

Review Article

The not-so-sweet side of mango: Mango allergy

Sudeep Edpuganti¹, Jui Rajendra Gaikwad¹, Binu Thomas Maliyil¹, Rowyna Reji Koshy¹, Rhea Potdar¹, Shifna Latheef¹, Naga Harika Korrapati²

¹Faculty of Medicine, Tbilisi State Medical University, Tbilisi, Georgia, ²Department of Public Health, School of Health Sciences, University of New Haven, West Haven, United States.



***Corresponding author:**

Sudeep Edpuganti,
Faculty of Medicine, Tbilisi
State Medical University,
Vazha-Pshavela Avenue 33,
Tbilisi 0186, Georgia.

edpugantisudeep@gmail.com

Received: 12 December 2024

Accepted: 29 December 2024

Published: 28 January 2025

DOI

10.25259/CSDM_212_2024

Quick Response Code:



ABSTRACT

Mango (*Mangifera indica*), from the *Anacardiaceae* family, originates from Asia and has grown globally. Despite its wide nutritional benefits, mango can induce allergic processes in some individuals. Mango allergy occurs from the body's immune response to various proteins found in the mango fruit, peel, stem, sap, or tree. Oral allergy syndrome (burning sensation and swelling in the mouth), to severe conditions, including anaphylaxis is included in the spectrum of symptoms observed. Contact dermatitis, a delayed hypersensitivity reaction that manifests as rash, pruritus, and blisters, is also observed in patients after direct contact with mango or exposure to related allergens from the *Anacardiaceae* family, such as poison ivy or oak. This narrative review aims at reviewing the cutaneous manifestations of mango allergy, examining the allergenic profiles of affected individuals, cross-reactivity with other allergens, diagnostic methods, and shed light on the importance of recognizing mango allergy in clinical practice, despite its relative rarity.

Keywords: Contact dermatitis, Cross-reactivity, Hypersensitivity reactions, Mango allergy, Oral allergy syndrome

INTRODUCTION

Various food substances trigger food allergies and can occur in any individual. It is quite a common concern during childhood but it can persist well into adulthood. These occur after the consumption of specific foods and allergies result from the repeated immune responses following that. Globally, the number of reported food allergy cases is steadily rising, with particularly higher incidence in children.^[1] Some individuals develop allergies to certain fruits in a similar manner. The mango, belonging to the *Anacardiaceae* family, is one such fruit that can cause allergic reactions.

Mangoes are found to have originated in Asia approximately 5000 years ago and have traveled their way across the globe. Mango seeds spread across the globe around 300 or 400 years from Asia to the Middle East, South America, and East Africa. They are indehiscent, one-seeded drupe fruit that contains proteins, fat, carbohydrates, cholesterol, and dietary fiber. Mangoes are also a good source of vitamins (such as folates, niacin, pantothenic acid, pyridoxine, riboflavin, thiamine, Vitamin C, Vitamin A, Vitamin E, Vitamin K), carotenoids (carotene- β and α), and minerals (sodium, potassium, calcium, copper, iron, magnesium, manganese, zinc).^[2]

This juicy fruit is a staple ingredient in cuisines of various parts of the world but can also elicit allergies in people. Researchers have identified certain proteins present in the fruit to be the cause of allergy elicitation.^[3] The allergic responses range from mild local reactions to severe systemic anaphylaxis.

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, transform, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

©2025 Published by Scientific Scholar on behalf of CosmoDerma

They occur due to type I immediate hypersensitivity or type IV delayed hypersensitivity resulting in a broad spectrum of clinical manifestations.^[4] Interestingly, some patients have developed contact dermatitis by being exposed not just to fruit, but to peel, stem, sap, or tree. Certain individuals develop the condition even without prior exposure to the fruit or tree. Here, dermatitis is developed from the sensitization from other fruits of the *Anacardiaceae* family (including cashews, pistachio, poison oak, sumac, and mastic).^[5]

This article aims to describe the cutaneous manifestation of mango allergy in individuals in detail. In this literature review, we have also concentrated on checking on the allergenic profile of individuals with allergies, cross-reactivity of the allergen with other similar allergens, diagnostic methods and differential diagnosis with other allergic conditions, and cutaneous clinical manifestations associated with the allergy.

MATERIALS AND METHODS

This review follows a narrative approach, aiming to synthesize existing information from the literature to offer a comprehensive understanding of the cutaneous manifestations of mango allergy. The primary goal is to integrate and analyze previously published research to find patterns, knowledge gaps, and clinical consequences. This review did not create any new experimental data or original discoveries.

To evaluate all possible cutaneous manifestations of mango allergy, we performed a narrative literature review in three major scientific databases (PubMed, ResearchGate, and SciOpen). The search was performed on December 24, 2024, and encompassed all original research articles, case reports and reviews published until that date. The main goal was to determine studies directly focusing on skin signs and symptoms due to mango allergy, such as urticaria, contact dermatitis, and other hypersensitivity reactions.

Diverse keyword and Medical Subject Headings terms were utilized, such as “mango allergy,” “cutaneous symptoms,” “skin reactions,” “contact dermatitis,” and “hypersensitivity reactions,” to guarantee a comprehensive search across disparate disciplines, including dermatology, allergology, and immunology. Boolean operators (AND, OR) were employed to refine the search and capture the breadth of available literature.

After selecting potentially relevant research, we reviewed their titles and abstracts to exclude duplicates, non-original articles, and those that did not focus on cutaneous manifestations of mango allergy. After that, we conducted full-text reviews of the remaining papers to extract relevant information, such as the type of skin reaction, patient demographics, diagnostic procedures, and treatment options. The findings were combined to provide a thorough

overview of the clinical presentation, diagnostic criteria, and therapeutic strategies for mango-induced skin allergies.

Justification of databases

PubMed was chosen for its massive archive of biomedical literature, and ResearchGate and SciOpen were included to capture developing research and case studies that are frequently published on these platforms. Although Embase and Web of Science are widely acknowledged as important databases, resource restrictions and institutional access limits influenced database selection.

RESULTS

A thorough study explored cases of contact dermatitis linked to mango exposure. It included participants of various ages, genders, and regions. The main goal was to pinpoint which parts of the mango plant might cause allergic reactions. To do this, tests were performed on different mango components – such as the peel, sap, skin, stem, and pulp, as well as processed items such as mango gelato – to identify specific triggers for contact dermatitis in those affected.

Results showed that contact dermatitis from mango exposure can affect anyone, regardless of age or gender. A review of 13 case reports and four case series, encompassing 37 patients, revealed an intriguing pattern. The majority of these individuals had never encountered mangoes or resided in mango-growing regions. A smaller group came from areas where poison ivy or oak was prevalent, while the fewest patients were from countries that cultivated mangoes. Interestingly, many had become sensitized to urushiol, a toxic resin found in plants such as poison ivy and poison oak, without prior mango contact. This sensitization led to cross-reactivity, causing their immune systems to mistakenly identify similar allergens from different plants as the same threat.^[4]

Therefore, those already exposed to plants containing urushiol had allergic responses when encountering mangoes for the 1st time.

The research also provided details about how allergic reactions could arise through different means of exposure to mangoes. Whether it was through direct contact with the skin, sap, stem, or pulp – by touching or even eating the fruit – symptoms of contact dermatitis were common. Remarkably, even processed products such as mango gelato could lead to allergic reactions in some individuals, highlighting how potent these allergens can be.

This study stresses the need to recognize mango as a potential allergen – especially for those already allergic to urushiol-related plants. It also brings attention to cross-reactivity. This awareness is crucial since it can result in unexpected allergic responses in individuals who have never encountered

mangoes before but are sensitized to related plants in the same family.

DISCUSSION

Allergy is a reaction to substances in the environment that are harmless to majority of the people and these substances are called allergens which are found in pollens, pets, dust, insects, ticks, food, and medications.^[6] Mango contains several substances such as mangiferin, phenolic acids, benzophenones, flavonoids, carotenoids, quercetin, isoquercetin, Vitamin C, and Vitamin E. It also contains several proteins.^[7]

Mango allergies occur when an individual's immunity is disrupted by the reaction to fruit, peel, stem, sap, tree, or its extracts.^[4] These people experience Oral Allergy Syndrome which happens because the proteins in the mango are similar to the contents of some pollens, causing a cross-reaction.^[8]

Epidemiological data show a prevalence in the number of people developing the allergy in countries where large-scale cultivation of mango does not occur. It's suggested to be due to the consumption of canned or alternate forms of fruit. However, the type of reaction elicited in the patients is similar in all the countries with an equal number of them having immediate or delayed hypersensitivity to the fruit.^[9]

The mango allergy has two hypersensitivity reactions: immediate hypersensitivity and delayed hypersensitivity.^[4]

The immediate hypersensitivity can occur within minutes after mango ingestion^[8] is immunoglobulin E (IgE) mediated and processes such as Mast cell degranulation which produces primary and secondary mediators leading to inflammation which in turn causes bronchoconstriction advancing to wheezing, coughing, angioedema, nasal congestion, skin redness, and bronchospasm.^[4]

Another important IgE antibody-mediated allergic reaction is the oral allergy syndrome also known as pollen food syndrome^[8] which occurs in individuals sensitized to pollen and manifests as mild symptoms such as a burning sensation around the mouth and throat area leading to swelling, gastrointestinal symptoms to severe symptoms such as anaphylaxis which is rare.^[4] Manifestations can last for days to weeks. This type of hypersensitivity reaction can occur due to cross-reactivity between certain pollens, house dust mites, latex, and other such allergens.^[8] Even with the food items belonging to the *Anacardiaceae* family such as cashew or pistachio nuts, cross-reactivity is very bound to occur in patients.

The delayed hypersensitivity has an onset of the symptoms which is variable and ranges from 4 h to 7 days and could be due to direct contact with mango or even after ingestion.^[8] It is mediated by T helper 1 cells causing an inflammatory response after coming in contact with mango fruit, bark of a tree, peel, or

stem leading to, periorbital edema, an eczema-like rash around the lips, and blisters are symptoms of contact dermatitis.^[10] The cutaneous signs and symptoms of mango allergy are included in Table 1. These reactions have been recorded mainly in non-atopic individuals unlike the immediate hypersensitivity reactions.^[8] It can be localized or systemic and is manifested as rash, pruritus, and blisters occurring often on the extremities. Usually, the onset of symptoms is within 8–12 h after the contact.^[4] Sometimes within 15 min after ingestion of fresh mango, exacerbation of asthma develops.^[8] Severe and systemic presentations such as dyspnea require immediate medical treatment.^[11] Most of the symptoms should be treated with parenteral epinephrine and hydrocortisone.^[8]

Cases of contact dermatitis without exposure to mango fruit can be because of close contact with family members such as poison ivy/oak/sumac due to cross-reactivity of an allergen called urushiol. A lot of other factors also have a role such as feeding history, family, and smoking.^[8]

Only three mango allergens (two major allergens and one minor allergen, profilin) have been identified so far using sera from patients with mango IgE-mediated sensitization. The two main allergens are Man I 1 (molecular weight: 28 kDa) and Man I 2 (17 kDa).^[12]

The most common method of diagnosis for mango allergies is a patch test, which can be performed using a variety of mango-derived products made from the fruit's peel, pulp, leaves, sap, stems, and/or urushiol.^[12]

Prick-to-prick testing and intradermal testing with mango extract can both detect antigen sensitization in patients who have an acute reaction to mango.^[8]

For hives, treatment includes a second-generation H1-receptor antagonist, H2-antagonist, or leukotriene

Table 1: Cutaneous signs and symptoms of mango allergy.

Signs	Rate/Frequency of occurrence	description
Contact dermatitis	High	Erythema, pruritus, blisters rash on the areas exposed.
Angioedema	Low	Swelling of lips or other soft tissues.
Periorbital edema	High	Swelling around eyes.
Anaphylaxis	Low	Severe allergic reaction.
Respiratory symptoms	Low	Sneezing, difficulty breathing.
Gastrointestinal symptoms	High	Nausea, vomiting, abdominal pain
Eczema	Medium	Itchiness and dryness scaly plaques resembling atopic dermatitis.

modifying agent. The guidelines should be followed while administering the drugs because they may cause anticholinergic side effects, sedation, or a decline in cognition.^[13] As for angioedema, oral corticosteroids and anti-inflammatory agents such as dapsone, and sulfasalazine can be used for treatment.^[14] The symptoms of oral allergy syndrome such as itching or mouth tingling can be reduced by anti-histamines such as Zyrtec, and Allegra and if gets severe, treatment with epinephrine is required.^[15] The best-known method of managing a mango allergy is to avoid eating or otherwise coming into contact with it. For patients who have already come into contact with mango, the symptoms can start within 4–5 h or if their symptoms are severe, the focus of treatment is the management of the manifestations that arise, this is done by taking corticosteroids such as prednisone and antihistamines such as chlorpheniramine for immune suppression.^[16]

The results are consistent with textbook definitions of mango allergy, which highlight contact dermatitis as the major cutaneous sign. However, the research also uncovers anomalies, such as the unusually high prevalence of systemic symptoms among people who had no direct mango contact, emphasizing the importance of cross-reactivity with urushiol-containing plants. This finding shows that mango allergy may be underdiagnosed in communities lacking direct mango exposure, as systemic symptoms could be mistaken for other allergic disorders.

CONCLUSION

Mango allergy is a rare clinical problem, but it is not a minor one the allergy is not really caused by the fruit itself but also by the Peel stem sap or a tree and can be also complicated by the cross-reactivity with the related species in the *Anacardiaceae* family which include poison Ivy and oak and sumac. The symptoms range from erythema hives, angioedema, wheezing, and oral allergy syndrome to severe anaphylactic reactions (type I hypersensitivity reactions) or contact dermatitis (type IV hypersensitivity reactions). The main management for this allergy is avoiding mango and the species which can cross-react and it is also treated for the symptoms using antihistamines and corticosteroids depending on the severity of the reaction.

Ethical approval: Institutional Review Board approval is not required.

Declaration of patient consent: Patient's consent is not required, as there are no patients in this study.

Financial support and sponsorship: Nil.

Conflicts of interest: There is no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation: The authors confirm that they have used artificial intelligence (AI)-assisted technology to assist in the writing or editing of the manuscript or image creations.

REFERENCES

- Loh W, Tang ML. The epidemiology of food allergy in the global context. *Int J Environ Res Public Health* 2018;15:2043.
- Maldonado-Celis ME, Yahia EM, Bedoya R, Landázuri P, Loango N, Aguillón J, et al. Chemical composition of mango (*Mangifera indica* L.) fruit: Nutritional and phytochemical compounds. *Front Plant Sci* 2019;10:1073.
- Ortega-Martín L, Sastre B, Rodrigo-Muñoz J, Cañas J, Valverde-Monge M, Del Pozo V. Anaphylaxis after mango fruit intake. Identification of new allergens. *J Investig Allergy Clin Immunol* 2021;32:401-3.
- Berghea EC, Craiu M, Ali S, Corcea SL, Bumbacea RS. Contact allergy induced by mango (*Mangifera indica*): A relevant topic? *Medicina* 2021;57:1240.
- Hershko K, Weinberg I, Ingber A. Exploring the mango - poison ivy connection: The riddle of discriminative plant dermatitis. *Contact Dermatitis* 2005;52:3-5.
- National Center for Biotechnology Information. StatPearls. Treasure Island, FL: StatPearls Publishing; 2023. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK447112> [Last accessed on 2024 Dec 05].
- Kumar M, Saurabh V, Tomar M, Hasan M, Changan S, Sasi M, et al. Mango (*Mangifera indica* L.) leaves: Nutritional composition, phytochemical profile, and health-promoting bioactivities. *Antioxidants* 2021;10:299.
- Hassan AK, Venkatesh YP. An overview of fruit allergy and the causative allergens [published correction appears in *Eur Ann Allergy Clin Immunol* 2016;48:31]. *Eur Ann Allergy Clin Immunol* 2015;47:180-7.
- Sareen R, Shah A. Hypersensitivity manifestations to the fruit mango. *Asia Pac Allergy* 2011;1:43-9.
- Guo H, Cong Y. Recent advances in the study of epitopes, allergens and immunologic cross-reactivity of edible mango. *Food Sci Hum Wellness* 2024;13:1186-94.
- Li SK, Liu Z, Huang CK, Wu TC, Huang CF. Prevalence, clinical presentation, and associated atopic diseases of pediatric fruit and vegetable allergy: A population-based study. *Pediatr Neonatol* 2022;63:520-6.
- Berghea EC, Craiu M, Ali S, Corcea SL, Bumbacea RS. Contact allergy induced by mango (*Mangifera indica*): A relevant topic? *Medicina (Kaunas)* 2021;57:1240.
- Kaplan AP. Hives and angioedema. In: Middleton's allergy principles and practice. 9th ed. New York: Elsevier; 2019. p. 15-30.
- Sánchez-Borges M, Asero R, Ansotegui IJ, Baiardini I, Bernstein JA, Canonica GW, et al. Diagnosis and treatment of urticaria and angioedema: A worldwide perspective. *World Allergy Organ J* 2012;5:125-47.
- Stanford Health Care. Oral allergy syndrome. *Stanford Health Care*; 2022. Available from: <https://stanfordhealthcare.org/content/dam/shc/clinics/menlo-medical-clinic/docs/allergy/oral%20allergy%20syndrome.pdf> [Last accessed on 2024 Dec 05].
- Wivanitkit V. Mango dermatitis. *Indian J Dermatol* 2008;53:158.

How to cite this article: Edpuganti S, Gaikwad JR, Maliyil B, Koshy R, Potdar R, Latheef S, et al. The not-so-sweet side of mango: Mango allergy. *CosmoDerma*. 2025;5:18. doi: 10.25259/CSDM_212_2024