



RECENT ADVANCES IN PHARMACOLOGICAL POTENTIAL & PHYTOCHEMICAL SCREENING OF HOLOPTELEA INTEGRIFOLIA : A REVIEW .

Pharmaceutical

Parveen Ruhil

Department Of Pharmaceutical Sciences & Research, Baba Mastnath University, Asthal Bohar, Rohtak, Haryana, India

Neha Minocha

Department Of Pharmaceutical Sciences & Research, Baba Mastnath University, Asthal Bohar, Rohtak, Haryana, India

ABSTRACT

Papri (*Holoptelea Integrifolia*) is a popular traditional medicinal plant in India with a variety of chemical compounds that have been used in the treatment and prevention of Cancer of bladder, Viral, Acid gastritis, Intestinal Worms, topical ulcers, fever, Vomiting, Wounds healing, Diabetes and so on. There are various common vernacular names of the plant in India. The current review focuses on the recent research investigation on pharmacological action of papri plant, which showed antiviral, antidiabetic, analgesic, antioxidant, antifungal, anti-inflammatory, CNS depressant, antitumor, anti-cancer activities and so on. The phytochemical analysis of *Holoptelea Integrifolia* (papri) has showed the presence and absence of steroids, phenols, proteins and so on. we have investigated some important compounds like epifriedlin, stigmaterol, β -sitosterol and betulinic acid which have been identified and isolated from the plant species. The Methanolic extract and petroleum ether extract (100 & 200 mg/kg body weight) of *Holoptelea Integrifolia* leaves and bark has showed the Antifungal, Anti-oxidant, wound healing, Anti-ulcer, Anti-cancer, Anti-helminthic, Anti-diabetic, CNS depressant, Heparo-protectives and Anti-bacterial properties which provide a base for further clinical approaches for this plant.

KEYWORDS

Papri, Phytochemical investigation, Pharmacological activity, Traditional uses.

INTRODUCTION:

Holoptelea integrifolia (H. *integrifolia*) belongs to the family (Ulmaceae). The flowering time of the tree is January to end of February, whereas fruiting is seen in April to distributed over tropical and temperate regions of May. The plant *Holoptelea integrifolia* is a large and glabrous tree used in Northern hemisphere for the treatment of cancer, fungal infection, viral, common fever, diabetes. It is a very common village side tree of Rajasthan, Bengal, Haryana, Andhra Pradesh and Maharashtra [1]. This plant contains several of pharmacological activities and the wood of the tree is used in making furniture. There are various common vernacular names of *Holoptelea Integrifolia* depending upon the various languages spoken in India region. The names used in various languages are described in Table 1 given below [2].

Table 1 : Various Vernacular names of *Holoptelea Integrifolia* in various languages

Languages	Vernacular names
1. Hindi	Papri, Chilbil, Kanju, Bawal, Poothigam, Dhamna, Begana, Chirabil
2. Sanskrit	Chirivilva, Pootikaranja, Udakirya, Hasthivaruni, Markati, Vayasi, Karabhanji
3. Punjabi	Rajain, Khulen, Arjan
4. English	Indian elm, jungle cork tree, Monkey biscuit tree, Indian beech tree.
5. Telugu	Nemilinaru, Nali, Thapasi, Nemali.
6. Marathi	Ainasadada, Vavala, Vavli, Papra, Bawal
7. Gujarati	Charal, Charel, Kanjo, Waola, Chirbil.
8. Tamil	Aya, Ayil, Kanci, Vellaya, pattai Bengali.
9. Kannada	Kaladri, Nilavahi, Rahubija, Thavasai .
10. Nepali	Sanopangro Siddha Iya

The leaves and bark of the plant showed the presence and absence of steroids, proteins, phenols, tannins, alkaloids and many more. It is commonly known as Indian Elm Tree. Decoction of the bark used as oxytocic in pregnant ladies. There are two new medicinal pentacyclic triterpenoids which are betulinic acid and betulin were isolated from bark of plant and it is an important pollen allergen. Its bark paste is applied on forehead of patient who suffering from common fever.

BOTANICAL DESCRIPTION:

A smooth plant of the Ulmaceae family, 15 – 25 meters in height. Leaves are glabrous oblong-ovate to elliptical or having rounded base, crushed leaves give a strong smell and 7.5-12.5 by 3.3-6.3 cm in size. Flowers are small in size, greenish-purple and polygamous which found in axillary fascicles. Male flowers bear 8 stamens. Ovary is (2.5–4 mm long). Stem is brown in color having agreeable smell and

smooth texture with irregular flakes and used as anti-inflammatory agent specifically for eyes.

Fruits are one seeded samara, light brown, obliquely elliptic and 2.5–3.5 cm long and 1.5–2.5 cm wide. [2]

SCIENTIFIC CLASSIFICATION:

Kingdom: Plantae
 Division: Magnoliophyta
 Class: Magnoliopsida
 Order: Urticales
 Family: Ulmaceae
 Genus: *Holoptelea*
 Species: *Integrifolia*
 Binomical name: *Holoptelea integrifolia* Planch

PARTS USED – Leaves, Bark

Traditional Uses -- plant of *Holoptelea integrifolia* used for treatment and prevention of Cancer of bladder, Viral, Acid gastritis, Intestinal Worms, topical ulcers, fever, Vomiting, Wounds healing and so on as discussed above. Leaves and bark of this plant are used as bitter, astringent, analgesic, antioxidant, antifungal, anti-inflammatory, CNS depressant, antitumor. [2]

Figure: *Holoptelea integrifolia* leaves.



MATERIAL AND METHODS

PLANT MATERIALS :

The Leaves and bark of *Holoptelea integrifolia* were collected from Rohad village Jajjhar district, Haryana and were shade dried, powdered and extracted in Soxhlet apparatus successively with methanolic and petroleum ether respectively due to their nature of polarity. After extraction, the methanolic and petroleum ether extracts

were filtered through Whatman No 1 filter paper and stored for further use.

PHYTOCHEMICAL SCREENINGS

The leaves and bark extract of *Holoptelea integrifolia* were analysed for the presence and absence of alkaloids, steroids, tannins, phenols, proteins according to standard methods and Preliminary phytochemical screening of *Holoptelea integrifolia* is shown in Table 2.[3]

Alkaloids:

0.5 to 0.6 g of the methanolic and petroleum ether extract was mixed in 8 ml of 1% HCl, warmed and filtered. 2 ml of the filtrate were treated separately with the reagent after which it was observed that the alkaloids absent in both part of plant in petroleum ether extract but present in methanolic extract. [3]

Steroids:

0.5 g of the methanolic and petroleum ether extract fraction of plant was mixed with 2 ml of acetic anhydride followed by 2 ml of sulphuric acid. The colour changed from violet to blue or green and indicated the presence of steroids in both parts of plant of both extract. [3]

Tannins:

0.25 g of the methanolic and petroleum ether extract was dissolved in 10 ml distilled water and filtered. 1% aqueous Iron chloride ($FeCl_3$) solution was added to the filtrate. The appearance of intense green, purple, blue or black colour indicated the presence of tannins in both part of plant in petroleum ether extract while in methanolic extract tannins absent in leaves and present in bark of plant. [3]

Phenols:

1ml of the methanolic and petroleum ether extracts, 2ml of distilled water followed by a few drops of 10% aqueous ferric chloride solution were added. Formation of blue or green colour indicated the absence of phenols in both part of plant in petroleum ether extract while in methanolic extract phenols absent in leaves and present in bark of plant. [3]

Proteins: One ml each of the methanolic and the petroleum ether extracts was treated separately with few drops of conc. HNO_3 and NH_3 solution. Formation of reddish orange precipitate indicates the presence of proteins in both part of plant. [3]

Table 2: Preliminary phytochemical screening of *Holoptelea integrifolia*

Solvent	Part used	Alkaloids	steroids	Tannins	Phenol	Protein
Petroleum ether	Leaves	Negative	Positive	Positive	Negative	Positive
	Stem bark	Negative	Positive	Positive	Negative	Positive
Methanolic	Leaves	Positive	Positive	Negative	Negative	Positive
	Stem bark	Positive	Positive	Positive	Positive	Positive

Pharmacological Activities

Many researches have founded that there are Anti – inflammatory, antibacterial, antihelmintic, antidiabetic, antitumor and antioxidant activities are present in various plant part of *H.integrifolia*. This plant known to posses various medicinal value from ancient times also. Pharmacological activities of petroleum ether and methanolic extract of *H. integrifolia* shown in table 3.

Antibacterial and antitubercular activity of *H.integrifolia* were demonstrated and founded against Gram positive and Gram negative bacterial stains and in tuberculosis H_37RV stain. [4]

When on aqueous extract of leaves of *H. integrifolia*, antibacterial activity was checked using different solvents like hexane, diethyl ether, acetone, petroleum ether, then with mentholic as a solvent the leaves and bark shows the presense of antibacterial activity. [5]

H.integrifolia also showed antibacterial activity in leaves extract using chloroform as a solvent on various microorganisms and was founded greatest activity against citrobacter freundii. [6]

Antioxidant activity in *H.integrifolia* has been evaluated by DPPH free radical scavenging activity using HPLC method. [7, 12]

The activity is also present in the plant's stem bark which was identified by using α -tocopherol as standard antioxidant. [8]

Antidiabetic activity of plant with different extracts and solvents have been carried out on different parts of plants, in which *H.integrifolia* leaves were extracted with ethanol, chloroform and showed the presence of anti-diabetic activity. [9]

Similarly extraction of leaves were done using methanol and petroleum ether and compared with standard drug for diabetes i.e glibenclamide, which showed significant results. [10]

Antineoplastic activity (anticancer) of *H.integrifolia* was observed using butanol, hexane, chloroform, in which extraction of bark was done and the effect was studied on small cancer cells which showed significant results. [11]

Table 3: Pharmacological activities of petroleum ether and methanolic extract of *H.integrifolia*

Activity	Plant part	Extract
Antibacterial	Stem bark	Pet.ether, chloroform, benzene, methanolic
Antidiabetic	Leaves	Pet.ether, methanolic
Antifungal	Leaves	Methanolic, hexane, ethyl acetate
Antioxidant	Leaves	Methanolic
Anticancer	Bark	Pet.ether, ethanolic

CONCLUSION

In the present review, the phytochemical screening showed the presence of antibacterial activities with methanolic and petroleum ether extract of leaves and bark of *H.integrifolia*.

Holoptelea integrifolia was identified to contain Alkaloids, Steroids, Tannins, Phenol, Protein.

Leaves and bark were identified to possess antibacterial, antidiabetic, antioxidant, anti tumor activities used to treat various diseases. Many biological activities of plant are yet undiscovered and it may be further investigated with researches for treatment of various ailments.

References:

- The Wealth of India, 1959. Council of Scientific and Industrial Research, New Delhi, pp: 109-110.
- Ganie S.A, Yadav S S, "Holoptelea integrifolia (Roxb.) Planch: A Review of Its Ethnobotany, Pharmacology, and Phytochemistry, Biomed Research International, Vol 2014.
- Kumar R. Suman et al, "Phytochemical Screening of some compounds from plant leaf extracts of *Holoptelea integrifolia* (Planch.) and *Celestrus emarginata* (Grah.) used by Gondu tribes at Adilabad District, Andhrapradesh, India. www.ijesi.org Volume 2 Issue 8 | August 2013 | PP:65-70.
- S. D. Joshi, C. S. Hallikeri, and V. H. Kulkarni, "Evaluation of antibacterial and antitubercular activities of *Holoptelea integrifolia* (Roxb) Planch bark," Universal Journal of Pharmacy, vol. 02, pp.87–90, 2013.
- N. V. Vinod, M. Haridas, and C. Sadasivan, "Isolation of 1,4 naphthalenedione, an antibacterial principle from the leaves of *Holoptelea integrifolia* and its activity against β -lactam resistant *Staphylococcus aureus*," Indian Journal of Biochemistry and Biophysics, vol.47, no.1, pp.53–55, 2010.
- S.Ahmad, R.Sharma, S.Mahajan, R.Agnihotri, and A.Gupta, "Antibacterial evaluation and preliminary phytochemical analysis of the leaf extract of *Holoptelea integrifolia*," Journal of Pharmacy Research, vol. 5, pp.3823–3825, 2012.
- Srinivas Reddy B, Kiran Kumar Reddy R, Naidu VG, Madhusudhana K, Agwane SB, et al. (2008) Evaluation of antimicrobial, antioxidant and woundhealing potentials of *Holoptelea integrifolia*. J Ethnopharmacol 115: 249-256
- A.Saraswathy, D.S.Nandini, and D.Ramasamy, "Antioxidant, heavy metals and elemental analysis of *Holoptelea integrifolia* Planch.," Indian Journal of Pharmaceutical Sciences, vol. 70, no. 5, pp.683–686, 2008.
- M. K. Mamatha, Phytochemical investigation and antidiabetic activity of *Holoptelea integrifolia* Planch [M.S. thesis], KLE University, Karnataka, India, 2009.
- Sharma S, Khatri P, Pandey A, Jakhetia A, Chaturvedi L, et al. (2010) Anti-diabetic screening leaves extract of *Holoptelea integrifolia*. Int. J. Pharm. Res. Dev 2: 66-71
- H.Guo, D.S.Wang, G.H.Rizwanietal., "Antineoplastic activity of *Holoptelea integrifolia* (Roxb.) Planch bark extracts (in vitro)," Pakistan Journal of Pharmaceutical Sciences, vol. 26, pp. 1151–1156, 2013.
- Khalid Shaikat et al, Natural Products Chemistry & Research, "Medicinal importance of *Holoptelea Integrifolia* (Roxb).Planch-Its Biological and Pharmacological activities" 2013.