

Anaphylaxis after the Epicutaneous Application of Argan Oil

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Argan oil is an edible oil which is obtained by pressing mature seeds from the berry of the argan tree (*Argania spinosa*), which is endemic to Morocco. It is used in food, cosmetics and hair care [1]. It has been an increasingly popular ingredient in the international cosmetics industry since 1980, and the use thereof in Spain is increasingly widespread.

Until now, one case of anaphylaxis owing to argan oil intake [2] and two of allergic contact dermatitis (ACD) have been described [3,4].

Epicutaneous sensitization to foods could induce food allergy through skin care treatments with food in adults [5].

The following describes the first case of anaphylaxis triggered by the topical application of a product containing argan oil.

A 29-year-old female patient diagnosed in childhood with allergic rhinoconjunctivitis to domestic mites and grass pollen, which developed progressively from adolescence to food allergy to peanuts, peach and other *rosaceae* (apricot, plum, cherry), nuts (hazelnut, walnut, chestnut) and mustard, with symptoms of generalised urticaria, and oral syndrome with various vegetables (courgette and aubergine). The patient does not refer to history of atopic dermatitis.

The patient requested a consultation owing to her having presented, over the previous four years, two anaphylactic episodes immediately after epicutaneous contact with argan oil, which she had previously used in some well tolerated cosmetic preparations: the first related to a cosmetic hair care product applied to the scalp (presenting widespread cutaneous pruritus, angioedema and hypotension), and the second (with the same manifestations of faster implementation) with the cutaneous application of a body oil on the arm. On both occasions, she required emergency treatment with epinephrine to control the symptoms. . She does not refer to food intake or presence of cofactors at both events. Since then, she has been prescribed with self-injectable adrenaline. The patient denies ever having ingested argan oil as a food seasoning.

Skin prick tests (SPT) were performed with a standard battery of aeroallergens and several foods, yielding positive results to grass, salsola and mugwort pollens, mites, peanut, LTP-peach peel, mustard, tarragon and cumin. Skin tests for other foods such as nuts (almonds, hazelnuts, sunflower seeds, cashew, pistachio, walnut, pine nut), spices (cardamom, clove, coriander) and sesame seeds, were negative. All tests were performed following EAACI guidelines [6]. A positive test result was defined as a wheal of at least 3 mm.

Determination of serum specific IgE (sIgE) (Immuno-CAP,Thermo Fisher Scientific): mustard 0.12 kU_A/L, peanut 0.34 kU_A/L, peach 0.75 kU_A/L, walnut 0.54 kU_A/L, Pru p3 0.99 kU_A/L.

sIgE to a panel of 112 allergens was also evaluated using ImmunoCAP ISAC microarray (Thermo Fisher Scientific). Results were expressed as ISAC standardized

units (ISU), with a cut-off of 0.3 ISU. ISAC revealed sensitization to species-specific components of grass pollen (rPhl p1: 9.9 ISU; rPhl p5:3.0 ISU), salsola pollen (nSal k1: 2.4 ISU) and dust mites (nDer p1: 1.1 ISU; nDer f1: 1.3 ISU) and marker components of cross reactivity (nsLTP) in walnut (nJug r3:0.7 ISU), peach (rPru p3:0.6 ISU) and mugwort (nArt v3: 0.7 ISU); and negative to all other native and recombinant allergens in the panel.

For the study of the specific allergy to argan, berries were collected directly from the tree in Morocco to prepare the extract. Skin tests with argan berry extract (7.39 mg/ml) were positive (10x12 mm) at a dilution of 1/10. A provocation study was not considered, owing to the severity of the symptoms presented by the patient after epicutaneous contact with the products.

A prick test was conducted with two healthy controls and five atopic controls sensitized to peach LTPs, which was negative at a concentration of 1:1.

In the western blot analysis (Figure 1a) of the Argan extract (water-soluble fraction), several protein bands around 10, 14, 18, 20, 32-34 and 48 kDa (Figure 1b) fixed the patient IgE, with immunodetection being negative for the extracts of their external-internal coverings and very slight for the fat-soluble fraction [7]. The presence of bands of IgE binding to proteins of other plant-based foods (walnut, peach, peanut, sesame and mustard) was investigated, which was negative for peanut, walnut and sesame seed, with several bands being revealed for mustard (10, 14, 15, 21, 27, 30 and 34 kDa) and one of 13-15 kDa for peach (Figure 1b).

The immunoblotting inhibition (Figure 1c) performed for argan berries, with preincubation with both peach and mustard, resulted in the inhibition of binding in

several previously described bands (10, 14, 32-34 and 48 kDa) and the persistence of bands 18 and 20 kDa which do not correspond with the predicted molecular weight for the LTP proteins of peach (Pru p3 8-10 kDa) and of mustard (Sin a3, of 12 kDa).

One dot blot [8] was performed with argan oil, which was positive (Figure 1d).

We present the first case of allergy to argan berries with the manifestation of anaphylaxis after epicutaneous contact with the oil thereof, in a female patient primarily sensitised to peach LTP (Pru p3).

The epicutaneous route has been described as a possible inducer of IgE hypersensitivity with different food allergens (peanut, wheat, fish, jellyfish, milk or rice), on both skin affected by atopic dermatitis or irritative skin and on healthy skin [9], demonstrating the possibility of ulterior anaphylaxis after ingesting the food, but also after further epicutaneous contact subsequent to sensitization [10].

In our patient, immunoblotting determines the presence in the patient's serum of specific IgE against proteins of 18 and 20 kDa molecular weight (mw) present in argan berries, which persists after pre-incubation with peach or mustard extract, and may be responsible for the anaphylactic symptoms regardless of primary sensitization to LTP. The existence of a positive *dot blot* with argan oil demonstrates that proteins in the berries that have caused sensitization in the patient remain in the oil.

The patient also seems to demonstrate specific IgE to mustard versus other non- LTP -dependent proteins present in the extract.

To date, one single case of anaphylaxis owing to the intake of argan oil [2] has been described in a male Moroccan patient, where a 10 kDa protein band is described,

which may correspond to the similar mw band found for our patient; and two cases of ACD [3,4], but no cases of anaphylaxis owing to the epicutaneous application of a product containing argan oil.

Given the increasingly widespread use of argan in food and cosmetics, it is foreseeable that more cases of allergy to this product will be encountered in the future.

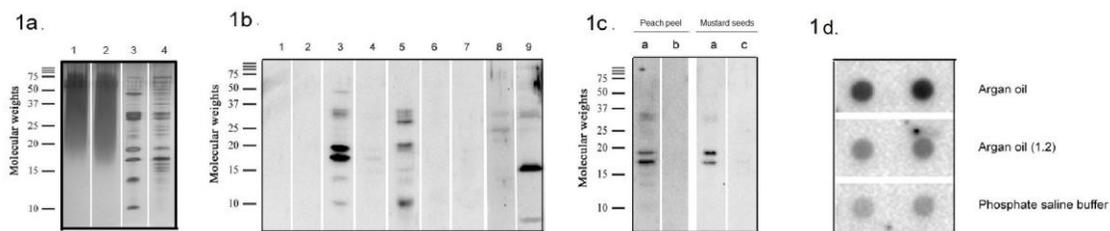
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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Figure 1: SDS PAGE (1a.): Molecular weight marker, lane 1: Argan berries wall, lane 2: Argan berries peel, lane 3: Argan water-soluble extract, lane 4: Argan fat-soluble extract, IgE-Western blot (1b.) Molecular weight marker, lane 1: Argan berries wall, lane 2: Argan berries peel, lane 3: Argan water-soluble extract, lane 4: Argan fat-soluble extract, lane 5: mustard seeds, lane 6: Walnut, lane 7: sesame seeds, lane 8: peanut, lane 9: peach peel. IgE-Western blot inhibition (1c.): solid phase: lane a: Argan water-soluble extract, lane b: peach peel, lane c: mustard seeds. Inhibitory phase: peach peel and mustard seeds, in both “a lines” respectively. IgE-DOT blot (1d): Argan oil, ½ diluted argan oil and phosphate salt buffer.

