

ALLERGY TO SUNFLOWER SEEDS*

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SUMMARY: A case of oral syndrome after eating sunflower seeds is reported. Sensitization has been probably through inhalant route when using these seeds to feed birds.

Skin prick tests with a fresh macerate of sunflower seeds has been clearly positive (greater than histamine control) but commercial extracts have given borderline positivity and specific IgE to sunflower was strongly positive.

Key-words: Sunflower - Food allergy.

Allergy to sunflowers has been reported to pollen, seeds and oil (*Ayelson, Bousquet, Dutau, Halsey, Jimenez, Kanny, Noyer, Papageorgiou, Sampson*).

Sunflower (*Helianthus*) is a member of the of the Compositae or Asteracea which includes also plants which are cause of frequent pollinosis, mugwort and ragweed (*Ayelson, Dutau, Guillarte, Molkhov, Brestoff*).

Sunflower seeds are usually used as bird's food and also, recently as a healthy food in addition to cereals, milk, yoghurts and also in pastries and cookies (*Brostoff, Wüthrich 95,96, Dutau*). Sunflower oil is currently used to cook or in salads being considered a healthy grass (*Kanny, Halsey, Dutau, Palma-Carlos, Molkhov*).

Sunflower pollinization is mainly entomophyl, the pollen being transported by insects, namely bees (*Guillarte, D'Amato*).

Sunflower pollinosis is sometimes an occupational allergy in people working in sunflower fields or living in the immediate neighbourhood (*Bessot, Gomez, Guillarte, Pauli 99*).

Sunflower is probably originary from Western template North America and used in culture in Central North America about 3 000 years ago.

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Sunflower has been introduced in Europe in XVI century coming from Mexico to Spain (1568) and has been for a long time used only as ornamental plant (*Guillarte*). The introduction of sunflower seeds as a source of human food has started only in 1779 in Russia expanding afterwards through all Europe. Sunflower seeds contain 30 to 80% of oil and are nowadays largely used in human diet (*Guillarte, Valero*).

Two major allergens have been identified in *Helianthus* (*Asturias, Fernandez, Guillarte, Gadermeier, Kelly*).

Hel a1 (MW 34 KDa) major allergen.

Hel a2 (MW 15,7 KDa a profilin) minor allergen with other compositae asteraceae. Sunflower seeds contain albumin 2S, similar to albumin of other seeds as mustard and Brazil nut. Cross reactivity is mainly with mugwort (*Asturias, Fernandez, Guillarte, Valenta*).

We report a rare case of oral syndrome due to sunflower seeds.

MATERIAL AND METHODS

Skin tests: Skin prick tests of routine inhalants including composite pollens were carried out using conventional glycosed skin prick solutions and standardized needles (Stallerpoints, Stallergenes, France) using extracts from Stallergenes, ALK-ABELLO, LETI, ALLERGOPHARMA and IPI Laboratories. A macerate

from the cookies has been done from the entire cookie and from the seeds - sunflower and sesame in the surface.

Skin tests were evaluated after 20 min. and results graded according to the guidelines of the European Academy of Allergology and Clinical Immunology (EAACI Sub-Committee) (49).

Skin tests have been done to eggs and fractions, cow-milk and fractions cacao, nuts, hazelnuts, chestnuts, brazilian nuts, almond peanuts, oats, barley, wheat, grapes, soy, sesame, sunflower pollen and composite pollens, mugwort, ragweed.

CASE REPORT

A.S.M. - male 67, Portuguese. 3 weeks before the first appointment describes an acute oral allergy syndrome with burning pain in tongue and mouth extending to retro external area and epigastric area a few minutes after eating a cookie containing as labelled, peanuts past, sesame past, milk, hazelnuts, oat, butter, honey and sunflower seeds. In the local health center he has been treated with a e.v. corticosteroid and an oral anti-histamine.

A previous similar episode but only with mouth burning has occurred some years ago in France after eating a pastry containing unidentified seeds. He don't report any respiratory symptoms seasonal or pereannual with the exception of sneezing while feeding at home a canary cage, the birds being fed with mixed seeds.

Objective examination was normal. Blood analysis were normal with the exception of a slight elevated total IgE 149 UA.

Slight positive tests (1+) were found to soy mugwort, ragweed, sesame, sunflower pollen was borderline. A prick-prick was done with the composant extracted from the cookies, sesame seeds and sunflower seeds macerated in the prick tests solvent.

To improve the reliability of test a fresh preparation of macerated sesame and sunflower seeds was done. With this technique a clear positive prick skin test was obtained to sunflower seeds (3+ equal to histamine). Skin prick tests were negative for the macerate of sesame seeds.

Specific IgE was negative to peanuts, hazelnuts, milk, casein, oral bilirubin, almonds sesame seeds and strongly positive to sunflower - 59,5 KuA/l. (5+) CAP+Feia.

In vivo and in vitro tests confirm therefore sunflower seeds allergy.

DISCUSSION

In this paper we present a patient suffering from inhalants allergic reaction to seeds used to feed birds and anaphylaxis with oral syndrome after eating a cookie containing sunflower seeds. In vivo skin prick tests with a macerate of sunflower seeds have been positive. For sesame and other foods skin-prick tests were negative. A slight reaction was obtained for a composite pollen mugwort without clinical history of late pollen sensitization.

Sunflower can trigger allergy through pollen inhalation, seeds or oil ingestion or professional exposure (*Delmar, Moneret-Vautrin, Sampson, Bessot, Dutau, Kanny*).

In sunflower pollen two allergens have been isolated HEL a1 and HEL a2-HEL a1 has molecular weight of 34 KDa and is the major allergen. HEL a2 is a profilin with a molecular weight of 15-16 KDa (*Gadermeier*) with cross reactivity with the pollen of other compositae or asteracea mainly with mugwort (*Asturias, Molkou, Duta, Errigo, Palma-Carlos, Pauli, Perino, Yma, Van Ree*).

Sunflower seeds contain one allergenic albumin 2S presenting cross reactivity with other seeds like mustard and Brazil nut (*Fernandez, Papageorgiou, Murtagh*).

Most of the plant food allergens sensitizing via the gastro-intestinal tract belong to three major protein superfamilies: the cupin, prolamin and cysteine protease superfamilies (*Bindslev-Jensen, Breiteneder*).

Cross reactivity has been found with other plants (*Garrido, Weber, Wüthrich*).

The cupins are a large and functional immensely diverse superfamily of proteins. They have a common origin and their evolution can be followed from bacteria to animals and higher plants (*Breiteneder*). There are cupins with a single domain and with two domains the bicupins: comprising the globulin seed storage proteins that are a major component of the human diet (*Breiteneder, Gadermeier, Teuber*).

Based on their sedimentation coefficient globulins can be divided into two groups the 7S vicilin-type globulins and the 11-S legumin type globulins. Some seed allergens are cupins as Ses 13 from sesame seeds which is an allergenic 7-S vicilin type globulin.

Seed storage protein 2S albumin, 7S vicilin and 11S legumin have been identified as the major allergen in legumes, tree nuts and sunflower (Van Ree, Papageorgiou, Murtagh, Teuber).

The prolamin superfamily contains also seed allergens. Prolamins were originally characterized by their high content of prolin and glutamine, giving the name prolamin. Water soluble allergenic 2S albumins storage proteins are the typical allergens of nuts and seeds. However the allergenicity of the sunflower seed 2S albumins SFA-8 is still under discussion (Breiteneder, Kelly).

In this case the sensitizing allergens have not been fully characterized but the clinical history points to a sensitization by inhalatory route when using sunflower seeds to feed birds followed by oral syndrome due to ingestion of the same seeds. Sesame, nor peanuts although allergens of growing importance were not implied in these patients (Kanny, Panizzolo, Malish, Sampson).

The allergy to sunflower has been shown only by using a fresh macerate of sunflower seeds. Commercial extracts have given only a slight positive reaction, therefore confirming previous reports that the use of fresh preparation is preferential to diagnostic purposes (Bindsley-Jensen, Bruynzel-Koomen, Beyer, Brostoff, Chapman, Malish, Molkhov, Moneret-Vautrin, Perino, Sampson, 98,99, Wüthrich 95,96).

Strongly positive specific IgE has confirmed previous "in vivo" diagnosis.

Careful exclusion of sunflower seeds and also a of sunflower oil has been strongly advised and the patient has not presented for the last 12 months any other allergic reaction. Immune intervention can be proposed if new episodes supervene (Sampson, 98,99, 2000).

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