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Analytical and Medicinal properties of leaves of *Holoptelea Integrifolia*

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Abstract

The ethanolic extract of leaves of *Holoptelea integrifolia* traditionally used in Indian system of medicine and exhibit wide range of biological activity. Plant extract have evolved as a source of bioactive compounds and possess a potential for developing novel therapeutic agents. All these biological activity are subjected to further studies aimed to develop promising bioactive compound for preclinical and clinical trials. According to ethno-medical studies leaves and stem bark of this plant have been reported for antiviral, antioxidant, antimicrobial, abortifacient activity and used in management of cancer. The aim of the present study was to evaluate the analytical and medicinal property of the leaves extract of *Holoptelea integrifolia*.

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INTRODUCTION:

Herbal medicines have recently attracted much attention as alternative medicines useful for treating or preventing life style related disorders and relatively very little knowledge is available about their mode of action. There has been a growing interest in the analysis of plant products which has stimulated intense research on their potential health benefits. *Holoptelea integrifolia* is well known roadside tree having a wide range of spectrum of biological activities[1]. *Holoptelea integrifolia* is also known as Indian elm and ulmus integrifolia which belong to Ulmaceae family. The Ulmaceae family

consist of 15genera and 200 species are distributed over tropical and temperate regions of northern hemisphere[2]. Mainly distributed in India, Nepal, Sri Lanka, .Indo-china, Cambodia, Laos, Myanmar, Vietnam, Burma and China[3]. *Holoptelea integrifolia* is also known as chirivilva, pootikaranja, udakirya, hasthivaruni (Sanskrit); papri, chilbil, kanju, cilbil, banchilla, bawal, poothigam, begana (Hindi); Indian elm, jungle cork tree, Indian beech tree, monkey biscuit tree (English); Aavil, njettaval, aval (Malayalam); Aya, ayil, kanci, vellaya, avil, pattai (Tamil)[5]; rajain, khlen, arjan (Punjabi); Nata karanja (Bengali) Ainasadada, vavala, vavil, papra, bawal (Marathi); Charal, charel, kanjo, waola, chirbil, chirmil, (Gujrathi); Sano pangro (Nepali); Iya (Siddha); Vamvlo (Konkani)[6,5].Various part of plant is reported for various activities. Traditionally, bark-stem and leaves are used as Astringent, bitter, anthelmintic, and in treatment of tuberculosis, dysmenorrhoea, piles ,leprosy, diabetes, hemorrhoids fistula, flatulence, vitiligo and in skin diseases.

Holoptelea integrifolia, the versatile medicinal plant is the unique source of various types of compounds having diverse chemical structure a very little work has been done on the biological activity and plausible medicinal application of these compounds and hence extensive investigation is needed to exploit their therapeutic utilities to combat diseases.

Pharmacognostic studies:

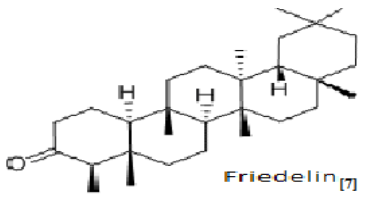
- **Morphological studies:**

Holoptelea integrifolia is the large spreading glaborous deciduous tree about 15-25 meters in height distributed throughout the greater part of India upto an altitude of 600 m. Its Bark: is whitish yellowish grey, and exfoliates with regular intervals and offensive smell when cut. Leaves: are simple alternates, elliptic, usually distichous , acuminate and the base is rounded or cordite. Leaf: margin is entire glabrous and leaf blade is pinnately veined with 3 to 7 veins on each sides[5]. Flower : are greenish yellow, usually male or hermaphrodite, monochlamydeoous or rarely polygamous and flowering usually takes place in Jan to Feb. Fruits : are sub orbicular samara with membranous wings and usually seen in month of April and may .The shape of fruit is 2 cm in diameter and 0.6 to 1 inch broad and notched at the top[22].

Active chemical constituents:

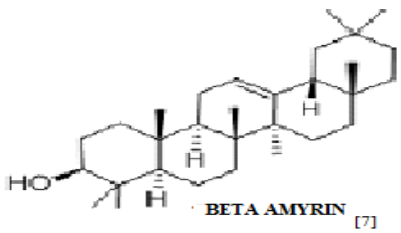
Phytochemical investigation shows the presence of chemical constituent such as terpenoids, alkaloids, glycoside, carbohydrates, steroids, sterols, saponins, tannins, protein, and flavonoids[6]. The isolated principle are Beta amyrin, Beta sitosterols, octacosanol, holopettelin-A, holopetelin-B, hederagenin, hexacosanol, Beta-D-glucose,fridelin, epifriedelin, 2-amino napthaqiunone, 1,4-napthalenedione are considered as responsible for various activity[7]. The traditional uses, reported biological/pharmacological activity, isolated compounds and therapeutic application of holoptelea integifolia which might be useful for scientific and researchers to find out new entities responsible for therapeutic activity.

Hexacosanol [38]

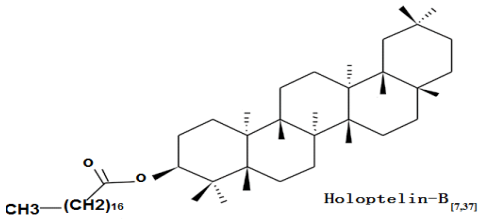


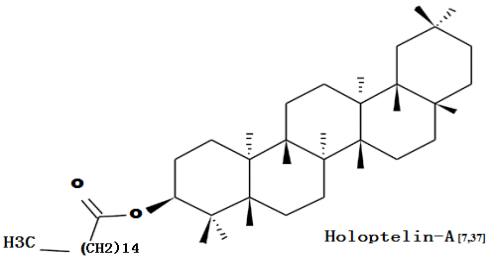
Friedelin [7]

OCTACOSANOL



BETA AMYRIN [7]





Medicinal uses of *Holoptelea Integrifolia* in traditional ayurvedic system:

The bark and leaves are used as bitter, astrigents, anthelmintic, and used in treatment of diabetes, skin disease, intestinal disorder, leprosy, rheumatism and wound healing in the form of paste[26] .It is an important pollen allergens plant of India. Plant is useful in treatment of obesity, edema, and bronchitis. Mucilage and juice obtained from boiled bark has been reported to be useful in rheumatism intestinal tumour when applied externally. Paste of stem bark is applied externally to treat inflammation of lymph gland and common fever, scabies and ring worm. Whereas paste of bark and leaf is applied externally for treatment of leucoderma[6,16].

Materials and methods:

Plant collection and authentication

The leaves of *Holoptelea Integrifolia* was collected from Jhansi (U.P), and Identified and authenticated by National vrkshayurveda research institute Jhansi. The accession no. is NVRI/05551/2011. The leaves was dried in shade, and finally grounded in powdered form in and electronic grinder and stored in cellophane bags at 4°C until use.

Preparation of Extract:

The air dried and coarsely powdered leaves (350 g) were first extracted with 1ltr petroleum ether about 40-80°C to remove all fatty acids and again it is extracted with ethanol (95%) in a soxhlet apparatus for 70 hr .The extract were concentrated to dryness under reduced pressure and controlled temperature (30-50°C).The yield value of both the leaves extract is recorded.

Analytical study of leaves extract:

Phytochemical evaluation of ethanolic extract:

Table 1: Phytochemical screening of ethanolic extract of leaves of *Holoptelea integrifolia*. (Roxb)

S. NO	TEST	RESULT	REFERENCE
1.	ALKALOIDS: a. MAYERS TEST: b. WAGNERS TEST: c. DRAGENDROFFS TEST: d .HAGERS TEST	 +ive +ive +ive +ive	16
2.	GLYCOSIDES: a .MODIFIED BORNTRAGER'S TEST: b. LEGAL'S TEST :	 +ive +ive	16
3.	CABOHYDRATES: a. MOLISCH'S TEST: b. BENEDICT'S TEST: c. FEHLING'S TEST	 +ive +ive +ive	16
4.	SAPONINS: a. FROTH TEST : b. FOAM TEST	 +ive +ive	16
5.	PHYTOSTEROLS: a. SALKOWSKI'S TEST: b. LIBERMANN BURCHARD'S TEST	 +ive +ive	16
6.	TANNINS: a. GELATIN TEST:	 +ive	16
7.	FLAVONOIDS: a.ALKALINE REAGENT TEST: b. LEAD ACETATE TEST	 +ive +ive	16
8.	PROTEIN AND AMINO ACID TEST: a. XANTHOPROTEIN TEST: b. NINHYDRIN TEST:	 +ive +ive	16
9.	DITERPENES TEST: 1) COPPER ACETATE TEST	 +ive	16

Chromatographical studies: TLC

The Ethanolic extract of powdered leaves of *Holopetlea integrifolia* was subjected to thin layer chromatography studies, to find the presence of number of compound. When a substance or a mixture of compounds is spotted in dissolved form to the thin layer plate during the separation process & developed in a suitable solvent system, the

compound that have a higher affinity for the stationary phase (Sorbent), adsorbed on the sorbent, and so move slowly up the plate as the solvent font migrates. Those compound that have a less affinity for the stationary phase (Sorbent), adsorbed less on the sorbent.

TLC plate showing the 6 spots with different colour with different R_f value, 0.5% vanillin in dil. H_2SO_4 in solvent system (Toluene:Ethylacetate:formic acid) in 9:1:1.

- **Adsorbent-**Activated Silica gelG
- **Detecting Agent-** 0.5%vanillin in dil.H2SO4**.**
- **Solvent system-** Toluene: Ethylacetate: formic acid (9:1:1).

HPTLC

HPTLC finger print profile of leave extract of *Holoptelea integrifolia*.

Application –Linomat 5 Applicator (Camag)

Volume Applied – 10 ul

Solvent System – Toluene :Ethyl acetate : formic acid (9:1:1)

TLC plate development –Pre-saturated Camag Twin Trough Chamber

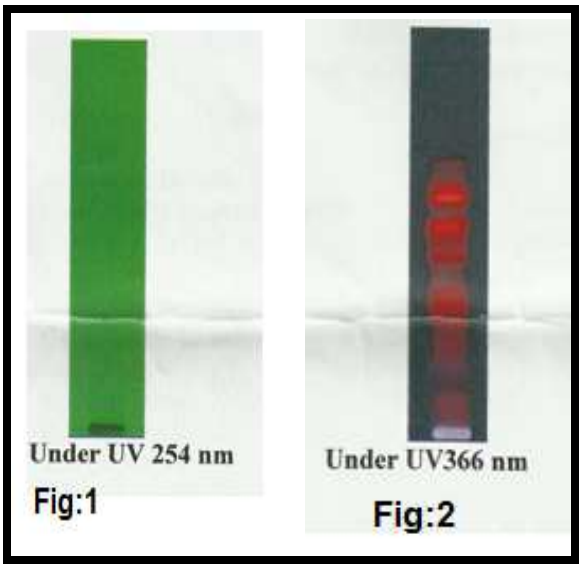
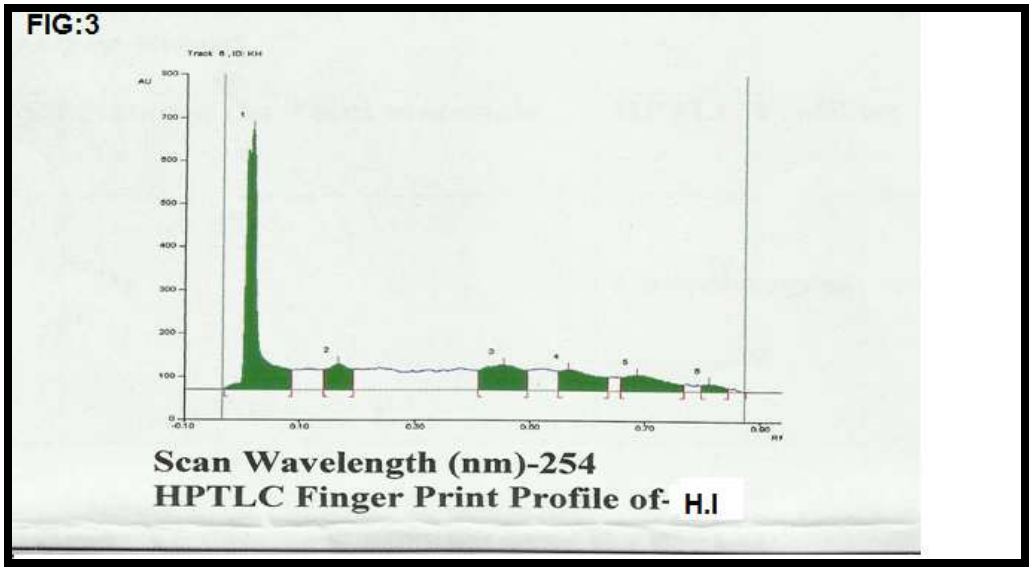


Table 2: HPTLC of etanolic extract of leaves *of Holopetlea integrifolia* (Roxb)

Peak	Start position	Start height	Max position	Max height	Max %	End position	End height	Area	Area %
1.	-0.04Rf	2.0AU	0.01Rf	606.4AU	72.97%	0.08Rf	46.3AU	11383.5AU	49.71%
2.	0.14Rf	47.8AU	0.16Rf	61.4AU	7.38%	0.19Rf	48.5AU	2153.6AU	9.40%
3.	0.41Rf	45.8AU	0.45Rf	58.6AU	7.06%	0.49Rf	47.1AU	3568.3AU	15.58%
4.	0.55 Rf	45.6AU	0.56Rf	49.6AU	5.97%	0.63Rf	31.8AU	2785.7AU	12.16%
5.	0.65Rf	32.5AU	0.68Rf	37.9AU	4.56%	0.76RF	15.4AU	2456.6AU	10.73%
6.	0.79 Rf	14.8AU	0.81Rf	17.2AU	2.07%	0.84Rf	8.1AU	552.1AU	2.41%



Medicinal properties of leaves Extract of *Holoptelea integrifolia*:

Ethnomedically, the leaves and stem bark of plant were used by tribals for skin diseases, obesity and in management of cancer. Whereas various extract, like methanolic, aqueous, petroleum ether, and ethanolic extract of leaves and bark of plant used as antiviral, antioxidant, antimicrobial, abortifacient, and in cancer. Traditionally leaves and bark used as bitter, astringent, anthelmintic, inflammation[7,8], acid gastritis, dyspepsia, colic, intestinal worms, vomiting, edema, piles, wound healing, leprosy, diabetes[17], haemorrhoids, dysmenorrhoea, diarrhoea, rheumatism, polyuria, helminthiasis, tuberculosis.

Table 3: Medicinal properties of various extract already reported are follows:

S. No.	EXRACT	PART USED	ACTIVITY	REFRENCES:
1.	Ethanolic	Leaf	Antiinflammatory	7, 8
2.	Ethanolic	Leaf	Antidiarrheal	9
3.	Ethanolic	Leaf	Antitumour	10, 11
4.	Ethanolic	Stem bark	Antioxidant	13, 14
5.	a) Methanolic	Leaf	Antidiabetic	17
	b)Petroleum ether	Leaf	Antidiabetic	17
6.	Chloroform	Stem bark	Antibacterial	14, 18
7.	Methanolic	Stem bark	Anthelmintic	15, 16

CONCLUTION: The phytochemical screening of extracts also revealed the presence of various chemical constituents responsible for various activities. Further studies should emphasize on isolations and characterization of active principle and medicinal importance of plant *Holoptelea integrifolia*.

REFRENCES:

(1) Anonymous : The useful plants of India, council of scientific and Industrial research, Newdelhi ,publication and information directorate, CSIR,1992:p.271,622

(2) Parrott JA. Healing plant of peninsular india (AB), New York, U.S.A.2001;18:719

(3) Bambhole VD and Jiddewar GG. Antiobesity effect of iris versicolor and holoptelea integrifolia in rats.sachitra Ayurveda 1985;37:557-561

(4) Rajbhandari M, Wegner U, julich M, Schopke T and Mentel R screening of Nepalese medicinal plants for antiviral activity journal of Ethanopharmacology2001;74:251-255

(5) Sharma S, khathri P, Samanta KC, Sharma A, Pandey A, Jakhetia V, Aggarwal P. phyto-pharmacognostic study of holoptelea integrifolia Roxb. *Journal of global pharma technology*2010;2(10); 53-61

(6) Mahmud S, Shareef H, Ahmad M, Gouhar S, Rizwani GH.Pharmacognostic studies on fresh mature leaves of Holoptelea Integrifolia (Roxb.) Planch. *Pakistan Journal of botany* 2010:42(6);3705-3708

(7) Sandhar HK, Kaur M, Tiwari P, Salhan M, Sharma P, Prasher S, kumar B. Chemistry and medicinal properties of Holoptelea integrifolia.*International journal of drug development and research* 2011;3(1);06-11

(8) Sharma S, Lakshmi K.S, Patidar A, Chaudhary A, Dhakar S, studies on anti- inflammatory effect of aqueous extract of leaves of Holoptelea integrifolia, planch in rats . *Indian Journal of Pharmacology* 2009;41 (2); 87-88.

(9) Sharma S, Lakshmi KS, and Rajesh T. Evaluation of Antidiarrhoeal potentials of ethanolic extracts of leaves of Holoptelea integrifolia in mice model . *International Journal of pharmaTec research* 2009;(3);832-836

(10) George SK, Rajesh R, S kumar S, Sulekha B, Balram P. polyherbal ayurvedic drug –indukantha ghritha as an adjuvant to cancer chemotherapy via immunomodulation .Immunobiology 2008;213;641-649

(11) Lakshmi KS, Shrinivas S, Rajesh T, and Chitra V. antitumor activity of ethanolic extract of leaves of holoptelea integrifolia on Dalton's ascetic lyumphoma in swiss albino mice.International journal of green pharmacy 2010;44-47.

(12) Puri S, Dednath J, Tiwari P, Salhan M, Kaur M, Mittan A. Camparative pharmacological evaluation of adaptogenic activity of Holoptelea integrifolia and withania somnifera.*International journal of drug development and research* 2011;3(1);84-98

(13) Saraswathy A, Devi SN, Ramasay D.Antioxidant ,heavy metals and elemental analysis of holoptelea integrifolia planch. *Indian journal of pharm science* 2008;70(5);676-683.

(14) Srinivas RB, Kiran KKR, Naidu VG, Madhusudhana K, Agwane SB, Ramkrishna S, Diwan PV. Evaluation of antimicrobial, antioxidant and wound healing potentials of holoptelea integrifolia. Journal of ethanpharmacology 2008; 115(2):249-56.

(15) Durga N, and paarakh PM.Evaluation of anthelmintic activity of stem bark of holoptelea integrifolia (roxb.) planch .International journal of research in Ayurveda and pharmacy 2010;1(2):637-641

(16) Kaur S,Kumar B, Puri S, Tiwari P, Divakar K. camparative study of anthelmintic activity of aqueaous and ethanolic extract of bark of holoptelea integrifolia.International journal of drug development and research 2010;2(4):758-763.

(17) Sharma S, Khatri P, Pandey A, Jakhetia V, Chaturvedi L, Diwedi N. Antidiabetic screening of leaves extract of Holoptelea integrifolia Roxb. International journal of pharma.Research and Development.2010;2(10):66-71

(18) Vinod NV, Shijina R, dileep KV, sadadsivan C. Inhibition of beta –lactamase by 1,4-naphthalenedione from the plant Holoptelea integrifolia.Applied Biochemistry 2010;160:1752-1759.

(19) Kumar D, Kumar K, Gupta J, Bishnoi N, Kumar S.A review on chemistryand Biology Of Holoptelea integrifolia.Asia pacific Journal of tropical Biomedicine2011;1-6

(20) Acharaya D.Monkey's favourite seasonal fruit: Holoptelea integrifolia. Americal chronicle.2008;1-5

(21) Khare CP,Encylopedia of India medicinal plants, springer,2004;p.251-252

(22) Prajapati,P, Patel,NM . pharmacognostic and phytochemical evaluation of leaves of *Holoptelea Integrifolia* . International journal of pharmaceutical science 2010;1:34-40

(23) Kirtikar , K.R, Basu, B.D; Indian medicinal plants. Bishen singh and Mahendrapal singh publisher,dehradun, India,1999.

(24) Bhutani,KK, Gohil, VM .Natural products drug discovery in India. Status and appraisal.Indian journal of experimental biology2010;48:199-207

(25) Pulliah T.Encyclopedia of world medicinal plants. Regency publication. 2006;3.p.1095-1097.

(26) Mudgal V and Pal DC. Medicinal plants used by tribal (Orissa) bulletin of Botany survindia1980;22:59-62

(27) Maheswari JK and singh H. Herbal remedies of Nainital district, U.P *Aryavaidyan* 1990;4:30-34

(28) Mulla WA, thorat VS, patil RV, Burade KB. Anthelmintic activity of leaves of Alocasia indica Linn. International journal of pharmaTech research 2010;2(1):26-30.

(29) Devi K, Indumathy S, Rathinambal V, Uma S, Kavimani S, Balu V. Anthelmintic Activity of Asta Churna. International journal of health Research 2009;2(1): 101-103.

(30) Warrier PK, Nambir VPK, Ramankutty .Indian Medicinal Plants-a compendium of 500 species, Vol.4. Chennai: Orient Longman pvt.ltd:2004

(31) Mudgal V and Pal DC . Medicinal Plants used by tribals (orrisa). Bulletin of Botany survindia 1980; 22:59-62.

(32) http://www.lookchem.com/cas-155/155566-37-3.html

(33) http://www.lookchem.com/cas-508/5085-72-3.html

(34) Elayaraja A, Vijayalakshmi M, Garikapati D. Anthelmintic screening of various crude extracts of phyllanthus simplex retz. Research journal of pharmaceutical,Boilogical and chemical sciences 2010;1(4):425-428.

(35) Graham JC, Quinn ML, Fabricant DC, Fransworth NR. Plants used against cancer –an extention of the work of jonathan Hartwell. J Enthnopharmacol 2000; 73:347-377.

(36) Fotsis T ,Pepper MS, Aktas E, Breit S, Rasku S, Adlercreutz H, *et al* .Flavonoids, dietary-derived inhibitors of cell proliferation and in vitro angiogenesis. Cancer Res 1997;57:2916-2921.

(37) HPTLC-Fingerprint atlas of Ayurvedic Single plant Drug mentioned in Ayurvedic Pharmacopeia vol-3 and 4.Central council for research in Ayurveda and Siddha.WHO,India

(38) Kalpana,Upadhyay,Anti inflammatory evaluation of ethanolic extract of leaves of Holoptelea Integrifolia, planch.annals of biological research 2010;185-195.

(39) http://webbook.nist.gov/cgi/cbook.cgi?ID=c506525 andmask=200.