

# Review on *Philodendron Species*-Plant Seeking For Validation of Its Therapeutic Approaches

Pankaj Nainwal

Assistant Professor, School of Pharmacy, Graphic Era Hill University, Dehradun, Uttarakhand, India

## Abstract

*Philodendron* is a member of the Araceae (Arum) family and originates from the Caribbean, Colombia and Venezuela, but also grows in Asia nowadays. Hundreds of species are known, of which around ten have been promoted to houseplant status. The plant was first described in 1644, and was given its name in 1829. That name derives from Greek: 'philo' means 'love' or 'affection' and 'dendron' is 'tree'. Freely translated it means 'tea hugger', because *Philodendron* is a real climber that loves to 'embrace' trees. The plant symbolises health and abundance. However the plant is used as an ornamental plant but some studies reveal that plant consists of triterpenoids and flavonoids in some of the species which can exerts some effective usage for various disorders. As per this information this plant species seeks for its validation to potentiate the therapeutic effect present in it.

**Keywords:** *Philodendron*, houseplant, triterpenoids, flavonoids

## INTRODUCTION

*Philodendron species* commonly known as Heartleaf, Heart-leaf Ivy, *Philodendron*, Sweetheart Plant, is a species of flowering plant in the family Araceae, native to Central America and the Caribbean. *Phileo* comes from the Greek words meaning to love and *dendron* meaning a tree for its affinity to climb trees. Most of the species occur in humid tropical forests, but can also be found in swamps and on river banks, roadsides and rock outcrops. *Philodendron species* are often found clambering over other plants or climbing the trunks of trees with the aid of aerial roots. It is also native to Mexico, West Indies and Brazil. It is perhaps the most popular *philodendron* sold in commerce today. Naturally plants will grow to 20' tall, but indoors are more often seen in the 4' tall range. The features claim to be bright, glossy, heart-shaped, dark green leaves that may have a bronze tinge on emerging. The leaves typically grow to 3-4" long, but increase in size up to 12". Twining stems of this plant will either trail from a pot or climb up a column if given support. The flowers infrequently appear as Greenish-white arum on mature indoor plants. *Philodendrons* belong to the Arums or Aroid (Araceae), a family which is characterized by its distinctive spathe and spadix blooms. They are typically climb tree trunks, obtaining moisture and nutrients absorbed by the bark. In frost-free climates, *philodendron* appears regularly in landscape plantings. In temperate regions this plant is used for interior landscape plantings in various organizations and public places. The plants grows very well as long as they are kept warm - 65° minimum – moderately moist, and out of direct sunlight. *Philodendron* is found as an evergreen climber growing to 3–6 mts with heart shaped glossy leaves to 30 cm long, and white flowers in mature plants. In temperate regions it must be grown under glass or as a houseplant with minimum temperature of 15-16°C. [1] The leaves grows with an acutely pointed tip and it look slightly brownish and almost transparent when they are new, but changes to deep green as they grow to maturity. Many of the species of this plant seems in two growth phases, the first one is a juvenile form and another one is mature form. It often look very different in leaf size and shape. Specimen of the plant which grows in container almost always stay in the juvenile phase. [2]

## CULTIVATION APPROACHES

*Philodendrons* grows its best in loose, well-drained soil which is rich high in organic matter. Also grow in 100% sphagnum peat moss and mixtures such as peat-vermiculite or peat-perlite. [3,4]

### Fertilization

*Philodendrons* are considered heavy feeders. Some of the species will live for a long time without supplemental fertilization, however, a regular feeding program with a nitrogen fertilizer will increase leaf size and produces a larger, healthier plant. It's a nice strategy to fertilize more frequently at half strength than to apply one strong dose. Plants of these species which mainly grows in low-light conditions require less fertilization than actively-growing plants. Moist soil requires fertilizers to avoid injury to plant roots.

### Watering

The vital factors in keeping *Philodendrons* growing evenly with large, uniform leaves is plentiful of water. Keep the potting mix consistently moist, but not wet. Make sure all excess water drains, since sitting in water or overwatering can cause root injury, which will cause leaves to turn yellow and drop. A high-humidity environment should be maintained with a pebble tray or by grouping plants will encourage larger leaves.

### Light

*Philodendron species* grows best in bright and indirect sunlight. Exposure to the sunlight causes a yellowish color in the leaves or a sunburn spot. Artificial light gives best results if natural light is not present.

### Temperature

*Philodendron species* will grow well in normal to warm indoor temperatures 24-27°C (75-80°F). *Philodendron species* cannot tolerate temperatures which drop below about 13°C (55°F).

### Fertilizer

Throughout the months while the *Philodendron species* is actively growing apply standard liquid fertiliser once every two weeks.

### Potting and repotting

Like other houseplants, *philodendrons* benefit from repotting to a larger container when they become root bound and outgrow the original pot. A combination of half

soil-based potting mixture and half leaf mould or coarse peat moss is used. Move *Philodendron species* into container one size larger only when their roots have completely filled the current one. This is done at any time of year except during the short rest period. After the long rest period the convenient pot size has been reached (probably about 25-30cm (10-12 inch)), an annual spring top-dressing with fresh potting mixture will help to keep the plant healthy. A container with drainage holes to prevent root rot is used. A cachepot is used if a decorative container is without drainage. It is necessary to cover the bottom of a cachepot with pebbles so as to keep the plant above the drainage water.

#### **Propagation**

Cutting and layering are popular methods of *Philodendron species* propagation. Try propagating them during the growing season. A small brown nubs are formed where the leaves meet the stem. These nubs, when in contact with soil or water, will grow roots. There are many ways to propagate this plant, the easiest being to cut a branch just below a root-nub and place it in water with a few pieces of horticultural charcoal to reduce the likelihood of rot. As soon the growth of new leaf takes place it is potted in the rich soil. Similarly it can also be propagated within its own pot by pinning vines at the root-nub to the soil with hairpins or bent wire. The root nub in contact with the soil will sprout new roots in a very short time. When the different parts of *Philodendron species* are rooted, the plant will greatly profited from misting several times a day.

#### **Problems**

No serious insect or disease problems is however reported. Watch for aphids, spider mites, mealy bugs and scale. Leaf spots may occur. Root rot can occur in overly moist soils. Small leaves or long spaces between leaves show that the plant need enough light to grow.

#### **Treatment**

Move the *Philodendron* plant to a brighter location, but not into direct sun.

#### **Interesting facts**

About 200 year old discussion going on about the true name of this plant. Some of the reference are found to *Philodendron oxycardium*, *Philodendron scandens* and *Philodendron cordatum* in houseplant books etc., but *Philodendron hederaceum* is the actually the correct name. The reason for all the names, in part, is that the plant has a really variable habit, depending on its age and growing conditions, so specimens collected at different times and different places can leads to the differences in size, habit, coloration and texture. Identified as for their ability to flourish in low-light conditions typical of many homes and offices, *Philodendron hederaceum* plants are often grown for their lush foliage. This can be grown-up as a climbing or training specimen depending on whether its long stems are trained up supports or are allowed to trail over the rims of the pots or hanging baskets. *Philodendron hederaceum* as a climbing species is usually tried to a stake inserted into the potting mixture for support. For best results, dress the stake in sphagnum moss until form a 5-8cm (2-3 inch) thickness over the full length of the stake above the potting mixture level. Sphagnum moss or cork-

bark being used must be sprayed with water at least once in a day. By doing this it will rouse the aerial roots of the *Philodendron hederaceum* to get a firm hold on this support. Assuring that the support is tall enough to accommodate the eventual total growth of the plant. *Philodendron hederaceum* can be used as a ground cover or on arbors or trellises for dependable, soft green color and a tropical look, particularly around patios, windowsills and pools specifically in tropical and humid subtropical regions. *Philodendron hederaceum* is one of the best types of houseplants for removing formaldehyde in higher concentration and is capable to absorb much quantity of formaldehyde present in water-based paint, roofing felt, glues in fitted carpets or even laminated wooden floors.

#### **SPECIES VARIATIONS**

*Philodendron hederaceum* is the most common houseplant variety having a solid dark-green leaves approximately 5" long. Brazil is a popular cultivator with a band of yellow along the center of each leaf. *Philodendron* (*P. bipinnatifidum*, formerly known as *P. selloum*), is common basis plant in zones where it can reach a height of 12-15 feet with an equal or greater spread, has deeply cut, green to dark green leaves up to 3 feet in length. This plant has the same cultural requirements as *P. hederaceum* which makes a dramatic statement in larger commercial and public spaces. *Philodendron var. Xanadu* is a compact hybrid species which is found suitable for home use. Other strains of *Philodendron* that have been made popular by tissue culture are Burle Marx, Congo and Hope. The red strains of *Philodendron* include Anderson's Red (mostly green, with red overtones), Autumn (light orange), Imperial (green with some burgundy, also Imperial Red with much more bright brownish), Rojo Congo (bright brown leaves on red petioles and Prince of Orange (foliage rich orange). *Philodendron speciosum* is alike to *P. bipinnatifidum* only difference is that the leaves are not lobed, they are entirely with toothed margins with an inflorescence having a white spadix and surrounded by a pink spathe. This plant is very rare and not commonly obtainable at nurseries. Hybrids of *P. speciosum* and *P. bipinnatifidum* are sometimes found in local landscapes but is rarely sold. *Philodendron evansii* is an ornamental plant with large, lobed leaves but not as deeply divided as *P. bipinnatifidum* which possess a colorful inflorescence that is white with pinkish edges. *Philodendron 'Xanadu'* is a small, self-heading plant that important for places having small landscapes. It grows to 2-3 feet tall with a slender stem. The leaves are narrow and are shallowly lobed is of 6-12 inches in length. It can grows in both sun or shade. *Philodendron 'Xanadu'* is easily found in local nurseries. *Philodendron bipennifolium* has lobed leaves similar to *P. bipinnatifidum*, but occur in small and dark green in color. [5] The upright stems grow 2 to 3 feet. Various self-heading species are existed but are very uncommon and can be difficult to locate. *Philodendron eichleri* and *Philodendron undulatum* both have large, undivided leaves. *Philodendron stenolobum* is usually misidentified as *P. williamsii*. having wavy narrowed leaves that can get 2 to 3 feet in length and grows a slender trunk several feet taller.

*Philodendron goeldii* has divided leaves that resemble those of a *P.schefflera*. *Philodendron* 'Soledad' is an unknown hybrid species which resembles *P. vansii*. *Philodendron corcovadense* is found as a small species growing 3 to 4 feet in height. *Philodendron erubescens*, which is also known as the Red-leaf *Philodendron* consist of a triangular leaves, green and glossy and have a red tint on the underside. The stems and leaves are reddish-purple. *Philodendron radiatum* has deep lobed leaves up to 1 ft in length. *Philodendron wilsonii* is a large climber with lobed leaves, 2 to 3 feet in length. [6] In addition to the climbing *Philodendrons*, there are some other vining aroids that can be grown in Central Florida and resemble *Philodendron*.

#### CHEMICAL AND PHARMACOLOGICAL ASPECTS:

In the Amazon area of Brazil, the roots of different species of *Philodendron* are used as the traditional medicine. *Philodendron fragrantissimum* (Hook.), locally known as 'cipó-tracuá'. The roots are found very aromatic and is used for baths and for fumigation. The volatile oil from the roots of *P. fragrantissimum* obtained by hydrodistillation in a modified Clevenger-type apparatus for 4 hours. The oil was analyzed by gas chromatography (GC) and GC/mass spectrometry (GC/MS). Around 35 chemicals were detected and the major components were found as  $\beta$ -caryophyllene (29.9%), limonene (15.8%),  $\beta$ -selinene (11.5%),  $\alpha$ -selinene (15.7%),  $\alpha$ -pinene (3.4%),  $\alpha$ -copaene (3.2%),  $\beta$ -pinene (2.5%) and  $\delta$ -cadinene (2.9%). The high content of  $\beta$ -caryophyllene was not observed in the other species. This study so far, might be considered a tool in taxonomy studies. The analysis of the essential oil obtained from adventitious roots of the *P. fragrantissimum* exposed the presence of around 31 constituents with relative percentage peak area above 0.1%, characterized as 24.3% of monoterpenes and 72.6% of sesquiterpenes. The major components were  $\beta$ -caryophyllene (29.9%), limonene (15.8%),  $\alpha$ -selinene (15.7%),  $\beta$ selinene (11.5%),  $\alpha$ -pinene (3.4%),  $\alpha$ -copaene (3.2%),  $\beta$ -pinene (2.5%),  $\delta$ -cadinene (2.9%) and  $\gamma$ -eudesmol (2.9%). The other substances, present in proportions less than 2%. However, as for what concerns their major constituents,  $\beta$ -caryophyllene has now been identified as the major compound in *P. fragrantissimum* essential oil (29.9%) which is found in a less quantity in *P. imbe* (2.3%) and was found absent in *P. acutatum*. On the other hand,  $\alpha$ -pinene,  $\beta$ -pinene, limonene and myrcene were characteristic compounds in common for the three *Philodendron* species essential oils. Seasonal variations of these constituents were reported to *P. acutatum* [7]. The high content of  $\beta$ -caryophyllene was not observed in the other *Philodendron* oils studied so far and might be considered a tool in taxonomy studies. Some studies have reported the chemical composition of *Philodendron* species. Studies reveal their allergenic potential due to the presence and abundance of 5-alkyl and 5-alkenylresorcinols in the leaves and stamens of nine species. Aromatic amines have also been described in the inflorescences of sixteen Araceae species, of which seven are *Philodendron* [8]. Also, some common plant steroids, fatty acid ethyl esters and a polyprenoid (hexaprenol) were reported from the ethanol extract of *Philodendron imbe*

leaves and roots [9]. As far as we know, there are only three reports on the chemical composition of the essential oils of *Philodendron* species: *Philodendron acutatum* Schott., *P. imbe* Schott., and *Philodendron scabrum* K. Krause, all obtained from their roots [10].

#### Toxicity

The most of oxalate containing plants, such as *Philodendron* (*Philodendron bipinnatifidum*), are kept for their ornamental beauty and are often easily accessible to pets. If any part of these plant is ingested in large quantities, it cannot be metabolized, and the salts are absorbed into the bloodstream and oxalic acid combines with calcium and forms the calcium oxalate crystals. These crystals are primarily deposited in the kidneys in form of stones and they can also be deposited in other organs, including the heart. Oxalosis can lead to cardiac abnormalities correlated with decline in renal function in humans, mainly causes heart blockage. Sheep and cattle grazing on *Rumex crispus* (Curled Dock) which are native to Europe and Western Asia, experienced tetany, recumbency, and death. Some grass varieties like Buffelgrass (which is common in southern Arizona land, contain much oxalates that may induce Calcium deficiency.[11] Oxalates bind Calcium in the gastrointestinal tract and lead to a change in the Calcium level of the blood along with a subsequent effect on the muscular system. The calcium and oxalate proportion in the diet is 0.5:1 which is considered safe. The formation of calcium oxalates also leads to hypocalcemia, which interferes with electrical activity of the heart, as it inhibits the calcium pump active in the generation of the action potential, resulting in the relaxation of the muscles. [12] The LD50 of oxalic acid is 375 mg/kg b.w. for rats. However very insufficient data on cardiac manifestation of oxalosis in animals are available. Sodium oxalate if ingested can leads in various bad effects like weak and irregular pulse, hypotension, necrosis of the myocardium, and eventually cardiovascular collapse. The treatment includes oral dosing with calcium lactate followed by an emetic is recommenced as aid, i.e., binding the unabsorbed oxalates to calcium and then removing them. However the plant is used as an ornamental. [13] If enough area is available to spread, Xanadu makes a handsome foundation or specimen planting, and can also be used in large containers where it looks especially attractive at poolside. It's having so much similarities in smoothness and its form to Selloum without its large size. Since the leaves of this plant remain close to the ground it makes a nice, heighted ground cover for any shaded or damp location. Xanadu is well adapted to the shade of tall trees which desires a quite rich, moisture-retentive soil to look its best. Most of *Philodendron* species become accustomed to alkaline soil fairly well and are resistant to drought.[14]

#### Therapeutic aspects

However the plant is known for its toxic principle, but chemical studies reveals presence of various terpenoidal and flavonoidal moieties. However no any therapeutic activity in any case has been reported so far. In houses it is basically used as a part of ornamental plant.

**CONCLUSION:**

Philodendron species in all over world used as ornamental plants grown for its glowy flower part. As per literature available it is concluded that toxic principles were identified in most of species, which can cause severe infection or problem. However various terpenoids are also identified in most of species which in turn signifies the presence of volatile oils and resins in them. Flavonoids and tannins are in the main probable chemical source which may exert various therapeutic property. However ornamental use of this plants somewhere restrict this plant to being as medicinal source due to which its importance being as medicinal is on stake, hence an objective can be made to explore its therapeutic approaches so that it may be useful identifying new molecules in prophylaxis & treatment of various infections or diseases either known or unknown.

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