A REVIEW ON PHYTOCHEMICAL
PHARMACOLOGICAL AND
PHARMACOGNOSTICAL INVESTIGATION OF
PIPER BETLE LEAF

Prepared by: - *1Gambhire Rohini, *2Maharanwar Akanksha

*3Mrs. Bodkhe Vaibhav *4 Mrs. Dr. Kolhe S. D.

Designation: - *1Student of bachelor of pharmacy ACS’s College of Pharmaceutical Science and Research Center, Ashti

*2Student of bachelor of pharmacy ACS’s College of Pharmaceutical Science and Research Center, Ashti

*3Department of pharmaceutical chemistry of ACS’s college of pharmaceutical science and research, Ashti.

*4Principal, ACS’s college of pharmaceutical science and research Center, Ashti.

ABSTRACT:

Piper betle is glorified as evergreen and perennial plant that god designed and have given shape of his own heart. The heart shape of leaves are initiate in ancient Sanskrit text, include charaka, sushruta samhita and astanga hradayam. Betle leaf extract has been used as mouth wash when the mouth is swollen, cleanses and badbreath stop bleeding and treat other diseases such as vaginal discharge, coughing, hoarseness and skin wounds. the phytochemical of betel plant content saponins, flavonoids, polyphenols and triterpenoids and essential oil sesquiterpenes sugar and starch. Betel plant have pharmacological effect such as antibacterial, antimicrobial, analgesic anti-inflammatory, antioxidant, antiproliferative and antidiabetic.

KEYWORDS:

piper betel L, chavicol chavico, chavibetal, medicinal properties, green heart.
INTRODUCTION:-

Piper betel (L) commonly known as betel vine belongs to the family piperaceae. It is a popular medicinal plant in Asia.[1] The leaf is the most widely used and studied part of the betel vine. There are chewing habit practices of betel leaves in many countries which are believed beneficial for avoiding bad breath, preserving the teeth and stimulating the digestive system. The shape the flat betel leaf is heart shape and stalk rather long. The leaf surface is green and slippery, while the tree trunk is slightly brownish green with rough and wrinkled skin surface. Roots are tap, round and yellowish brown colour. Extract of piper betle leaves are seen to be effective against several human pathogens. piper betel is medicinal plant that has long been used by Indonesian people as an antivaginal.

Plant profile:-

Taxonomical classification :-

- **Kingdom:** Plantae
- **Division:** Magnoliphyta
- **Class:** magnolipsida
- **Family:** piperaceace
- **Order:** piperales
- **Genus:** piper
- **Species:** betle
Chemical constituents:-

Chief constituents of leaves is the volatile oil(0.8-1.85%) , betel oil,contains two phenols,betelphenol (chavibetol) and chavicol, allyl pyrocatechin ,eugenol.

Pharmacological activity:-

1. Anticancer activity
2. Anti-allergic activity
3. antibacterial
4. Anti-malarial activity
5. Antifungal
6. Antioxidant
7. Insecticidal
8. Antidiabetic

Anticancer activity:-
The betel leaf was used as common household remedy for inflammation in oral cavity anticancer has free Radical scavenging potency of catharanthus roseus piper and curcuma mangga extract in breast cancer cell lines was investigated by widowati in 2013.

Anti-allergic activity:-
The result suggested that piper betel may offer a new therapeutic approach for the control of allergic mediation .The goal of an antiseptic was to eliminatd or reduced the number of an microorganisms in the surgical field at the time of th surgery.

Antibacterial activity :-
The antibacterial properties of the medicinal plants were reported from all over the world and used in the tratment of many diseases like malaria, AIDS,and sxually transmitted of many diseases.

Antifungal activity:--
2010 worked on in vitro antifungal activity hydroxychavicol,isolated from the chloroform extraction of the aqueous leaf extract of piper betle L.,124strains of selected fungi were taken for antifungal stud.

Antimalerial:-Essential oil of piper betel provide better protection from biting of mosquitoes anophls stephensi and outleex fatiigen compered to known mosquito repellnt to known mosquito repellant citronella oil.
Antifungal: at 2010 worked on in vitro anti-fungal activity of hydroxychavicol isolated from the chloroform extraction of selected Fungi were taken for antifungal study.

Anti-oxidant: The consumption of anti-oxidant rich foods will help to neutralize the free radicals in the body, thus preventing or delaying the oxidative damage of lipids, proteins and nucleic acid.

Insecticidal: Insecticidal activities of essential oil from betel against storage by aristateal. The insecticidal activity of essential oil extracted from the leaves of piper betle L. was evaluated against the bean weevil.

Anti-diabetic: The anti-diabetic properties of some like bitter gourd, neem, tulsui and garlic are known in India. In piperaceae family piper sarmentosum, piper longum, nigrum and pipr betle are identified as potential anti-diabetic agent.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage of Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chavibetol</td>
<td>53.1</td>
</tr>
<tr>
<td>Caryophyllene</td>
<td>3.71</td>
</tr>
<tr>
<td>Chavibetol acetate</td>
<td>15.5</td>
</tr>
<tr>
<td>Allylpyrocatehol Diacacetate</td>
<td>0.71</td>
</tr>
<tr>
<td>Chavibetol methyl ether</td>
<td>0.48</td>
</tr>
<tr>
<td>Campene</td>
<td>0.48</td>
</tr>
<tr>
<td>f-Pinene</td>
<td>0.21</td>
</tr>
<tr>
<td>Eugenol</td>
<td>0.32</td>
</tr>
<tr>
<td>u-Limonene</td>
<td>0.14</td>
</tr>
<tr>
<td>a-Pinene</td>
<td>0.21</td>
</tr>
<tr>
<td>1,8-Cineol</td>
<td>0.04</td>
</tr>
<tr>
<td>Saprobe</td>
<td>0.11</td>
</tr>
<tr>
<td>Allylpyrocatehol Monoacetate</td>
<td>0.23</td>
</tr>
</tbody>
</table>

Piper betle chemical constituents:-
Traditional system of medicine/different languages

**Synonym of *Piper betle* Linn**

Ayurvedic
Taambula, Naagvallari, Naagini, Taambulvalli, Saptashiraa, Bhujangalataa.

Unani
Paan, Tambool
Sidha/Tamil
Vetrilai Nagavalli, Kammaaruvetritai
Hindi, Bengal, Gujraj, Urdu
Paan
Konkani
Phodi paan
Malayalam
Vettila
Marathi
Vidyache pan
Telugu
Tamalapaka

**Pharmacognostical study:**

**Pharmacognostical study**

The pharmacognostical study has been done by performing morphological and microscopic analysis of leaves as per WHO guidelines.

**Morphological features**

Morphological features of the leaf such as the presence of foreign organic matter, color, odor, size, shape and taste were studied.

**Microscopic analysis**

Transverse section of midrib, petiole and lamina of fresh leaf were cut by using potato pith method. The sections were cleared by boiling with chloral hydrate solution and stained with a mixture of phloroglucinol and hydrochloric acid (1:1), and studied under a compound microscope (10 X and 45 X).

**Powder microscopy**

Powder microscopy has been performed by using coarse powder of leaf. This study was used for identification of various diagnostic characters of leaf powder.
Physicochemical parameters

Physicochemical constants such as total ash value, acid insoluble ash, water-soluble ash, sulfated ash and loss on drying were determined as per WHO guidelines. Alcohol soluble extractive value has been determined by making an extract of dried powder leaves of *P. betle* L. by cold maceration technique using alcohol as a solvent while for water-soluble extractive value, hot maceration technique was used using chloroform water as solvent.

Preliminary phytochemicals analysis

For phytochemical analysis, four types of extract *v. i. z.* petroleum ether (40-60 °C), chloroform, ethanol and aqueous extract were prepared by using successive solvent extraction method of dried powder of leaves of *P. betle* L. These extracts were screened for the presence of various phytochemical constituents in the leaves of *P. betle* L. In addition to phytochemical screening, percentage yield of each extract were also calculated.

RESULTS

Macroscopic analysis

*P. betle* Linn. is a perennial creeper with woody stem belonging to family Piperaceae. Leaf is dorsiventral, mesomorphic with a prominent midrib on both sides. Description of morphological characters.

fig: TS of midrib
Transverse section of the petiole (fig. 4) was semicircular with a shallow depression on the adaxial side and somewhat round at abaxial side. Schizigenous oil cavities (secretory canal) were present in the center of the petiole. Pappilate epidermis beneath of which a wide zone of 6 - 8 layered collenchymas cells was present. Parenchymatous cells were present in the ground tissue. Vascular bundles were present as a ring showing 6 - 10 in number. Para dermal section of leaf showed the presence of pearl like secretory cells.

**Morphological characters of *Piper betle* Linn leaf**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Characters</th>
<th><em>Piper betle</em> Linn</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Dimensions</td>
<td>Length of leaf: 8 - 16 cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Width of leaf: 6 - 12 cm</td>
</tr>
<tr>
<td>2.</td>
<td>Color and condition</td>
<td>Green to dark green and fresh leaves</td>
</tr>
<tr>
<td>3.</td>
<td>Lamina</td>
<td>Simple and reticulate</td>
</tr>
<tr>
<td></td>
<td>Composition and venation</td>
<td>Entire and acuminate</td>
</tr>
<tr>
<td></td>
<td>Margin and apex</td>
<td>Broadly cordate leaves with rounded base</td>
</tr>
<tr>
<td></td>
<td>Base</td>
<td>Thick lamina with smooth and glabrous surface</td>
</tr>
<tr>
<td></td>
<td>Surface and texture</td>
<td>Long petiole 1.5 to 4.5 cm long</td>
</tr>
<tr>
<td></td>
<td>Petiole</td>
<td>Stipulate leaves</td>
</tr>
<tr>
<td></td>
<td>Leaf base</td>
<td>Alternately arranged leaves</td>
</tr>
<tr>
<td></td>
<td>Phyllotaxis</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Taste</td>
<td>Aromatic</td>
</tr>
<tr>
<td>5.</td>
<td>Odor</td>
<td>Characteristic and pleasant</td>
</tr>
</tbody>
</table>
CONCLUSION:

This review is submitting to grate potential of medical and nutrient value. Piper betle is known to world wild and consumed frequently as moth fresheners and also as potent source for novel therapeutic value. In Ayurveda, the betle leaf extract is often used as adjuvant, aromatic, beneficial for sound laxative, appetizer, aphrodisiac effect and helps increase taste and appetite, stop nose bleeds, fever, sores and eye infection. Chemical content in betle includes saponins, flavonoids, polyphenols, and triterpenoids essential oils (constite of chavicol, chavibtol, carvacrol, eugenol, estragol). Piper betle has bioactivity Anti-cancer, Anti-allergic, Anti-diabtic, Anti-malarial, Anti-fungal, Anti-oxidant, Anti-diabtic, Anti-insecticidal activity.

References:


