

Oral allergy syndrome to sapodilla (*Achras zapota*)

To the editor:

The constellation of immediate symptoms appearing less than 1 hour after ingestion of certain vegetables and fruits eaten in raw form is usually confined to the oropharyngeal area and has been termed *oral allergy syndrome* (OAS).¹⁻³ Typical symptoms of OAS involve tingling in the lips, itching, and swelling of the tongue and/or swelling in the throat.

During the course of a random survey of 600 adults in Mysore, India, for detection of food allergy to fruits and vegetables, we came across 3 cases of allergy to sapodilla. Sapodilla (*Achras zapota* L syn *Manilkara zapota* van Royen, a member of the Sapotaceae family), also known as the *sapota* or *sapodilla plum*, is popular for its delicious fruit.⁴ (The sapodilla plum, an exotic fruit, is not related to the familiar plum that belongs to the Rosaceae family.) Here we present these 3 cases of allergy to sapodilla and describe the detection of the causative allergen by immunoblot analysis.

Case 1. A 20-year-old atopic female had experienced allergy to sapodilla for the first time at the age of 12 years after eating one quarter to one half of a sapodilla plum. Within 15 minutes, she had experienced swelling of the lips (lip edema), accompanied by itching in the lips, tongue, and throat (oropharyngeal pruritus), as well as a feeling of dryness and hardness in the throat (glottic edema). There was a similar incident when she was 15 years old. The family history of allergy is positive; the subject's mother and brother are allergic to certain foods (mango, Indian dill, and egg), and her brother had childhood asthma.

Case 2. A 23-year-old atopic female first experienced allergy to sapodilla at the age of 22 years. She had severe itching of the mouth (perioral pruritus) and swelling of the lips and tongue (lip and tongue edema), which began approximately 10 to 20 minutes after she ate a sapodilla plum. On several other occasions, she had experienced mild oral reactions to sapodilla. In childhood she had had allergy to egg, which she has outgrown.

Case 3. A 23-year-old atopic male experienced very mild itching or unpleasantness while eating sapodilla. As a result of this adverse reaction, he does not relish sapodilla and avoids eating it. Allergic (urticaria) to several analgesics, particularly ibuprofen, this subject had a family history of allergy (his father being allergic to certain drugs).

This study was undertaken after clearance by our Institutional Ethics Committee; informed consent was obtained from all allergic and normal subjects in the age range 15 to 60 years.

Skin prick testing (SPT)⁵ was performed with fresh sapodilla juice (protein content, 0.45 mg/mL), obtained by blending the pulp for approximately 5 minutes and filtering. For prick-by-prick testing (PPT), the pulp portion of a freshly opened, ripe sapodilla was pricked with a sterile lancet; the subject's skin was then pricked with the same lancet. Both SPT results and PPT results were positive in all 3 allergic subjects (Table I);

Table I. Skin prick test, prick-by-prick test, and allergen-specific IgE to sapodilla

SPT	Wheal/flare diameter (mm)		ELISA units (A ₄₉₂)*
	PPT		
Negative control (glycerinated PBS)	0-1/0	NA	—
Positive control (histamine, 1mg/mL)†	6-8/20->30	NA	—
Case 1	9.5/>30	6.5/25	0.333
Case 2	4.0/20	4.0/20	0.276
Case 3	5.0/20	4.0/16	0.287

SPT, Skin prick test; PPT, prick-by-prick test; PBS, phosphate-buffered saline solution; NA, not applicable.

*Mean of triplicate determinations. Values for 2 normal sera: 0.190 and 0.199.

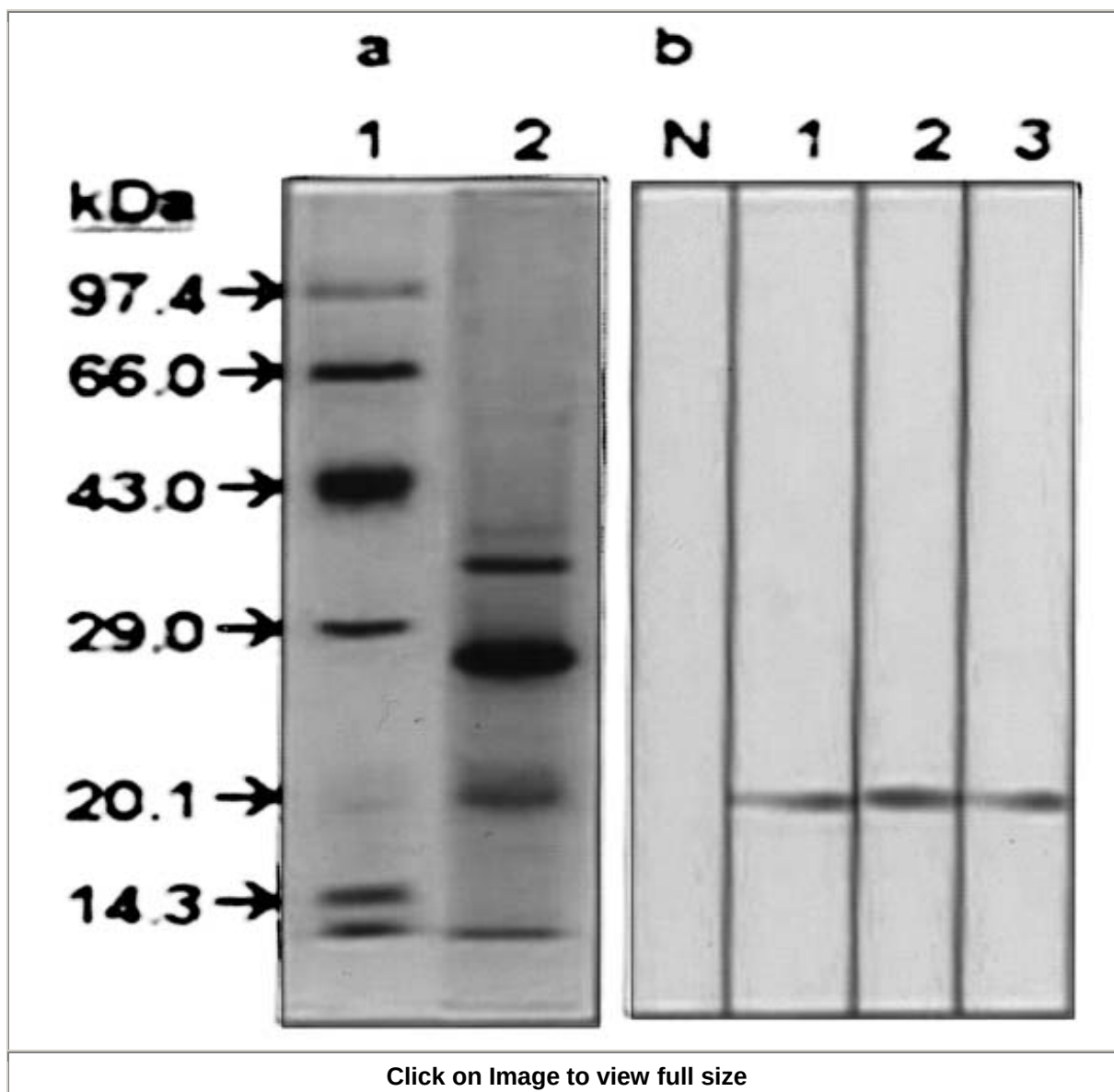
†Histamine dihydrochloride, 1.66 mg/mL (equivalent to 1 mg/mL histamine base).

Case 1 showed maximum skin reactivity. Results of SPT with common inhalant weed pollen and grass pollen-mixes were negative in all 3 allergic subjects (data not shown). Results of SPT and PPT with sapodilla were negative (0-1/0 mm) in 15 normal subjects.

Sapodilla pulp was blended in phosphate-buffered saline solution (PBS) and filtered through Whatman 1 filter paper to obtain 50% w/v extract. Allergen-specific IgE was detected by means of ELISA.⁵ Briefly, Maxisorp microtiter wells (Nunc, Roskilde, Denmark) were coated with sapodilla extract (pH 9.6; 50 µg protein/well); this was followed by incubation with allergic or normal serum at a dilution of 1:3. Peroxidase-conjugated goat antihuman IgE (Sigma-Aldrich, St Louis, Mo) was used as secondary antibody (1:1000 dilution). Serum allergen-specific IgE for sapodilla was positive in all 3 allergic subjects (Table I).

Sapodilla extract was subjected to SDS-PAGE and immunoblot analysis.⁶ Silver staining revealed several protein bands in the range 15 to 90 kd; the 3 major bands corresponded to relative molecular weights (*M_r*) of 37, 28, and 20 kd (Fig 1, A).

Fig. 1. Analysis of sapodilla extract (50% w/v) by electrophoresis and immunoblotting. **a**, 12% SDS-PAGE (silver staining): *lane 1*, molecular weight markers; *lane 2*, sapodilla extract (approximately 10 µg protein). **b**, IgE-immunoblot: *lane N*, control serum (pooled sera of normal subjects); *lanes 1, 2, and 3*, serum from cases 1, 2, and 3, respectively.



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In the immunoblot (Fig 1, B), all 3 allergic subjects' sera (1:3 dilution) detected the 20-kd protein band, whereas the control serum did not detect any protein band.

Allergies to fruits and vegetables are usually associated with sensitization to pollen¹⁻³ or latex (latex-fruit syndrome),⁷ and a few cross-reactive allergens have been identified. However, localized oral symptoms to fresh fruits without associated pollenosis are also referred to as OAS and categorized as non-pollen-associated OAS.^{3,8} In the present study, the allergic subjects were not allergic to any other fruits or vegetables or to latex/natural rubber products, nor did they have any pollen-related or respiratory allergic symptoms. Hence, we feel that the 20-kd sapodilla allergen responsible for OAS is not a cross-reactive allergen. To our knowledge, this is the first report of allergy to ingestion of sapodilla.

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