

# Dermatosis due to plants (phyto dermatosis)\*

## Dermatoses provocadas por plantas (fitodermatoses)

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**Abstract:** Dermatitis caused by plants is relatively common and may occur by various pathogenic mechanisms. Dermatitis due to physical trauma, pharmacological action, irritation, sensitization, mediated by IgE and induced by light are described. Pseudophyto dermatosis caused by plant-delivered elements is also described in the introduction to this work.

**Keywords:** Allergy and immunology; Dermatitis; Plants; Skin diseases

**Resumo:** As dermatoses causadas por plantas são relativamente comuns no nosso meio e podem ocorrer por diversos mecanismos patogênicos. São descritas dermatoses por trauma físico, por ação farmacológica, mediadas por IgE, por irritação, por ação conjunta da luz e por sensibilização. Também são descritas na introdução desta revisão as pseudofitodermatoses causadas por elementos veiculados pelas plantas e, por isso, aparentemente causadas pelas plantas.

**Palavras-chave:** Alergia e imunologia; Dermite; Dermatopatias; Plantas

### INTRODUCTION

#### DERMATOSIS DUE TO PLANTS (PHYTODERMATOSIS)

Phyto dermatosis is a dermatosis caused by plants. It is mainly caused by direct contact with the plant, but it may occur without any direct contact or by association with sunlight. Therefore, it is interesting to note that substances produced by plants and capable of causing dermatosis may enter in contact with the skin without direct contact of the individual with the plant.

This is the case of “aroeira-brava” (*Litbraea molleoides*), which causes “aroeirite” in individuals sensitive to the long chain phenols produced by the plant when they pass by or lie under the tree. This is explained by the dispersion of droplets in the air containing the allergenic substance.<sup>1</sup>

Another form of phyto dermatosis without direct contact with plants occurs in individuals sensitive to plant-derived substances most often used in perfumes, creams, and cosmetics.<sup>2</sup> This is the case of most perfumes used as such or fragrances present in cosmetic products and other products used for different purposes. As an example, we have the Balsam of Peru, with substances such as eugenol, isoeugenol, cinnamaldehyde, colophony, and terebenthine, among others.

We should also emphasize that some dermatoses are caused by contact with contaminants present in the plant, such as insecticides, agrototoxic substances, and contaminated arthropods, such as the hay itch mite (*Pyemotes ventricosus* or *Pyemotes tritici*), found in cereal and other vegetals. They cause extremely pruriginous skin rashes that often affect farmers, farm workers, veterinarians, and others.<sup>3,5</sup>

Other examples are phyto dermatosis caused by furocoumarins produced by plant-contaminating fungi (for instance, *Sclerotinia sclerotiorum*), or very pruriginous dermatologic diseases caused by “micuins”, larvae of the Cayenne tick (*Amblyomma cajennensis*), present in bushes or tall grass where they will wait to attach to a passing host (animal or human).

Lichens, which are not exactly plants but a combination of fungi and algae, produce usnic acid, which has been commonly used in several cosmetic products and topical sunscreens. For this reason, it has become an important sensitizing agent that may cause contact dermatitis. Due to the fact that lichens attach not only to humid rocks, but also to old tree trunks and vegetables, plants may be mistakenly blamed for causing the disease.<sup>6,7</sup>

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The most common propagation medium of the causal agent of sporothricosis, a profound mycosis caused by *Sporotrix schenckii*, are plants, particularly rosebushes. Likewise, some cases of paracoccidioidomycosis may have the etiologic agent (*Paracoccidioides brasiliensis*) veiculated by vegetals, that is, the disease is apparently caused by plants.

In spite of all the existing possibilities, the most common form of phytodermatosis is contact dermatitis and the most frequent dermatologic symptom is eczema.

A type of contact dermatitis, generally non-eczematous, caused by a plant-derived substance is allergy to the latex produced by the rubber tree (*Hevea brasiliensis*), characterized by a type I immunologic reaction, IgE dependent, possibly leading to contact urticaria and respiratory anaphylactic phenomena. There is also contact with a plant-derived substance for ubiquitous use without direct contact with the originating plant.

To facilitate the understanding of phytodermatosis, skin reactions caused by contact with plants will be divided in the following manner:

- DERMATITIS BY PHYSICAL TRAUMA
- DERMATITIS BY PHARMACOLOGICAL ACTION
- IgE-MEDIATED DERMATITIS
- DERMATITIS BY IRRITATION
- SUNLIGHT-INDUCED DERMATITIS
- DERMATITIS BY SENSITIZATION

#### DERMATITIS BY PHYSICAL TRAUMA

Some plants have their own defense mechanisms in the form of true thorns, aculeus, serrated borders, pointed leaves, prickles that may injure the skin upon direct contact, such as when plants are manipulated or by accident without skin protection.

Among these we can highlight rosebushes, orange trees, lemon trees, Bougainvillea, cactus and pseudocactus, euphorbiaceae such as the “crown-of-thorns”, and other plants.

Other plants, when manipulated, crushed or after small fractures or cuts in their structures, release irritants like sap, small prickles or even microscopic spicules or crystals that in contact with the skin may lead to intense and severe inflammatory reactions.

In the cactaceae family there are several genera, such as: *Opuntia*, *Cereus*, *Cephalocereus*, *Acanthocereus*, and *Echinocereus*, among which we can cite the “mandacaru” (*Cereus jamacaru*), and the “xiquexique” (*pilocereus gouneli*).

#### DERMATITIS BY PHARMACOLOGICAL ACTION

Dermatitis by pharmacological action can occur with anyone, even with individuals who are not predisposed, because the disease is triggered by the penetration of pharmacologically active substances in the skin.

The nettle, <sup>8</sup> *Urtica dioica* or *Urtica urens*, a plant found in shrubbery close to trails frequented by men or other animals and even in gardens as weed, is capable of provoking papular-pruriginous lesions in areas of the skin that entered in contact with the plant. It is similar to an urticaria outbreak – the name of the disease originated from this plant.

The leaves and stems of these plants have in their surface small needle-like urticating hairs whose distal silicone extremity breaks after superficially penetrating the skin. When they break, they release their contents, composed by hystamine, serotonin, acetilcoline and other vasoactive substances, in the dermis.

The following plants have been described to exist in our environment: “cansação”, *Cnidosculos urens*, *Fleurya aestuans*, *Loasa rupestris*, or “favela”, the popular name of *Cnidosculos phyllacantus*.

There are also reports of “urtiga-cipo”, “trepadeira” (creeper) or “urtiga-mamao” (*Dalechampia scandens*). The quince (*Cydonia oblonga*), velames, “canela-do-mato” (*nectandra nitidula*), “mucuna brava” or “cabeluda” (*Mucuna urens*) are other plants covered with urticating hairs.

#### IgE-MEDIATED DERMATITIS

Many plants can provoke urticaria or eczema after contact with the skin through an IgE-mediated mechanism. Proteins present in these plants trigger this reaction, as already described in the case of contact with regular-use latex gloves by health professionals.

This type of dermatitis (protein contact dermatitis) is often restricted to the skin areas that entered in contact with plants, but respiratory and digestive systemic symptoms may occur (contact urticaria syndrome). Atopic individuals are predisposed to contact urticaria. Pruritus, erythema, edema, and sometimes vesicles appear 30 minutes after contact.

The list of plants, fruit, vegetals, and wood that may cause urticaria is very long because it is believed that all plants may provoke contact urticaria. However, frequent and continuous use is necessary for this to happen. The best example would be the celery (*Apium graveolens*).<sup>9</sup> Generally, this form of dermatitis affects food industry workers, cooks, gardeners and florists.<sup>10</sup>

### DERMATITIS BY IRRITATION

It occurs with any individual with no need for predisposition. Direct contact with specific plants or even maceration of plants that release irritating or caustic substances is enough to cause dermatitis. The degree of irritation depends on the substance, but the intensity of the irritation depends upon the thickness of the skin, especially of the corneal layer. Climatic factors that facilitate or reduce the penetration of substances in the skin also play a role.

Some plant families may cause irritative dermatitis, as described below.

#### EUPHORBIACEAE

*Euphorbia milli* (crown-of-thorns), *Euphorbia pulcherrima* (poinsettia), *Euphorbia tirucali* (pencil tree), *Euphorbia cutinoides* (assacui), *Euphorbia cyparissias* (cypress spurge) (Figure 1) belong to this family.

These are plants that resemble cacti and have inside a milky sap or latex that is highly irritant (euphorbine), formed by diterpene and phorbol esters, which in contact with the skin provoke irritation that leads to acute vesicating dermatitis.<sup>11,12</sup> In folk medicine, these plants are used to treat warts and even to destroy malignant neoplastic skin tissue. They are garden plants and because they have thorns some are used as terrain/house wall or fence protectors. Some species, such as the pencil tree, have their milky irritating sap released when cattle or other animals crush them and because of this are used as hedgerow.

#### ARACEAE

In this family, there are plants like *Dieffenbachia picta* (dumb cane), which is commonly used as an ornamental plant. Known as



FIGURE 1: Crown-of-thorns (*Euphorbia milli*)

'office plant', it is beautiful with its large leaves and does not require excessive care. The *Philodendrum* (Adam's rib) and *Monstera* (horse face) also belong to this family. They contain calcium oxalate formed by fine needle bands grouped in compartments, surrounded by a mucilaginous liquid. These "needles" are called raphides, which are soluble in water and released from the compartments when in contact with water or direct contact.<sup>12</sup> There are very few reports of patients with allergic contact dermatitis caused by dumb cane (Figure 2).<sup>13</sup>

These plants cause lesions in the mucous membranes with edema and intense burning with sialorrhea when their leaves are bitten. They can lead to the formation of vesicles and blisters; because they cause edema of the tongue, palate and mucous membranes of the region, they lead to speaking difficulties and are known as muting plants.

They can cause lesions in the skin, eyelids and eye, and irritation of the mucosa of the digestive tract if ingested, which could more easily happen with small children and animals.<sup>12</sup>

#### AMARYLLIDACEAE

In this family we find the narciss (for example *Narcissus pseudonarcissus*), which contains calcium oxalate in the bulbs. There are several species of this plant with beautiful flowers and a pleasant smell. They are highly cultivated in Europa and are used as ornamental and garden plants and in perfumery as a source of essential oils and aroma.

They may cause scaling erythematous dermatitis, fissures and dryness of the finger pulps. They may also provoke subungueal hyperkeratosis. Clothes can spread the narciss bulb crystals to other areas of the body and thus lead to disseminated dermatitis. It



FIGURE 2: Dumb-cane (*Dieffenbachia picta*) ornamental plant of easy maintenance



affects individuals that cultivate, sell or distribute these flowers, being thus an occupational dermatosis that involves florists, gardeners, and flower producers.<sup>12</sup>

#### LILIACEAE

In this family we find the hyacinths, which cause irritative dermatitis due to the same mechanism as that of narcisses in professionals who manipulate these flowers and also tulips. Tulips, besides provoking dermatitis by irritation (despite not having oxalate in their bulbs) may cause dermatitis by an allergic mechanism, in the same way as *Aloe Vera*, which rarely causes an allergic skin reaction.<sup>14</sup>

#### ALIACEAE

Like liliaceae, the garlic (*Allium sativum*), the onion (*Allium cepa*) and other plants of this family are both irritants and sensitizing. This irritative capacity facilitates sensitization.<sup>12</sup>

#### BROMELIACEAE

The pineapple (*Ananas comosus*) is included in this family. It contains calcium oxalate crystals and bromelain, a proteolytic enzyme whose action is facilitated by the crystals. It is known that pineapple can cause irritations in the mouth (stomatitis, particularly angular cheilitis and perioral dermatitis).

#### LABIATAE

Thyme (*Thymus vulgaris*), an aromatic herb of the labiatae family used in culinary and in the production of cosmetics and drugs, is described as a contact dermatitis agent that affects farmers. It provokes dermatitis by air dispersion probably through a primary irritation mechanism.<sup>15</sup>

#### OTHER FAMILIES

Several plants from various families cause irritative dermatitis; therefore, it is worth mentioning them individually:

Bougainvillea (*Bougainvillea spectabilis*) – ornamental bush originary from Brazil, highly cultivated worldwide, has many true thorns that can injure the skin. They belong to the nyctaginaceae family (Figure 3).

Agave (*Agave americana*), used in the manufacturing of ropes, hammocks, and to tie other plants such as forage, often causes traumas to the skin (e.g. cuts) when manipulated because it has calcium oxalate grouped in raphides and other irritating chemical substances released upon manipulation of the plant. In addition, the plant has thorns and leaves with cutting margins. It belongs to the agavaceae family.<sup>12</sup>

Podophyllin (*Podophyllum peltatum*), a plant from the berberidaceae family, contains the resin podophyllin, which has many components, among them podophyllotoxin and peltatin. When in contact with mucous membranes, podophyllin provokes irritation with ulcerations, depending on its concentration and amount.<sup>12</sup>

Podophyllin has been used since 1942 to treat cases of condylomata acuminata and warts, especially due to its antimitotic activity. It should be emphasized that podophyllin can lead to toxic phenomena depending on the amount absorbed. Indeed, its use by pregnant women should be prohibited in the treatment of condylomata because cases of fetal malformations have been described.<sup>12</sup>

#### SUNLIGHT-INDUCED DERMATITIS

Many plants produce substances known as furocoumarins; for instance, psoralens, which are chromophors that cause phototoxic reactions in the skin with ultraviolet stimulation, particularly ultraviolet A light (320 to 400 nm). This skin reaction is known as phytophotodermatitis.

Phytophotodermatitis occurs in areas that have been in contact with the plant and that have been exposed to sunlight. It often develops within 24 hours from exposure and is characterized by erythema such as a burn with the formation of vesicles and blisters, depending on the intensity of the reaction. It may evolve to a secondary infection, but the main characteristic of phytophotodermatitis is pigmentation that may last for several weeks.

Most plants that may cause phytophotodermatitis belong to the rutaceae, apiaceae (umbelliferous), fabaceae (leguminous) and moraceae (Figure 4) families.<sup>12</sup>



FIGURE 3: Bougainvillea (*Bougainvillea spectabilis*), which contains thorns that protect its stem and offshoots

## RUTACEAE

All the plants that produce citric fruit belong to this family. For example, the orange (*Citrus sinensis*), lemon (*Citrus limmonia*), lime (*Citrus medica*), tangerine (*Citrus reticulata* or *Citrus nobilis*) and others such as the common rue (*Ruta graveolens*).

The phytophotodermatosis caused due to the habit of preparing “caipirinhas” and lemonade or orange juice in beaches is very common in Brazil. The fact that lime juice is often squeezed on top of seafood on the beach is another contributing factor. It is also important to remember that because the contact of the juice is often with the hands, the dermatosis can be localized in the hands, often on the dorsal region, and also in those places touched by contaminated hands. This dermatosis is very common in the skin of other people, especially children, touched by contaminated hands. This occurs because furocoumarins (methoxypsoralens) are abundantly present on the skin of these fruits.

## APIACEAE (UMBELLIFEROUS)

Among the apiaceae we find the carrot (*Daucus carota*), parsnip (*Pastinaca sativa*), celery (*Apium graveolens*), garden angelica (*Angelica archangelica*), fennel (*Anethum foeniculum*), parsley (*Petroselinum crispum*), coriander (*Coreandrum sativum*), anise (*Pimpinella anisium*), and dill (*Anethum graveolens*). They may cause phytophotodermatosis due to the presence of psoralens in their components.<sup>12</sup>

## FABACEAE (LEGUMINOSAE)

Representing this family we have the “imburana de cheiro” (*Amburana cearensis*), a tree found in the Northeast of Brazil whose main component is coumarin. We also cite the “vinhático” (*Plathymenia foliosa*), a timber tree that contains psoralens.<sup>16</sup>



FIGURE 4: Phytodermatosis caused by lime on the dorsum of hands

The fruit of *Psoralea corylifolia* has been used for a long time in chinese medicine to treat vitiligo and alopecia areata, but due to the great and variable amount of psoralen, its prohibition has been recommended because cases of severe phytophotodermatosis have been reported with its use.

## MORACEAE

The ficus tree is included in this family (*Ficus carica*). The sap extracted from its leaves contains psoralens and has been used as a self-tanning adjuvant. This has led to cases of severe burning.<sup>17</sup> The “mama-cadela” or “inhare” (*Brosimum gaudichaudii*),<sup>18</sup> which has been used to treat vitiligo both topically and orally, also belongs to this family. A recent case of photoallergy caused by a bracelet made out of this plant’s wood has been reported in the literature (Figure 5).<sup>19</sup>

## GUTTIFERAE (HYPERICACEAE)

Tipton’s weed (*hypericum perforatum*) is used worldwide, especially in Europe, as a phytotherapeutic substance with antidepressant properties. It is also known as St. John’s wort and may cause phototoxicity due to its components. This plant should not be mistaken for tropical whiteweed (*Ageratum conyzoides*), also used as a phytotherapeutic plant.

The phototoxicity of tipton’s weed or St. John’s wort is caused by the chemical compound known as hypericin, found in all parts of the plant, when oral or topical drugs are used. Hypericin absorbs light in the spectrum of 450 to 600 nm, that is, in the visible light spectrum.<sup>12</sup>

Despite the fact that some authors consider the reaction that results from the association of St. John’s wort and sunlight a photosensitivity reaction, it



FIGURE 5: Ficus tree (*Ficus carica*) and its fruit

should be emphasized that practically no plant causes photoallergy; therefore, they are not included in contact phototesting. However, sesquiterpene lactones are tested because there are controversies regarding the role of sunlight in the allergic reaction caused by this compound. It is more frequently found in plants of the asteraceae family.<sup>20-22</sup>

#### CAPPARIDACEAE

There is a report of a gardener from Europe with phototoxicity due to the manipulation of the spiny spiderflower (*Cleome spinosa*), a plant originary from Brazil and highly cultivated in European gardens for its beauty. It is used as a phytotherapeutic drug for its stomachic properties. It can be taken orally or applied to skin wounds and ulcers. It is believed that it contains chemical substances such as glucoparin and mustard oil extract, responsible for its irritating effect, and phototoxic substances such as coumarin.

#### OTHER PLANTS

The hairy beggarsticks (*Bidens pilosa*), a plant of the asteraceae family, is used in many countries, including Brazil, as tea or decoction. Some authors consider it phototoxic due to the substance phenyl heptatriene.<sup>23</sup>

#### DERMATITIS BY SENSITIZATION

Dermatitis by sensitization occurs when sensitizing substances are present. For this to happen, sensitization of the lymphocitary system to substances present in the plant must occur. After this initial phase, the skin reacts at every new contact with the sensitizing substance. Since many plants can have the same substance with allergenic capacity, it may be useful to group them in families and associate the families with specific substances in order to recognize the cause of allergic contact dermatitis caused by plants.

#### ASTERACEAE (COMPOSITAE)

This family includes approximately 20 thousand species, of which more than 180 may cause allergic contact dermatitis. The sensitizing substances are sesquiterpene lactones. There are several types of sesquiterpene lactones; other plants like hepatic (*Frullania*) and plants belonging to the magnoliaceae and lauraceae family (*Laurus nobilis*) may also contain this substance; therefore, patients allergic to this substance may have a reaction when in contact with these other plants and with para phenylenodiamine.<sup>24</sup>

The most important allergen (hapten) is the alpha-methylene-gamma-butyrolactone, which binds to skin proteins and acquires antigenic capacity. It

may show cross-reactivity with the usnic acid produced by lichens.<sup>12</sup>

It is interesting to note that tulipalin A, the quinone described as the allergen found in liliaceae (tulip) and alstroemeriaceae, does not show cross-reactivity with sesquiterpene lactones (alpha-methyl-gamma-butyric), despite the fact that both share a common radical.

A few vegetals belong to this family, such as lettuce (*Lactuca sativa*), chicory, artichoke, ornamental plants like chrysanthemum, daisies, marigolds, feverfew ("macela-da-serra"), and "macela-do-sertao". It is known as the sunflower family and is abundant in our planet – about 10% of all the flowering plants known.

Following the methodology of several authors and to simplify the classification of the large asteraceae family, we have divided it into three families:<sup>12</sup>

Chicoraceae - whose well-known examples are lettuce (*Lactuca sativa*), chicory (*Chicorium intybus*), endive (*Chicorium endivia*) and the common dandelion (*Taraxacum officinale*).

Two sesquiterpene lactones have been isolated from the endive and chicory: lactucin and lactucopicrin.<sup>25</sup> Cases of eczema (late reaction) and urticaria (immediate type) have been reported.

The allergen found in the dandelion is the glucopyranoside in ataraxic acid.

Ambrosiaceae - including the species *Ambrosia*, *Dahlia*, *Franseria*, *Helianthus*, *Iva*, *Rudbeckia* and *Xanthium*.

The *Ambrosia artemisiaefolia*, a typical herbal plant common in North America, causes skin eruptions in exposed areas with seasonal incidence in the pollination period. It leads to intense pruritus and when it becomes chronic, it lichenizes and causes fissures in the skin. The allergenic substances are sesquiterpene lactones, artemisofoline and isabelline. The asteraceae could cause reactions that resemble photosensitization, but this mechanism has never been proved in these cases.<sup>26</sup>

Asteraceae - with all the other plants that belong to this family. For instance, *Leucanthemum vulgare* or *Chrysanthemum leucanthemum*, known as daisy. *Matricaria inodora* and *Matricaria chamomilla*, known as chamomille. *Arnica Montana*, plant with an orange-colored flower, ornamental or phytotherapeutic. *Chrysanthemum morifolium* and many other species known as chrysanthemum, have as allergens the alantolactone, arteglinin A, arbusculin A, and other sesquiterpene lactones.



In India, the Santa Maria feverfew (*Parthenium hysterophorus*), of the compositae family, causes contact dermatitis by air dispersion. Its allergens pertain to the sesquiterpene lactones and are described as partenine, coronopiline, and tetraeurin A (Figure 6).<sup>27,28</sup>

The insecticide pyrethrin is a chrysanthemum derivative (*Chrysanthemum cinerariofolium*), but appears not to be responsible for the allergy to chrysanthemums.<sup>12</sup>

*Cynara scolymus* is an artichoke that may cause contact dermatitis in areas of the face through the dissemination of irritating substances by the hands. Cynaropicrin is the allergen.

*Bidens pilosa*, a herb known as hairy beggarsticks, often used in Brazil and other countries in the topical treatment of dermatosis, is frequently associated to the aggravation of the dermatologic condition by the own patient. It is described as having antifungal, antibacterial, and antiviral properties. However, it contains phenyl heptatriene,<sup>7</sup> a phototoxic substance. This helps to explain the high number of cases of worsening or development of eczema in areas exposed to sunlight after topical treatment (immersion baths) with hairy beggarsticks seen in dermatologic practice. *Bidens pilosa* is also used as tea to treat jaundice, liver diseases, and malaria.

#### ANACARDIACEAE

In this family, of great interest in Brazil, skin reactions by sensitization are due to substances constituted by a benzene ring linked to a ramified chain of 15 to 17 carbons (long-chain phenols), which vary by species. The antigenicity of the molecule increases with the following factors: presence of an aliphatic chain in the 3-carbon of the ring, increase of

chain length, presence of unsaturated double bonds on the lateral chain and presence of free phenolic groups in the ring.

#### COMMON CASHEW (*Anacardium occidentale*)

May cause contact dermatitis due to the liquid in the cashew skin. It has a monophenol with 15 carbons, the cardanol, and a biphenol with 15 carbons, the cardol, which are the likely allergens (sensitizing substances). It also contains anacardic acid, with an irritative property. The liquid obtained from the fruit is used in the treatment of warts and to irritate areas of alopecia areata due to its caustic effect.<sup>12</sup>

#### MANGO TREE (*Mangifera indica*)

Has mangol as one of the components of its leaves, stems and skins of the fruit,<sup>29</sup> which is similar to the phenols found in the cashew. Individuals who are allergic to any of these long-chained phenols (urushiols) can eat a mango without the skin.<sup>30</sup>

#### AROEIRAS (*Litbraea molleoides*)<sup>31</sup>

The “aroeira-brava” or “aroeira-branca” provoke eczematous dermatitis in patients sensitive to the uroshiols in areas exposed to particles dispersed in the air that have been released by the tree. Because it is similar to the eczema caused by photoexposure, it is frequently mistaken for photosensitization or phototoxicity.

There are some popular beliefs about the dermatologic condition known as “aroeirite”.<sup>32,33</sup> In some parts of Brazil you should salute the plant by saying good morning to avoid the skin reaction. In addition, it is said that if you sleep under the shadow of an aroeira you will develop the dermatosis. It is also popular knowledge that if you bathe the skin with the decoction of “aroeira-mansa”, you will be cured.

*Schinus terebinthifolius*, “aroeira-mansa” or “aroeira-pimenteira”, whose red fruit is used as pepper and does not cause dermatosis. On the contrary, it is popularly used as a phytotherapeutic treatment for dermatitis, especially aroeirite.

*Myracrodruom urundeuva* or *Astronium urundeuva*, the “aroeira-do-sertão”, whose wood is considered to be very resistant and of great quality.

#### TOXICODENDRONS

Cause contact dermatitis by sensitization in North-America. There are several species:

- *Toxicodendron radicans* (poison ivy)
- *Toxicodendron diversilobum* (poison oak)
- *Toxicodendron vernix* (poison sumac)



FIGURE 6: Daisy (*Leucanthemum vulgare*)

### Other plants with long-chained phenols:

*Ginkgo biloba*, whose fruit is of the same size as a cherry and produced only by the female tree, contains the ginkgo acid, a long-chain phenol. It belongs to the ginkgocaceae family. *Grevillea robusta* is a shrub used for decoration and wood. It is originary from Australia and is occasionally used in Brazil as a wind protection fence. Its allergen, the 5-tridecyl resorcinol, is chemically similar to the uroshiol, and this suggests that there might be cross-reactivity in patients allergic to these substances. It belongs to the proteaceae family.

### PRIMULACEAE

More than 600 species are known in this family, but most contact dermatitis described are associated with *Primula obconica*. It presents with a sudden development of erythema, edema and vesicles on the eyelids, face and obviously hands and forearms with linear distribution. It affects mainly florists and housewives who manipulate the plant to prune old leaves to stimulate the growth of new flowers. The small hairs (thrycomas) present in the leaves, stems and flowers, when in contact with the skin, release a quinone known as primin, its allergen,<sup>12</sup> and also miconidine.<sup>34,35</sup> It has been considered one of the greatest causes of contact dermatitis in some regions of Europe.<sup>36</sup>

Sea urchins have a substance similar to primin in their spines, the allergen of primula. This can cause allergic reactions in individuals previously sensitized or it can sensitize individuals to primulaceae.<sup>37</sup>

### ORCHIDACEAE

Orchids, which are very beautiful and valuable plants, are cultivated worldwide. More than 25 thousand species are known and some of them may cause contact dermatitis by sensitization. The allergens may be the 2,6 dimethoxy-1,4-benzoquinone, cypripedin, and other quinone derivatives.

### LITRACEAE

*Lawsonia inermis*, the henna, may occasionally cause a skin reaction due to the presence of naphthoquinone lawsone, described by Gupta in 1986. However, contact tests have shown cases of dermatitis caused by henna due to sensitization to paraphenylenodiamine. This chemical, the true responsible for the allergenicity of henna, is added to its commercial formula.

### LILIACEAE

Tulips, in addition to being irritants, are also allergenic due to their lactones - tulipalin A and

tulipalin B - and glucosides, tuliposide A and tuliposide B. Both glucosides are found in the external part of the bulbs, whereas the two lactones are released when the external part of the bulbs is injured. The dermatologic condition is widely known, especially in Netherlands where tulip is highly cultivated, as "tulip fingers".<sup>12</sup> The dermatosis affects gardeners, florists, and tulip growers, especially their finger pulps causing painful fissures. Tulipalin A is the main allergen and is found in other liliaceae as well. *Aloe Vera* is widely used in cosmetics and is very little allergenic, but it can provoke contact dermatitis by an allergic mechanism.<sup>14</sup>

### ALSTROEMERIACEAE

They are gorgeous plants and often cultivated as flowers. Tulip finger cases and dermatosis due to substances dispersed in the air have been reported. The allergens are the same as those found in tulips, in particular tulipalin A.<sup>38</sup>

### ALIACEAE

The garlic (*Allium sativum*) is included in this family and is widely used in culinary and also for its therapeutic properties. It contains potentially sensitizing substances called diallyl sulphides. Housewives who manipulate vegetables and various food items in the kitchen and who have hand dermatitis may be allergic to these substances. The typical dermatitis due to garlic manipulation is pulpitis in the fingers with erythema, scaling, hyperkeratosis, and fissures that cause local pain. The irritative component of garlic should not be neglected.<sup>12</sup>

Cross-reactivity with onion (*Allium cepa*), parsley (*Allium schoenoprasum*), and leek (*Allium porrum*) has been described, but it is not known whether all of them contain diallyl sulphides (Figure 7).

### FARBACEAE

This family, which includes several species that contain furocoumarins, belongs to the group of plants that cause dermatitis by sensitization due to the well-known Balsam of Peru (*Myroxolon pereirae*), which produces a latex containing various familiar allergens: benzoic acid, benzoic aldehyde, benzoic alcohol, benzyl benzoate, benzyl cinnamate, coniferyl alcohol, coniferyl benzoate, coumarin, eugenol and isoeugenol, limonene colophony, esters of p-hydroxybenzoic acid, cinnamon alcohol, cinnamon aldehyde, and cinnamon acid.

Patients who are sensitive to any of these substances may have skin reactions if they use topical drugs containing Balsam of Peru, such as hemorrhoid and diaper rash creams. The Balsam of Peru is





FIGURE 7: Dermatitis caused by garlic (*Allium sativum*)

frequently used in these topical drugs due to its pleasant smell and its antibacterial, antifungal, and keratoplastic effects.

The Balsam of Peru is one of the 30 substances present in the standard series of contact tests typically used in Brazil.

It may show cross-reactivity with the resins of other vegetals, especially coniferae such as terebenthine and colophony, as well as with flavorings in soap, hygiene products, seasonings, food, drinks such as cola, sweets and chocolate.

It has a high positivity rate in individuals under 15 years old, according to a study conducted in

Sweden with children with contact dermatitis.<sup>36</sup>

The most important allergen of the Balsam of Peru is the cinammon aldehyde that can be obtained naturally from the cinammon tree (*Cinnamomum zeylanicum*) or synthetically. It is used as flavoring in soap, detergent, deodorants, toothpastes, oral antiseptic solution, alcoholic and non-alcoholic drinks, chewing gum, bonbons, ice cream, sweets, perfumes, and others.

Approximately 50% of the patients allergic to propolis have a reaction when in contact with the Balsam of Peru. Propolis contains substances that are similar to those found in the Balsam of Peru. In fact, propolis is a substance used by bees to waterproof the hive with disinfecting properties. They collect it from the white poplar or any other tree that produces this sticky paste as resin.

Propolis is often used in cosmetic products, toothpastes, lip liners, massage creams, and others, and it can lead to allergic contact dermatitis.<sup>39</sup> The main allergen in propolis is 1,1-dimethylallyl caffeic acid ester, also known as 3,4-dihydroxi cinnamic acid ester.

In the family of the saxifragaceae, we find the hydrangea (hortense), which is little allergenic and often used in gardens all over the world. It may cause allergic contact dermatitis due to the allergen hydrangenol.<sup>40</sup>

In the labiatae family there is a report of allergic contact dermatitis caused by mint (*Mentha spicata*). Its allergens are carvone and limonene.<sup>4</sup> □

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