ISSN No:-2456-2165

Structured Review in Perspective of Holoptelea *Integrifolia* (Roxb.) Plant

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Abstract:- Natural herbs have grown as a source of bioactive compounds and possessan obtaining novel therapeutic agent. Medicinal herbs and plants which are found to renowned medicinal significance and their use inour daily life. Different researches areas are going to travel the useful, pharmacological and medicinal properties of herbal medicines. Systematic and detailed pharmacognostical studies have been performed on an important medicinal plant, *Holoptelea integrifolia*. Various parts of *Holoptelea integrifolia*, a waysideherbal, are specified and other traditional systems for the usage of inflammation, acid gastritis, Dyspepsia, Flatulence, Colic, Intestinal Worms, Vomiting, Wounds, Vitiligo, Leprosy, Filariasis, Diabetes, Hemorrhoids, Dysmenorrhea and Rheumatism. Biological actions have been reported by many hands. These all activities are subjected to further obtaining a good pharmaceutical applicant for preclinical and clinical trials. This review presents a detailed survey of the literature on pharmacognostical and various medicinal properties of *Holoptelea integrifolia*.

Keywords:- *Holoptelea integrifolia, Pharmacological activity, Phytochemistry, Traditional uses.*

I. INTRODUCTION

Holoptelea integriolia shortname is Holoh-tee-lee-uh from greekholos (whole) and ptelea (elm).It is also known as Indian elm. *Holoptelea integrifolia* is medium sized large glabrous and deciduous tree about 18-25m in height. It is mainly known as roadside tree and belong to Ulmaceae family, which have wide spectrum of biological activities. Natural herbs are used because they are safer to use than synthetic products. Until today, some research has been done on *Holopteleaintegrifolia*. The family Ulmaceae have 15 genera and include 200 species and distributed over tropical and temperate region of northern hemisphere [1,2] and Asia tropical regions like India, Nepal, Indo China, aos, Myanmar, Vietnam, Sri Lanka, China [3]. Various extracts of different part of plant areused in treatmentmany diseases like bronchitis and obesity [4].Leaves and bark of plantis used in treatment of various diseases like piles, leprosy, tuberculosis, intestinal worms, tuberculosis, diabetes, diarrhoeia, antiemetic, anthelmintic, wound healing, haemorrhoids, dysmenorrhoea, rheumatism, polyuria, fistula, vitiligo, helminthiasis, flatulence, and skin diseases. The phytochemical screening of the extracts also discloses the appearance of saponins.

Plant-derived drugs has been used as medicines for treating various infection for decades. Today we are stilldependent on “Ayurveda” for about 75% of our drug. The increasing prevalence of more-drug resistant strains of the bacteria and the recent appearance Flu, Bird, HIV II and new strains with low capable to antibiotics increase the presence of the impossible bacterial infections and add urgency to the search for new infection-fighting strategies. Herbal medicines have recently drawn much observation as adifferent source of useful medicines for treating or preventing various diseases. *Holoptelea integrifolia* is a roadside herb having a wide range of biological activities. This medicinal plant is enriched with a variety of phytochemicals, which are widely applicable in curing diverse ailment in human and animals. The plant species originated from Pacific Island [5]. It is deal with mild and steamy areas of northern hemispheres. It is a large deciduous tree with a height up to 30-35m. Leaves are alternative, elliptic-ovate, 5-13 cm long, acuminate, entire, sub-coriaceous pinnately veined. Flowers are greenish-yellow, usually male or hermaphrodite, monochlamydeous or rarely polygamous and flowering usually takes place in the month of January to February. The medicinal plant with membranous wings and one small kidney shaped seed, usually seen during the month of April to May [6].

ISSN No:-2456-2165

Fig. 1: Kingdom-Plantae

Kingdom-Plantae
Family-Ulmaceae
Order-Urticales
Genus-Holoptelea
Species-Integrifolia

II. ETHNOMEDICINAL USES

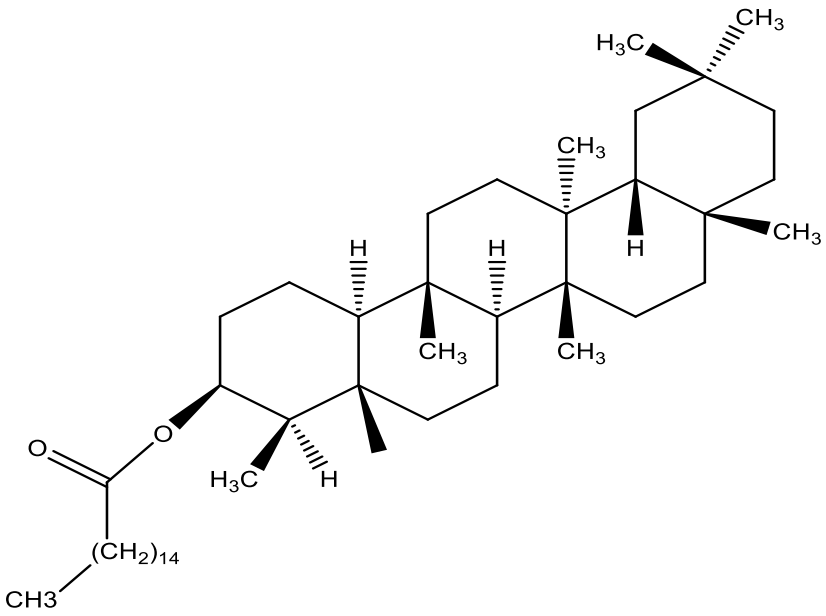
The plant *Holoptelea integrifolia* is traditionally designed for the treatment of irritation, gastritis, acid stomach, colic, intestinal worms, nausea, wound healing, leprosy, diabetes, hemorrhoids, dysmenorrhea, and rheumatism [11]. Bark and leaves are used as unpleasant, astringent, thermogenic, anti-inflammatory, digestive, carminative, laxative, anthelmintic, depurative, repulsive, and urinary astringent [12]. The leaves and stem bark of *H. integrifolia* are usedfor the treatment of several ailments. The mucilaginous bark isuseful forthe rheumatic inflammations [13]. Paste of the twig bark is outside applied to treat the redness of lymph glands, ringworm, and scabies. Decoction of the leaves is used to regulate fat metabolism, treat ringworm, eczema, and cutaneous diseases [14]. Stem bark acts as an anti-inflammatory agent specifically for eyes. Stem bark paste is externally applied on forehead of the patient suffering from common fever [15]. Bark and leaf paste of the plant is applied externally on the white patches or leukoderma. Bark boiled in coconut oil and mixed with garlic is applied externally to eczema [16]. Bark is cut in the shape of a coin and tied on left arm below the shoulder for treatment of malaria [17]. It is also used for the treatment of intestinal cancer [18]. Leaf bud mixed with lime juice is applied externally to affected area for treatment of hair loss by infection [19]. Bark grounded with lemon juice and made into paste is used for weakness [20]. Seeds are used in ringworm and dried fruit in polyurea and urinary disorders [21].

- Skin disease, Inflammation
- Headache
- Ringwarm
- Malaria
- Polyurea and other urinary disorder

III. PHYTOCHEMISTRY

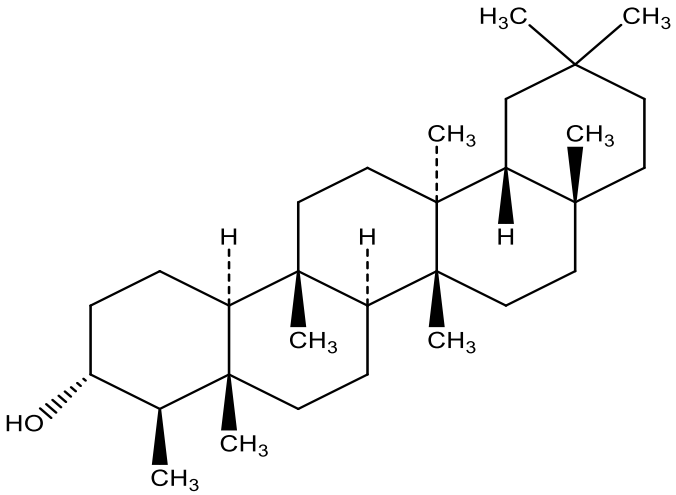
Holoptelea integrifolia, the all-around medicinal plant, is the unique source of different types of compoundshaving multiple chemical structure. The plant species are carrying high range of phytochemicals such as terpenoids, sterols, saponins, tannins, proteins, carbohydrates, and alkaloids [22,23]. In addition, H. *integrifolia* also contains flavonoids, phenols, cardiac glycosides, coumarins, and quinines [24]. The qualitative phytochemical screening of H. integrifolia is presented. Many compounds have been isolated from the plant and proved to be biological active. Holoptelin-A, Holoptelin-B, friedlin,epifriedlin, 2-aminonaphthoquinone, β-sitosterol, β-D-glucose, β-amyrin,stigmasterol, and hederagenin have been isolated from heart wood and bark while hexacosanol, octacosanol, β-sitosterol, and α-amyrin have been isolated from leaves [25]. Sadasivan et al. [26] isolated an antibacterial compound 1, 4-naphthalenedione from diethyl ether leaf extract of H. integrifolia. Recently, Ahmad et al. [27] isolated two medicinal pentacyclic triterpenoids, betulinic acid (3β-Hydroxy- lup-20(29)-en-28-oic acid), and betulin (Lup-20(29)-ene-3β, 28-diol) from methanolic bark extract. These isolated combinations were associate as betulinic acid and botulin, respectively, on the basis of complete spectroscopic examination and their comparisons with the data reported in the chemical literature for these components. Betulinic acid has valuable biological potential, such as inhibitors of HIV-1 entry, HIV protease, or of reverse transcriptase (RT), whereas botulin had significant anticancer effect on adenocarcinoma, cervix carcinoma, hepatoma, and breast cancer.

ISSN No:-2456-2165



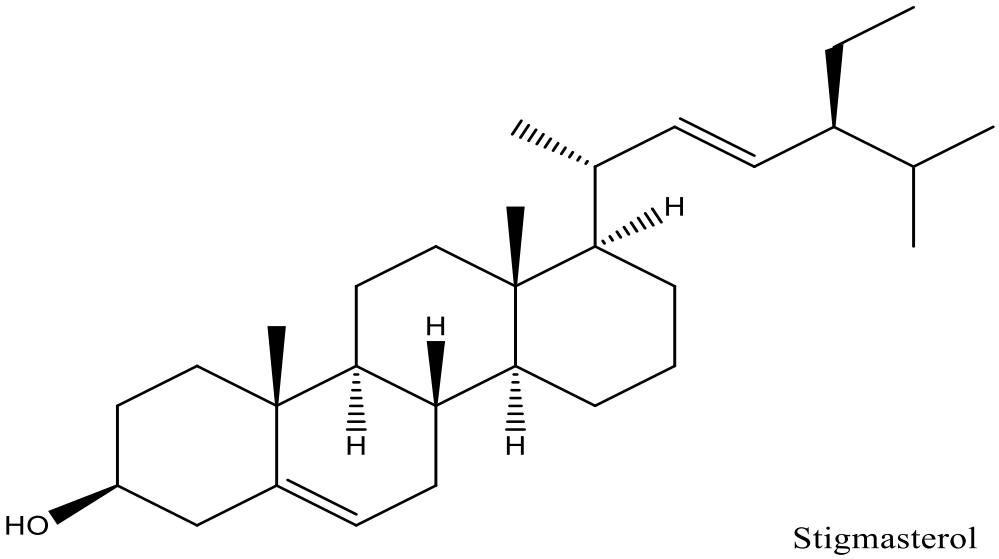
Holoptelin-A

Fig. 2: Holoptelin-A



Holoptelin-B

Fig. 3: Holoptelin-B



Stigmasterol

Fig. 4: Stigmasterol

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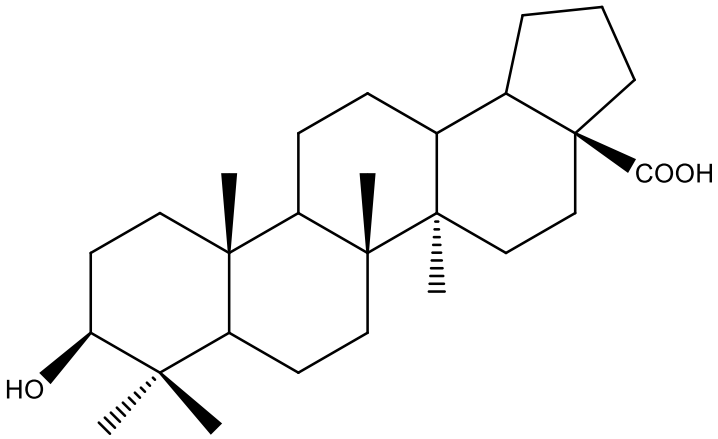
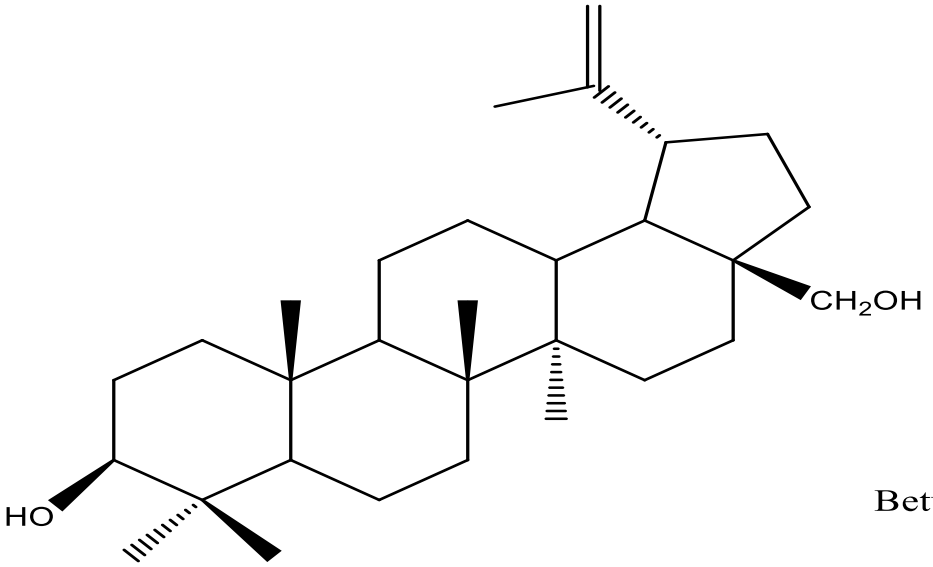


Betulinic acid

Fig. 5: Betulinic acid



Betulin

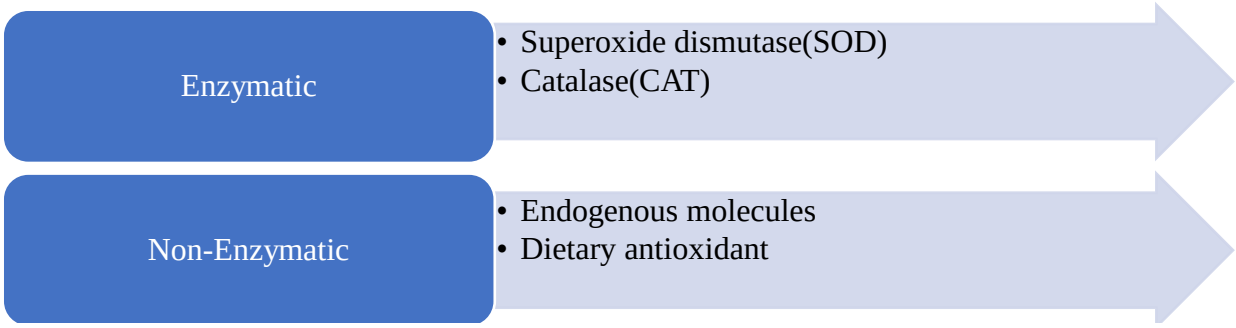
Fig. 6: Betulin

IV. PHARMACOLOGY

- **Anti-inflammatory activity:** The ethanolic extract of leaves of *H. integrifolia*had showna significant percentage inhibition of paw edema as compared to standard drug, Indomethacin (10 mg/kg per oral). The ethanolic extracts were given in doses of 250 and 500 mg/kg per oral which were comparable with reference drug [28]. In the same manner, the aqueous extract of leaves at dose of 250 and 500 mg/ kg per oral was given to observe percent inhibition of paw edema which were comparable with Indomethacin (10mg/ kg per oral) used as a reference drug. The extract had shown a significant dose dependent on inhibition of edema formation [29]. It suggests that the usefulness of leaves tree in acute and chronic inflammatory conditions.
- **Anthelmintic activity:** The methanolic and dissolvable extracts of stem bark of H. integrifolia, were found to possess significant anthelmintic activity in comparison to the standard drug (Piperazine Citrate) against adult earth worm Pheretima posthuma. The methanol extract at various concentrations showed shortest time of sparalysis and death [30]. In the same manner various applications (10, 25, 50 and 100 mg/ml) of ethanolic and dissolve extract of bark were tested against worms (Eisenia foetida), compared to standard Piperazine Citrate (10 mg/ml). The extractswere not only demonstrated paralysis, but also caused death of worms especially at higher concentrations [31]. The result showed that constituents of bark could be a potent anthelmintic agent for next generation.
- **Antitumor Activity:** The antitumour effect of EHI against DAL is Swiss albino mice. A significant ($P<0.05$) percentage increase in the life span and non-viable cell count in peritoneal exudates ($P<0.05$) was observed due to EHI treatment. To evaluate whether EHI treatment indirectly inhibited tumour cell growth, the effect of EHI treatment was examined on the viable and non-viable cell counts against tumour bearing mice [32].
- **Adaptogenic Activity:** Ethanolic extract of *Holoptelea integrifolia* showed adaptogenic activity and this activity was closer to the activity of 100mg/kg of *Withaniasomnifera.* The adaptogenic activity was dose dependent in ethanolic extract of *Holoptelea integrifolia.* These effects may be due to the presence of tannins, saponins, alkaloids, phenolics, flavonoids in the extract of bark of *Holoptelea integrifolia* as flavonoids,tannins andphenolics are mainly responsible for adaptogenic activity [33].

ISSN No:-2456-2165

- **Antidiarrhoeal activity:**The ethanolic extract of leaves of *H. integrifolia* was studied for its antidiarrhoeal properties in experimental diarrhoea, induced by Castor oil and Magnesium sulphate in mice. At the doses of 250 and 500 mg/kg per oral, the ethanolic extract showed significant and dose-dependent antidiarrhoeal activity. The extractswere also significantly reduced the intestinal transit in charcoal meal test when compared to Atropine sulphate (5 mg/kg). The results showed that the ethanolic extract of leaves of Indian Elm have a significant antidiarrhoeal activity and supports its traditional uses in herbal medicine [34].
- **Antioxidant activity** Ethanolic crude extract of stem bark of *H. integrifolia* traditionally used in Indian system of medicine was screened for its antioxidant activity using tocopherol as standard antioxidant. The free radical scavenging potential of the extract was evaluated by two different antioxidant methods; ferric thiocyanate method and thiobarbituric acid method. The ethanol extract was found to exhibit good antioxidant property, which is comparable to standard vitamin E, at a specific concentration [35,36]. Antioxidants can be defined as the substances which counteract free radicals and prevent the damage caused by them. They are capable of stabilizing, deactivating, or scavenging free radicals before they attack cells.



- **Wound-Healing Activity:** The methanolic extracts of *Holoptelea integrifolia* (Roxb.) leaves and stem bark were studied for the wound healing potential. Both extracts have anti-oxidant activity. Hence, the external use of these extracts on the wound prevented the microbes to invade through the wound, resulting protection of wound against the infections of the many microorganisms. At the sametime, external use of the extract wasentrapped the free radicals liberated from the wound surrounding cells, which are having in weren't machinery to protect the cells from the microbes. Hence, the combined effect of both antimicrobial and antioxidant activity accelerated the wound-healing process [37].
- **Antidiabetic Activity:** Methanol, Petroleum ether extract of leaves of *Holoptelea integrifolia* (Roxb.) was screened for Antidiabetic activity. Antidiabetic was changed with standard drug with Glipalamides for Alloxan producemethod. The methanol and petroleum ether extract showed significant antidiabetic activity [38].
- **CNS Depressant Activity:**The CNS (central nervous system) depressant activity of the methanolic leaf extract of *Holoptelea integrifolia* inSwiss albino mice. A daily dose of 250mg/kg of extract was administered to the animals for 15 days, after which several CNS experiments such as exploratory control and muscle relaxant were recorded and comparedwith the control animals. The findings revealed that the test extract caused significant reduction in exploratory behavioral pattern in head dip test and reduction in muscle relaxant activity in Rota rod and traction tests. These findings confirmed the CNS depressant activity in tested animal models.[39]
- **Mosquito Larvicidal Activity:** The first study related to larvicidal activity of *Holoptelea integrifolia* was reported by Singha et al. [40]. The effect of acetone extract from *H. integrifolia* leaves was assess on larval mortality of Culex vishnui after 24, 48, and 72 h of exposure with five concentrations of crude extract (0.1, 0.2, 0.3, 0.4, and 0.5%). The study showed that the mortality rate of all larval instars at 0.5% concentration was significantly higher ($P< 0.05$) than at 0.1, 0.2, 0.3, and 0.4% concentrations. Highest mortality was observed at 400 ppm concentration of acetone extract. Higher mortality rate was also recorded in 72 h bioassay than those in 24 and 48 h. The results of regression analysis revealed that the mortality rate (Y) was positively match up with the period of exposure (X). The log profit analysis (95% confidence level) revealed that LC50 values gradually reduced with the exposure period.
- **Antiemetic Activity:**An antiemetic is a drug that is effective against vomiting and nausea. Effect of ethanolic extract of leaves of *H. integrifolia* on cisplatin cause nausea using a rat model was investigated for antiemetic activity by Shrinivas et al. [41]. Cisplatin at 3mg/kg dosewas selected for testing the antinausea activity of extract. Cisplatin-induced pica reduced significantly when animals were preprocessingwith *H. integrifolia* extract at doses of 250 and 500mg/kg.
- **Analgesic activity:**An analgesic or (painkiller) refers to any drug used to relieve pain. Ethanol extract of *H. integrifolia* leaf at a dose of 500 mg/kg per oral exhibits significant ($P<0.05$) analgesic activity while ethyl acetate extract showed moderate activity. Aqueous and n-butanol extract of the plant showed mild analgesic effects. The highest effect was observed at 150 min, after consuming the drug [42].

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V. CONCLUSION

The medicinal plants find wide applications in pharmaceutical, cosmetic, agricultural and food industry. The use of the medicinal herbs for curing disease has been documented in the history of all civilizations. With the onset of reviewed in medicine and pharmacy, it was observed that plants contain active principles which are responsible for the therapeutic action of the herbs. Among the various medicinal plants, Holoptelea integrifolia possesses many medicinal properties such as anti-inflammatory, anthelmintics, antibacterial, anti-diarrheal, antitumor, adaptogenic, antidiabetic and antioxidant activities and wound healing potentials. Various parts of Holoptelea integrifolia, a roadside plant, are indicated in various traditional systems for the treatment of inflammations, acid gastritis, dyspepsia, flatulence, colic, intestinal worms, vomiting, wounds, vitiligo, leprosy, filariasis, diabetes, haemorrhoids, dysmenorrhoea and rheumatism..

VI. DISCUSSION

The herbal plants find wide applications in pharmaceutical, cosmetic, agricultural and food industry.Among the various medicinal plants, Holoptelea integrifolia possesses many medicinal properties such as anti-inflammatory, anthelmintics, antibacterial, anti-diarrheal, antitumor, adaptogenic, antidiabetic and antioxidant activities and wound healing potentials. Various parts of Holoptelea integrifolia, a roadside plant, are indicated in various traditional systems for the treatment of inflammations, acid gastritis, dyspepsia, flatulence, colic, intestinal worms, vomiting, wounds, vitiligo, leprosy, filariasis, diabetes, haemorrhoids, dysmenorrhoea and rheumatism.

These all activities are subjected to further obtaining a good pharmaceutical applicant for preclinical and clinical trials. This review presents a detailed survey of the literature on pharmacognostical and various medicinal properties of *Holoptelea integrifolia*.

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