

## A REVIEW ON PHARMACOLOGICAL ACTIVITIES OF THE PLANT

### *PEPEROMIA PELLUCIDA. L*

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#### ABSTRACT

*Peperomia pellucida*. L (Fam. Piperaceae) is used as traditional medicine worldwide, and it contain some scientific data. Since very long time *Peperomia pellucida*. L is reported to be used for the treatment of abdominal pain, abscesses, acne, boils, colic, fatigue, gout, headache, rheumatic joint pain, skin disorders, dressing wound. *Peperomia pellucida*. L has scientifically studied for various therapeutical activities like Anti-microbial, Gastro protective, Anti-hyperuricemic, Anti-diabetic, Anti-bacterial, Anti-oxidant, Hypotensive, Thrombolytic, Antipyretic, Immuno-stimulator, Anti-hypercholesterolemia, and Anti-cancer. The present review is an effort to give a detailed survey of the literature on its, phytochemical, traditional uses and therapeutical studies.

**Keywords:** *Peperomia pellucida*. L, Anti-microbial, Gastroprotective, Anti diabetic.

#### INTRODUCTION

*Peperomia pellucida*. L is widely distributed in many South American and Asian countries. The plant found at tropical and subtropical parts of India. The plant is occasionally cultivated and sparingly naturalized in Hawaii. In Fiji, Southern region of China, Samoa, New Guinea etc this plant is occurring as a weed along roadsides, in plantations, on damp ground in shady places near houses, and occasionally along forest trails<sup>1,2</sup>.



#### VERNACULAR NAMES

Shiny bush or silver bush, Sanskrit- Toyakandha, Varshabhoo. Malayalam - Mashitandu chedi; Bengali- Lochipata; Assame-Pononoa<sup>1,2</sup>.

#### CHEMICAL CONSTITUENTS

The plant *Peperomia pellucida*. L was found to have variety of chemical constituents. Phytochemical screening revealed the presence of alkaloids, cardenolides, saponins and tannins, flavonoids, apiols, phytosterols, substituted styrene, secolignans, tetrahydrofuran lignans, arylpropanoids, sesamin, isoswertisin, xanthone glycoside and peperomins A, B, C and E in it. Stem also contain alkaloid, tannins, flavonoids and steroids, except saponins. The roots of *Peperomia pellucida*. L also had shown the presence of alkaloid, tannins, steroids and carbohydrates etc.

Sesquiterpenes appear to be the major chemical constituents in the essential oils. Carotol (13.41%) was the major hydroxylated Sesquiterpenes in a chemical analysis of *Peperomia pellucida*. L Flavonoids, phytosterols, arylpropanoids (eg, apiols), substituted styrenes, and a dimeric ArC2 compound or pellucidin A have been isolated. Isolated flavonoids include acacetin, apigenin, isovitexin, and pellucidatin. Isolated phytosterols include campesterol and stigmasterol. Also contains five new compounds (1-5), including two secolignans, two tetrahydrofuran lignans, and one highly methoxylated dihydronaphthalenone. It also contains *trans*-caryophyllene, dillapiole. Mineral composition like potassium, calcium, iron, sodium, zinc, copper also exist.

*Peperomia pellucida*. L contained high levels of ash, up to 31.22% in the dried plant<sup>1</sup>.

## THERAPEUTIC USES

According to Ethno-botanical studies the whole plant of *Peperomia pellucida* has been in medicinal use since long. *Peperomia pellucida*. L leaves and stems are also be eaten as vegetable. In salads, the fresh plant has the crispness of carrot sticks and celery. It has been applied for treating abdominal pain, abscesses, acne, boils, colic, fatigue, gout, headache, renal disorders, and rheumatic joint pain. In Bolivia, Alenos Indians use the whole plant to stop haemorrhages. The roots are used to treat fevers and the aerial parts are used as dressing for wounds. In north eastern Brazil, the plant has been used to lower the cholesterol level. In Guyana and the Amazon region, it is a popular cough suppressant, emollient, and diuretic<sup>3</sup>. It is also used to treat proteinuria. In the Philippines, a decoction of the plant is used to decrease uric acid levels and to treat renal problems, skin disorders, eye inflammation, gout, arthritis, to boost skin complexion, treat pimples, fever, common cold, cough<sup>4</sup>, constipation, kidney diseases, urinary retention, dysuria, urinary tract infections<sup>5</sup>, emaciation, edema and general weakness, high blood pressure<sup>6,7</sup>. It also used as Antimicrobial<sup>8</sup>, Gastroprotective<sup>9</sup>, Anti hyperuricemic<sup>10</sup>, Anti diabetic<sup>11</sup>, Antibacterial<sup>12</sup>, Antioxidant<sup>13</sup>, Antihypertensive<sup>14</sup>, Thrombolytic activity<sup>3</sup>, Antipyretic<sup>15</sup>, Immuno-stimulator<sup>16</sup>, Anti hypercholesterolemia<sup>17</sup>, Anticancer<sup>18</sup>.

## PHARMACOLOGICAL ACTIVITIES

### 1. ANTIMICROBIAL ACTIVITY

The syrup of crude leaves methanol and chloroform extract of *Peperomia pellucida*. L possess antimicrobial activity. The clinical strains of bacterial and fungal organisms namely, *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumonia*, *Bacillus subtilis* and *Candida albicans*. The growth of all the organisms was inhibited by the formulation obtained from methanol extract of the plant while the chloroform extract was less sensitive. The presence of sucrose in the formulation rendered the formulation pleasant to taste. The inhibition of growth of the organisms by the extracts can be attributed to the presence of biologically active, complex organic chemicals (secondary plant metabolites) in their tissues. On the basis of the result

formulated syrup can possess similar antimicrobial activity<sup>8</sup>.

### 2. GASTROPROTECTIVE ACTIVITY

Antiulcerogenic activity of *P. pellucida* L. was studied in necrotizing agent i.e. (ethanol, sodium chloride, sodium hydroxide and hydrochloric acid) and indomethacin induced models in rats. The 70% of ethanolic extract of aerial part of *P. pellucida*. L was prepared. Four doses were selected for further study. Ulcer effects were determined by counting the total surface area of lesion in mm<sup>2</sup>. Results showed that PPE provided significant protection in various experimental models used. Pre-treatment with the PPE at all doses has produced significant inhibition of gastric mucosal damage induced by 80% EtOH, 25% NaCl, 0.6 M HCl, 0.2 M NaOH and 30 mg/kg indomethacin. The result suggests that PPE possesses anti-ulcer properties<sup>9</sup>.

### 3. ANTI-HYPERURICEMIC ACTIVITY

The plant *Peperomia pellucida*. L was tested for its anti-hyperuricemic effects. Placebo, allopurinol, and *Peperomia* extract was administered after induction of hyperuricemic with the use of potassium oxalate and uric acid. Fasting blood uric acid levels were taken at different time intervals after test drug administration. In the allopurinol group and *Peperomia* group, the mean blood uric acid level significantly decreased. This study confirmed the anti-hyperuricemic potential of the plant *Peperomia pellucida*. L<sup>10</sup>.

### 4. ANTIDIABETIC ACTIVITY

Antidiabetic activity of *Peperomia pellucida*. L (*P. pellucida*) in alloxan-induced diabetic rats suggest significant reduction in the level of HDL-cholesterol, Catalase, SOD activities and GSH concentration in diabetic untreated rats. The supplemented diets significantly reduced lipid peroxidation, which was elevated in untreated diabetic rats. Significant decrease in the activities of AST, ALT and ALP was also observed in rats fed *P. pellucida*. L supplemented diets. The results indicate that *P. pellucida*. L has antidiabetic property<sup>11</sup>.

#### 5. ANTIBACTERIAL ACTIVITY

Antimicrobial activity of N-hexane, Ethyl acetate, and Ethanol extract of *Peperomia pellucida*. L suggest antimicrobial activity against strains of some bacteria isolates including *Escherichia coli* ATCC 35218, *Klebsiella pneumonia* ATCC 34089, *Salmonella typhi* ATCC 22648, *Staphylococcus aureus* ATCC 25923 and *Pseudomonasaeruginosa*, using the agar well diffusion method. Phytochemical screening of this plant showed the presence of antraquinone, tannins, flavonoids, alkaloids and glycosides<sup>12</sup>.

#### 6. ANTIOXIDANT ACTIVITY

A study on oxidant activity by three methods DPPH, hydroxyl radical and ferric thiocyanate method, revealed that the fractions possessed antioxidant activity when compared with antioxidant standards: butylated hydroxyl anisole (BHA), ascorbic acid and  $\alpha$ -tocopherol used in the assay. The extracts were however more active in the Ferric thiocyanate method giving a% inhibition of over 98% scavenging activity. The high antioxidant activity of the plant at low concentration indicates that it could be very useful for the treatment of ailments resulting from oxidative stress. These results further corroborate the ethno medicinal uses of the plant<sup>13</sup>.

#### 7. ANTIHYPERTENSIVE ACTIVITY

*Peperomia pellucida*. L was screened to its antihypertensive activity in Sprague-Dawley rats and also studied for impact of CYP450 by using human liver and heterologously expressed microsomes. A dose-dependent reduction in systolic, diastolic, MAP and HR. Pre-treatment with atropine and propranolol but not mepyramine significantly reduced the hypotensive and negative chronotropic activities caused by the extract, displayed moderate inhibition of CYP3A4 enzyme activity using heterogeneously expressed CYP3A4 and human liver microsomes (HLMs). Results suggest dose-dependent hypotensive, bradycardic and vasorelaxant effects of PPAE are mediated through Nitric oxide-dependent mechanisms. The impact on CYPs enzyme activities

indicate unlikely adverse drug effect when *P. pellucida*. L is consumed with other medications reliant on CYP3A4 metabolism<sup>14</sup>.

#### 8. THROMBOLYTIC ACTIVITY

The crude ethanolic extract of *P. pellucida*. L leaves was investigated for qualitative preliminary phytochemical screening as per standard procedure. The various fractionates of the leaves of *P. pellucida*. L were designed to evaluate for their possible thrombolytic activity by using standard drug. The results obtained from the study suggests extracts can be considered as good source of thrombolytic agents<sup>3</sup>.

#### 9. ANTI-PYRETIC ACTIVITY

Antipyretic effects of petroleum ether and ethyl acetate soluble fractions of ethanol extract of the leaves of *P. pellucida* (Linn.) HBK (Fam. Piperaceae) were investigated. Intraperitoneal administration of boiled milk at a dose of 0.5 ml/kg body weight in albino rabbit leads to pyrexia. Intraperitoneal (i. p.) administration of petroleum ether and ethyl acetate soluble fractions of ethanol extract of the leaves of *P. pellucida*. L at a dose of 80 mg/kg body weight significantly reduced the elevated body temperature of rabbit. This antipyretic effect was compared with antipyretic effect of standard aspirin and the solvent used. Hence, it can be concluded that this extract possesses a significant anti-pyretic effect in the maintaining of normal body temperature and reduce boiled milk induced elevated rectal temperature in rabbits<sup>15</sup>.

#### 10. IMUUNO-STIMULATOR ACTIVITY

The study was aimed to screen the immune-stimulator activity of *Peperomia pellucida*. L leaf. Fish was used in the study. The experimental fish were fed with medicated feed at three different concentrations of *P. pellucida*. L leaf extract for 1 week before they were intraperitoneally exposed to *A. hydrophila*. Enzyme-linked immunosorbent assay was carried out to determine the value of antibody response to *A. hydrophila* in fish from a group of fish that received medicated feed, and the percentage of

total cumulative mortality of the experimental fish were observed at the end of the experiment. The results showed that huge potential of *P. pellucida*. L leaf extract as natural immuno-stimulator agent for aquaculture uses<sup>16</sup>.

#### 11. ANTI-HYPERCHOLESTEROLEMIA ACTIVITY

The study was aimed to determine the effect of ethanol extract *Peperomia pellucida*. L against total cholesterol, HDL, LDL, and triglycerides in the serum of white rats (Wistar) were given a diet atherogenetik, so it can be used as prevention of atherosclerosis. Rats were divided into 3 groups: group A positive control is given atherogenetik diet, group B and C were given diet *Peperomia pellucida*. L atherogenetik and extract orally at a dose of 150 mg/kg and 300 mg/kg. Diet atherogenetik given as much as 20 grams per day for 14 days. The study of total cholesterol, HDL, LDL and triglycerides showed ethanol extract of *Peperomia pellucida*. L at a dose of 300 mg/kg body weight can lower total cholesterol and LDL significantly, but there was no significant decline in triglycerides and can increase HDL levels<sup>17</sup>.

#### 12. ANTI-CANCER ACTIVITY

Anticancer activity of *P. pellucida*. L leaf extract was determined through Colorimetric MTT (tetrazolium) assay against human breast adenocarcinoma (MCF-7) cell line. The results of present study indicated that *P. pellucida*. L leaf extract possessed anticancer activity. The minimum inhibitory concentration (MIC) values indicates the inhibition in growth of *Edwardsiella*, *Escherichia coli*, *Flavobacterium* sp., *Pseudomonas aeruginosa* and *Vibrio cholerae*, *Klebsiella* sp., *Aeromonashydrophila* and *Vibrio alginolyticus* it was able to control the growth of *Salmonella* sp. and *Vibrio parahaemolyticus*. The concentration of the plant extract was found to inhibit 30% of DPPH, free radical. Findings from this study indicated that methanol extract of *P. pellucida*. L leaf possessed vast potential as medicinal drug especially in breast cancer treatment<sup>18</sup>.

#### CONCLUSION

*Peperomia pellucida*. L is a traditional plant with high therapeutic benefits. Different parts of the plant *Peperomia pellucida*. L were broadly studied for its pharmacological activities using several experimental screening models and based on its results. It could be concluded that this plant has the potential to be explored as a natural medicinal source. In the present an effort has been made to generate research evidence for the claimed activity.

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