

Letter

Goji berry: A potential new player in latex-food syndrome

The goji berry (*Lycium barbarum*), also known as wolfberry, is a berry member of the *Solanaceae* family. Goji berry has long been recognized in traditional Chinese medicine for various therapeutic properties based on its antioxidant and immunomodulating effects. In the last years, because of descriptions of their beneficial properties, the consumption of Goji berry has rapidly grown in occidental countries. Only a single report describing 2 cases of Goji allergy has been published,¹ but the prevalence of this allergy is growing because of increased Goji consumption.

It is important to describe new allergen sources and identify the allergens that could be responsible for cross-reactivity, such as occurs in latex–fruit syndrome.² Since the first description of a systemic reaction induced by plant-derived food in a patient allergic to latex,³ several reports of cross-reactivity between latex, fruits, and vegetables have been described.

We report the case of a 40-year-old woman who presented with immediate pharyngeal pruritus after Goji berry ingestion. She had previously been diagnosed with rhinoconjunctivitis caused by grass, and she had experienced allergy (pruritus and hives) to fruits, latex, king prawn, and nuts. She also reported problems after eating salad containing lettuce, escarole, and soy.

Skin prick tests were performed with a thorough battery of foods, including shellfish, tomato, potato, courgette, fruits, a panel of common inhalant allergens, and also latex, the panallergens lipid transfer protein (0.1 mg/mL), and Profilin (50 µg/mL) (ALK-Abelló, Madrid, Spain). Positive results were obtained for pollens, fruits, vegetables, nuts, LTP, and Profilin.

Total immunoglobulin E (IgE; 222 kU/L) and triptase (2.29 kU/L) were measured. Also, serum specific IgE against commercial extracts (Phadia CAP System) were performed, being positive to fruits (0.53–1.39 kU/L), nuts (0.47–1.08 kU/L), and latex (1.87 kU/L). Also, serum specific IgE against latex component rHev b8 was positive (4.66 kUA/L).

Prick by prick skin tests with Goji berries extract were positive (9 mm × 5 mm); in 3 healthy controls the same test were negative.

A protein extract from Goji berry was prepared following a previously described methodology⁴ with some modifications. Briefly, Goji proteins were extracted by magnetic stirring (16 hours at 4°C) in phosphate-saline buffer pH 7.5, at 10% w/v. The extract was clarified by centrifugation and dialyzed against distilled water. The dialyzed extract was filtered and freeze-dried.

Protein concentration was estimated according to the method of Bradford.⁵ The protein profile was analyzed by sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) under

reducing conditions, and protein bands were detected with colloidal Coomassie blue.

Different protein bands ranging from 12 to 150 kDa were visualized in extracts (Fig 1A), the most prominent of which were at 17, 25, 35, 38, 44, 60 to 75, and 150 kDa approximately (Fig 1A).

An immunodetection was performed to determine which proteins are able to bind IgE from patient serum. For these purpose, 20 µg Goji extract was loaded per line in an SDS-PAGE under reducing conditions. Briefly, the separated protein bands were electrophoretically transferred onto a 0.45 µm nitrocellulose membrane (Bio-Rad, Richmond, California) and was blocked with 0.25% gelatin in NET (Tris HCl 0.5 M pH 7.5, NaCl 1.5 M, ethylenediaminetetra-acetic acid 0.05 M, X-100 Triton 0.5%). Membranes were incubated overnight with sera from the patient diluted 1:3 at 4°C, followed by rabbit anti-human IgE (1:10,000) (DakoCytomation, Glostrup, Denmark) peroxidase conjugate incubation and detected by the enhanced chemiluminescence method as recommended by the manufacturer (Amersham Biosciences, Buckinghamshire, United Kingdom). Specific IgE-binding bands were obtained, with an apparent molecular weight of 35 and 60 kDa from Goji extract (Fig 1B).

The immunoreactive proteins were excised from the colloidal Coomassie blue–stained gel, digested with trypsin, and the resulting peptide mixture was analyzed by Matrix-Assisted Laser Desorption Ionization-Time-of-Flight Mass Spectrometry. Identification of proteins by MALDI-TOF MS was performed as previously described.⁴ We identified 2 novel allergens in Goji berries. The protein of 60 kDa was identified as a β -glucosidase (Mowse score 82, $P < .05$), and the 35 kDa protein was identified as an enolase (Mowse score 156, $P < .05$). These 2 proteins had been identified previously as allergens in latex allergy.^{6,7} To explore potential cross-reactivity between Goji and latex, we have performed an immunoblot against latex antigen, and several bands were recognized by patient serum (Fig 1B). True cross-reactivity, however, must be demonstrated with inhibition assays.

In summary, we report a new case of Goji allergy not attributable to the LTP as has been previously reported. The 2 new allergens identified in Goji extract are a β -glucosidase and an enolase, and they could be the responsible factors in latex–fruit syndrome.

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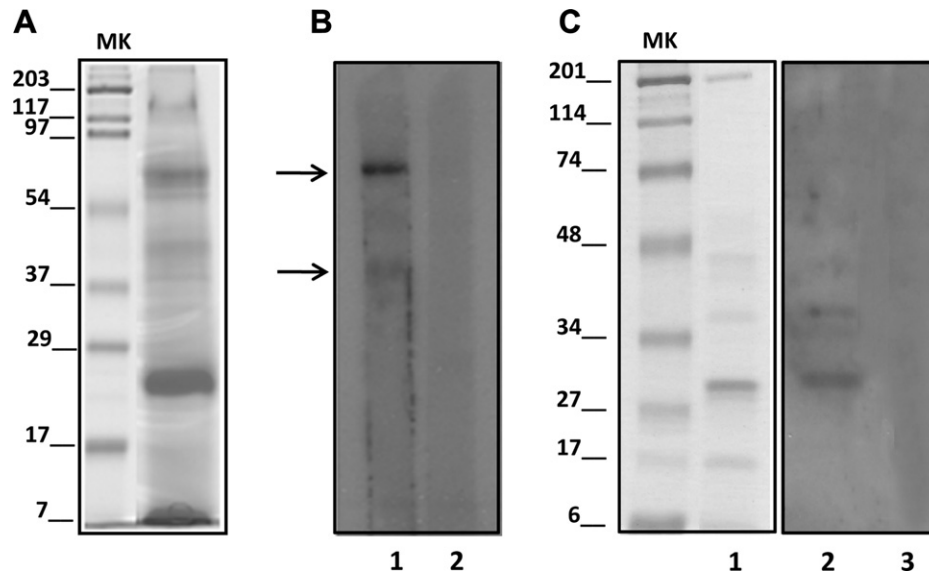


Figure 1. (A) SDS-PAGE of Goji berry protein extract. (B) IgE immunoblot with Goji berry protein extract. Arrows represent IgE-bands recognized by patient. 1: Serum sample from patient; 2: Serum sample from nonallergic donor. C: SDS-PAGE of latex protein extract and IgE immunoblot with latex extract. 1: Latex extract; 2: Serum sample from patient; 3: Serum sample from nonallergic donor. MK: molecular markers (kDa).

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