Cruciferae family (e.g., mustard, cabbage, and turnip).

METHODS

Examination of the patient included, on different days, cutaneous, serologic, and provocative diagnostic tests with

commercially available allergenic extracts and reagents. Informed consent was also obtained.

A skin prick test was carried out according to the method of Aas and Belin⁴ with standardized allergenic extracts for common inhalant allergens and the most common foods (Lofarma Laboratories, Milan, Italy). Wheal areas were also calculated.

Prick-prick testing was done according to the method of Dreborg and Foucard⁵ with leaves of *E. sativa* and other vegetables of the Cruciferae family such as radishes, red cabbage, cauliflower, brussels sprouts, turnips, and mustard. The same lancet was used for pricking first the foods and then the skin of the patient's forearm, and a serum sample was obtained for total and specific IgE determinations (SFERIKIT System, Lofarma Laboratories).

Open challenge with foods was done according to instructions given in a European Academy of Allergology and Clinical Immunology position paper⁶ by using leaves of *E. sativa* that weighed about 10 gm.

The use of an open challenge with fresh food (without placebo) was justified by the difficulty of obtaining a dehydrated form of this food without the risk of modifying the allergenic properties.

The evaluation of the degree of bronchial hyperreactivity was carried out with a methacholine inhalation challenge test. The test was performed with a standardized method, and the result was expressed as the PD₂₀ FEV₁.

In an attempt to demonstrate the possibility of cross-reactivity between *E. sativa* and *Parietaria* spp. or Gramineae allergens, sodium dodecylsulfate-polyacrylamide gel electrophoresis and immunoblotting were carried out with the serum of our patient.

RESULTS

The results of cutaneous, serologic tests and a non-specific bronchial provocation challenge are shown in Table I.

The patient was sensitized only to allergens of pollens (*Parietaria* spp. and Gramineae) and *E. sativa*.

No skin prick test response was registered by using other inhalant and food allergens, including vegetables of the Cruciferae family.

A prick-prick test with fresh *E. sativa* induced an intense skin reaction (wheal and erythema) on the forearm; no response was obtained by using this diagnostic procedure with other fresh foods of the same family (e.g., mustard, cabbage, and turnip).

Open challenge with food induced, after a few minutes, the appearance of intraoral itching and mild angio-

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TABLE I. Results of diagnostic procedures

Allergen	In vivo tests				In vitro tests		
	SPT with allergen extract		PPT with fresh food (<i>E. sativa</i>)		Serologic IgE assay*		
	Wheal area (mm ²)	Class	Wheal area (mm ²)	Class	Rast units	% Bound	Class
<i>Parietaria</i>	95	++++	NA	NA	14	27.6	3
Gramineae	47	+++	NA	NA	24.9	41.8	4
<i>Eruca sativa</i>	40	++	85	++++	1.2	5.3	2
Histamine (Positive control)	50	+++	NA	NA			

Nonspecific bronchial provocation test: PD20 FEV₁, 300 µg (very high bronchial hyperreactivity); open challenge with food; positive results for intraoral and respiratory symptoms.

SPT, Skin prick test; PPT, prick-prick test; NA, not applicable.

*Total IgE: 73 U/ml.

edema of the lips. Moreover, 20 minutes later, the patient experienced the development of a moderate bronchial obstruction that required the administration of β_2 -agonists (200 µg salbutamol administered by inhalation) and corticosteroids (40 mg methylprednisolone administered intravenously).

The results of sodium dodecylsulfate–polyacrylamide gel electrophoresis and IgE immunoblotting experiments were not able to demonstrate any cross-reactivity between the allergens of *E. sativa* and pollens (*Parietaria* spp. and Gramineae).

DISCUSSION

To our knowledge there are no documented reports of intraoral and respiratory allergy after the ingestion of *E. sativa*. Even if our patient showed a sensitization to pollen allergens (*Parietaria* spp. and Gramineae), no cross-reactivity was demonstrated between the allergenic components of *E. sativa* and these pollens from our geographic area. Therefore it is likely that, in our patient, the frequent consumption of this vegetable as an ingredient in salads and other dishes could be responsible for allergic sensitization.

We conclude that *E. sativa* sensitization is able to induce intraoral and respiratory symptoms besides cutaneous or systemic manifestations. It must be kept in account considering the widespread consumption of this food in the Mediterranean diet and the possibility of cross-reactivity with other common foods belonging to the Cruciferae family.⁷

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