

Anaphylaxis Due to *Silene Vulgaris* Ingestion

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Silene vulgaris, commonly known as maiden's tears, is a herbaceous plant belonging to *Caryophyllaceae* family [1] that grows in poorly tilled land in Mediterranean countries (Europe and northern Africa), west-central Asia, and North America. A commonly consumed plant gathered in the wild or farmed, *S. vulgaris* has a range of medicinal and cosmetic uses and is also grown as an ornamental. The tender leaves of this plant may be eaten raw in salads, while mature leaves are usually fried or boiled to be used as ingredients in stews or omelettes. It is considered a delicacy due to the small size of its small leaves, requiring many plants for a single human serving.

A 69-year-old man developed generalized urticaria, cough, dyspnoea, nausea, vomiting, and facial angioedema within 10 min of eating cooked *S. vulgaris*, strawberries, and bee pollen. He presented to the emergency department where he was treated with dexchlorpheniramine and corticosteroids, leading to symptom resolution within 7 hours of admission. No other drugs or cofactors were associated with the episode. He had consumed bee pollen daily and, until this episode, ate strawberries and *S. vulgaris* without symptoms. After the reaction, he has avoided bee pollen and *S. vulgaris*, but has tolerated strawberries, legumes, and other vegetables such as lettuce, spinach, Swiss chard, asparagus, broccoli, and avocado; fruits including peach, banana, and apple; peanuts and other nuts; and other edible wild plants such as coriander, parsley, oregano,

and thyme. Prior to this reaction, the patient had a 35-year history of mild pollen-induced seasonal rhinoconjunctivitis.

Skin prick testing (SPT) performed with a battery of common aeroallergens (pollens, dust mites, moulds, and animal danders) (Roxall®, LETIpharma®) showed a positive response (wheal ≥ 3 mm) to different pollens (*Cupressus arizonica*, *Olea europaea*, *Artemisia vulgaris*, *Lolium perenne*, *Dactylis glomerata*, *Salsola kali*).

SPT tests to legume extracts (Roxall®) were positive for green bean (5×4 mm) and mustard (4×6 mm) and negative for pea, chickpea, white bean, lentil, and soybean.

Tree-nut-extract SPTs (Roxall®) were positive for chestnut (5×4 mm) and sunflower seeds (4×4 mm) and negative for almond, peanut, hazelnut, walnut, pine nut, pistachio, and cashew.

SPT with purified allergens was negative for Pho d 2 (profilin from *Phoenix dactylifera* pollen) and the peach non-specific lipid transfer protein, Pru p 3 (Roxall®).

SPT with extracts of raw (10×15 mm) and cooked *S. vulgaris* (9×11 mm) at a concentration of 10 mg of extract/ml was positive.

Prick-prick test with cooked and raw *S. vulgaris* was positive, with wheal diameters of 15×15 mm and 12×10 mm, respectively. A prick-prick test with bee-pollen extract was negative.

Readings taken at 15 min were evaluated by comparing the wheal induced by the offending food and by 10 mg/ml of histamine [2].

Twenty non-atopic, pollen-allergic patients were tested as negative controls.

Written informed consent was obtained from the patient for all *in vitro* and *in vivo* studies.

Determination of serum-specific IgE for aeroallergens and food extracts was performed by immunoassay (*Siemens Immulite 2000/Xpi*); values over 0.35 kU_A/L were considered

positive. The results were as follows: *Cupressus arizonica* pollen 1.74kU_A/L, *Olea europaea* pollen 0.48 kU_A /L, *Artemisia absinthium* pollen 1.53 kU_A/L, *Salsola kali* pollen 0.79 kU_A/L, *Lolium perenne* pollen 0.59kU_A/L, birch pollen 1.47kU_A/L, chestnut 0.44kU_A/L, sunflower seed 0.74kU_A/L, red bean 1.01kU_A/L, green bean 1.02 kU_A/L, and mustard 0.46kU_A/L. Specific IgE was negative for pollen from *Platanus acerifolia*, *Chenopodium album*, *Parietaria judaica*, and *Plantago lanceolata* as well as other nuts (almond, peanut, hazelnut, walnut, cashew, pine nut, and pistachio) and legumes (pea, chickpea, white bean, lentil, and soybean). Total IgE was 986 UI/mL and tryptase was normal (5.2 µg/L).

Controlled oral administration was performed with bee-pollen grains, producing a negative result.

Protein extracts from raw and cooked *S. vulgaris* were prepared by delipidation, homogenization in phosphate-buffered saline (15% W/V) (50 mM phosphate buffer, 100 mM NaCl, pH 7.5), dialyzation against distilled water, and lyophilization [3].

Both extracts were analysed by sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) as described by Laemmli [4]. SDS-PAGE IgE-immunoblotting assay was carried out using polyvinylidene difluoride (PVDF) membranes (Immun-blott® PVDF Membrane, Bio-Rad, USA), patient serum (dilution 1/5), and both *S. vulgaris* extracts. IgE reactivity showed broad IgE-binding bands of approximately 90-35, 21-18, 16.5, and 14-12 kDa in raw *S. vulgaris* extract, and 90, 50, 37, and 22 kDa in cooked *S. vulgaris* extract (Figure 1).

Edible wild plants are commonly consumed in certain regions. Currently, consumption of wild plants is increasing in urban and rural settings [5]. Cases of other IgE-mediated allergy to wild edible plants [3, 6-9] have been reported, though the causative allergens are not clearly identified.

We present a case of IgE-mediated allergy to *S. vulgaris* demonstrated through *in vivo* and *in vitro* studies, suggesting that the allergens involved are proteins ranging from 22 to 90 kDa. To the best of our knowledge, no other cases of allergy to *S.vulgaris* have been published. The implication of profilins and nsLTP was ruled out given SPT results and the molecular mass of the IgE bands detected in cooked extract. Studies are under way to identify more cases and to characterize the allergen bands in greater detail. Allergists and patients must be aware that wild edible plants may be potent allergens, possibly inducing severe reactions.

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Conflicts of interest

All authors declare that there is no conflict of interest.

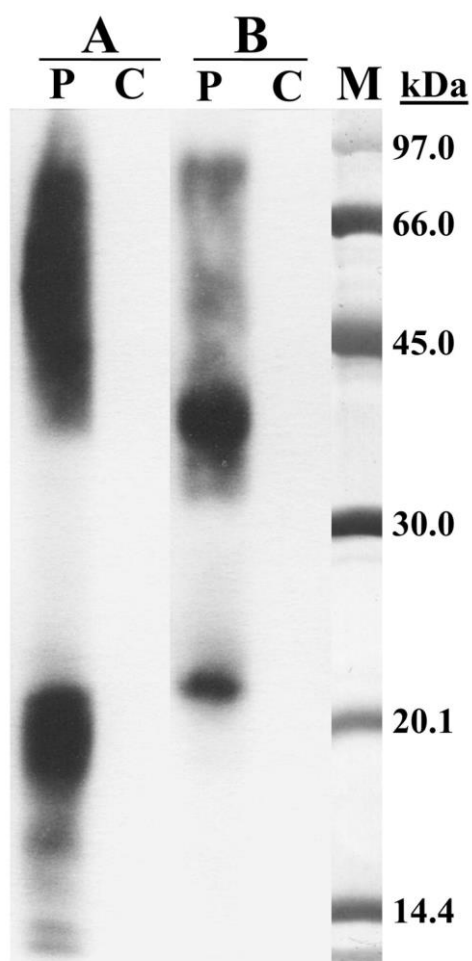
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Figure legends

Figure 1. SDS-PAGE Immunoblotting.



A) Raw *Silene vulgaris* extract B) Cooked *Silene vulgaris* extract. Lane P: patient serum, Lane C: control serum (pool of sera from nonatopic subjects), Lane M: molecular mass standard.