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REVIEW OF LITERATURE: PHYTO PHARMACOLOGICAL STUDIES ON *THESPESIA POPULNEA.*

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ABSTRACT

Thespesia populnea Linn (Family-Malvaceae) is one of the important drugs used in herbal medicine. It is known by the name Paras-pipal. It is cultivated for ornament and shade and it blooms throughout the year in the tropics. Various parts of this plant are found to have useful medicinal properties such as antibacterial, antiinflammatory, antioxidant, purgative and hepatoprotective activities. The yellow juice of fruits is used in treating certain hepatic diseases. A decoction of the bark is given internally in the diseases of skin and that of fruits as an antidote for poisoning. The seed has purgative properties. The plant has also been effective in treating malaria. A wide range of biologically active compounds such as flavonoids, sesquiterpenoids, tannin, saponins, alkanes, essential oils, sugars, fatty acids and anti-oxidants are present in the plant. This article provides a comprehensive review of its ethano-medical uses, chemical constituents and pharmacological profile as medicinal plants.

INTRODUCTION:

Malvaceae, is a family of flowering plants estimated to contain 244 genera with 4225 known species. Well known members of this family include Okra, Cotton, Cacao and Durian. The largest genera in terms of number of species include *Hibiscus* (300 species), *Sterculia* (250 species), *Dombeya* (250 species), *Pavonia* (200 species) and *Sida* (200 species)

Taxonomical classification of *Thespesia populnea*

Kingdom: Plantae
Division : Magnoliophyta
Class : Magnoliopsida
Order : Malvales
Family : Malvaceae
Genus : *Thespesia*
Species : *populnea*

Sub-Families

The Malvaceae comprise nine subfamilies. They are as shown below. Byttnerioideae – 26 genera, 650 species, Grewioideae – 25 genera, 770 species, Sterculioideae – 12 genera, 430 species, Tilioideae – 3 genera, 50 species, Dombeyoideae – 20 genera, 380 species, Brownlowioideae – 8 genera , 70 species, Helicteroideae – 8 to 12 genera, 10 to 90 species, Malvoideae – 78 genera, 1670 species, Bombacoideae – 12 genera, 120 species.

Vernacular names

Hindi	:	Paras-pipal
English	:	Portia tree; Umbrella
Marathi	:	Bhendikejhar
Kannada	:	Jogiyarale; Arasi
Gujarathi	:	Paarsapeepala
Sanskrit	:	Gardha-bhanda; Parisha
Tamil	:	Cheelnathi
Telugu	:	Gangaraavi

Botanical Description

T. Populnea (L.) Linn. (Fam. Malvaceae), a fast growing, medium sized evergreen tree, up to 10 m tall with yellow, cup-shaped flowers having maroon colour at the centre and distributed throughout coastal forests of India and also largely grown as a roadside tree. It has heart shaped leaves glossy green in colour and yellow hibiscus-type flowers. *T. populnea* is small evergreen tree with average 6-10m (20-33ft), a short, often crooked stem and a broad, dense crown. The tree grows well under full sunlight and tolerates drought conditions. It propagates easily and grows rapidly. This evergreen tree is bushy when young but thins out with age. It grows to 12-18m in height and 0.5-0.8 m in girth. It grows rapidly under favourable conditions.

Bark: Often knobby, fibrous, fissured, grey to brown.

Leaves: Simple, alternate, long petiole, cordate, entire and acuminate, prominent nerves 5-7 with peltate scale on one or both surfaces. Leaves are heart-shaped, shiny green, usually ranging in size 10 to 20 cm long and 6-13 cm broad.

Flowers: Showy, large, cup-shaped hibiscus-like pale yellow, size 5 to 8 cm, with a dark blotch at the base of the petals. They last for one to two days, turning maroon, purple or pink as the day progresses. They are produced throughout the year in warm climates.

Fruits and seeds: Capsules are brown, containing five cells and several seeds with persistent calyx. The brown or grey capsules are about 5 cm in diameter; grown on short stalks and clusters at the ends of the branches. The greyish brown hairy seeds are flat, elliptic, and powdery on the surface with the size 0.7 to 1.2 cm long and 0.6 m broad.

Chemical Constituents

The plant yields Kaempferol and its glycosides, herbacetin and its glucoside, populneol, populnin, populnatin, quercetin, rutin, gossipetin, gossypol, β-sitosterol and its glucosides, leupeol, leupenone, alkanes, myricyl alcohol, sesquiterpenoidal quinines viz; mansonone C, D,E and F, thespone, thespesone, amino acids and carbohydrates.

Traditional Uses

The plant has anti-inflammatory, antibacterial properties and is used to treat asthma and cough. Bark is used to treat skin diseases, dysentery, haemorrhoids and as astringent. The young fruit secretes a yellow sticky sap which is used to treat ringworm and other skin diseases. Leaves are applied to inflamed and swollen joints in the form of hot poultice. Roots are used as a tonic. Fruits, flowers and leaves were used for external application to scabies, psoriasis and other skin diseases. The bark and fruits possess more curative properties.

Some other species of *Thespesia*

Thespesia garckeana
Thespesia acutioba
Thespesia populneoides
Thespesia lampas
Thespesia grandiflora
Thespesia thespesiodes
Thespesia mossambicensis
Thespesia cubensis
Thespesia patellifera
Thespesia gummiflua
Thespesia fissicalyx
Thespesia multibracteata
Thespesia robusta

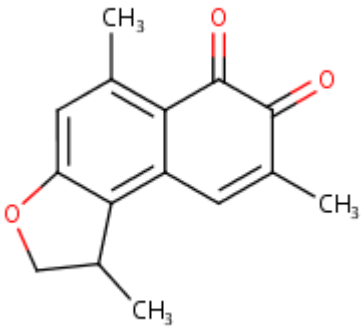
Table 1: Past pharmacological works on *T. Populnea:*

Part of the plant used	Activity done	References
Bark	Dyeing property	Kuchekar Mohini et al., (2017)
	Anti-diarrheal	Viswanatha et al., (2011)
	Anti-microbial	Saxena et al., (2010)
	Anti-diabetic	Parthasarathy et al., (2009)
	Anti-psoriatic	Shrivastav et al., (2009)
	Anti-bacterial and Cytotoxic	Boonsri et al.,
	Memory enhancing effect	Vasudevan et al., (2007)
	Anti-oxidant	Anandjiwala et al., (2007)
	Anti-inflammatory	Vasudevan et al., (2007),
	Anti-nociceptive	Vasudevan et al., (2007)
	Wound healing activity	Fathima naslath et al.,
Leaf	Anti-diabetic	Parthasarathy et al., (2009)
	Hypo-glycemic	Jayakumari et al., (2003)
	Anti-ulcer	Jayakumari et al., (2003)
	Anti-bacterial	Pratap Chandran et al., (2014)
	Anti-fungal	Pratap Chandran et al., (2014)
	Anti-hepatotoxic	Anni shirwaskar et al., (2008)
	Alpha amylase inhibitory activity	Sangeetha et al., (2012)
Flower	Anti-bacterial	Shravanakumar et al., (2009)
	Synergistic activity	Shravanakumar et al., (2009)
	Anti-steroidogenic activity	Kavimani et al.,
	Anti-diabetic	Hajasherief et al., (2011)
Seed	Anti-hyperglycemic	Belhekar et al., (2009)
Arial parts	Anti-oxidant	Saikoteswarsharma et al.,
	Anti-inflammatory	Saikoteswarsharma et al.,

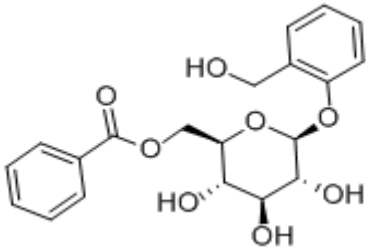
Table 2: Past phytochemical works on *T. Populnea:*

Part of the Plant	Compounds isolated	References
Bark	Gossypol,	Waller et al., (1983)
	Mansonone D, E and F	Mibrodt et al., (1997)
	Flavonoids TpF-1, TpF-2, sterol TpS	Shrivastav et al.,
	8-sesquiterpenoids populene A to H	Boonsri et al., (2008)
	Sesquiterpenoid $C_{15}H_{16}O_4$	Chantropromnea et al., (2007)
	3,6,9-trimethyl-2,3-dihydro-benzo	Fun et al.,(2007)
	(de) chromene-7,8-dione ($C_{15}H_{14}O_3$)	
	Populin, Populneol, Populnatin	Khare C.P et al.,(2007)
	Thespesenone,	Puckhabee.L et al.,(2004)
	Stearic acid, Betulin	Vasudevan M et al.,(2004)
Leaf	Quercetin-7-O-rhamnoglucoside	Annishirwarkar et al.,
	Lupeol, Leupenone	Zhang et al.,(2007)
Fruit	Herbacetin, Thespesin	Datta SC et al.,(1998)
Flower	Kaempterol, Gossipetin,	Datta SC et al.,(1973)
	Rutin, Quercetin	N.N.Seshadri ; et al.,(1973)

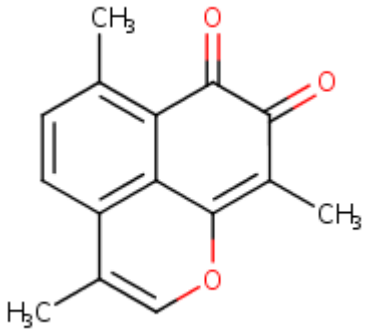
Fig 1: Some isolated compounds and structures:



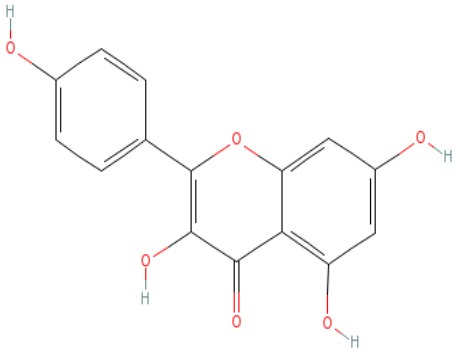
Mansonone D



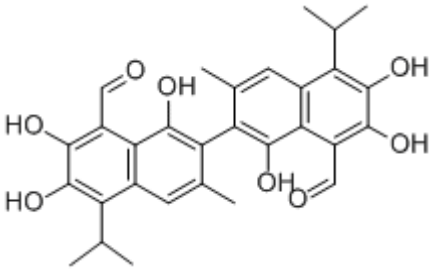
Populin



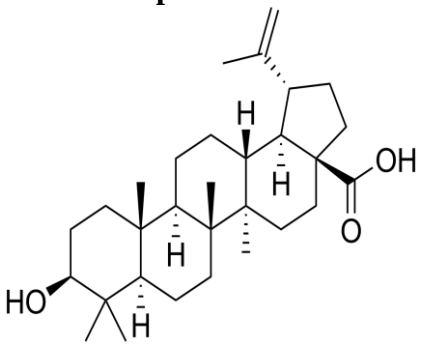
Mansonone F



Populneol



Gossypol



Betulin

CONCLUSION

The extensive literature survey revealed that *Thespesia populnea* is important medicinal plant with diverse pharmacological spectrum. The plant shows the presence of many chemical constituents which are responsible for varied pharmacological and medicinal property. The evaluation needs to be carried out on *Thespesia populnea* in order to know the uses and formulation of the plant in their practical clinical applications, which can be used for the welfare of the mankind.

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REFERENCES:

1. The Wealth of India. Vol II, 223 (Publication and Information Directorate, CSIR; New Delhi 1976)
2. Fun HK, Boonsri S, Chantrapromma S, Boonnak N, Karalai C. 3,6,9-Trimethyl-2,3dihydrobenzo[de]chromene-7,8-dione. Acta Cryst 63, 2127-29 (2007)
3. Puckhaber LS, Stipanovic RD. Thespesenone and dehydrooxoperezinone-6-methyl ether, new sesquiterpene quinones from Thespesiapopulnea. J. Nat. Prod. 67(9), 1571-73 (2004)
4. Boonsri S, Karalai C, Ponglimanont C, Chantrapromma S, Kanjana-Opas A. Cytotoxic and antibacterial sesquiterpenes from Thespesiapopulnea. J. Nat. Prod. 71(7): 117377 (2008)
5. Johnson IJ, Gandhidasan R, Murugesan R. Cytotoxicity and superoxide anion generation by some naturally occurring quinones. Free RadicBiol Med 26(9-10), 1072-78 (1999)
6. Milbrodt M, Konig WA, Hausen BM. 7-hydroxy2,3,5,6 –tetra-hydro- 3,6,9- trimethylnaptho (1,8-B,C)pyran-4, 8-dione. Phytochemistry 45(7), 1525 (1997)
7. Akhila A, Rani K. Biosynthesis of gossypol in Thespesiapopulnea. Phytochemistry 33(2), 335
8. Shirwaiker A, Shrinivasan KK. New flavonoids from the flowers of Thespesiapopulnea. J Med Aroma Plant Sci 18(1), 266 (1996)
9. Shirwaikar AA, Vasanth Kumar BR, Krishnanand, Sreenivasan KK. Chemical investigation and antihepatotoxic activity of Thespesiapopulnea. Pharmaceutical Biology 33(4), 305-10 (1995)
10. Kumar GS, Jayaveera KN, Ashok Kumar CK, Umachigi PS, Vrushabendra Swamy BM, Kishore Kumar DV. Antimicrobial effects of Indian medicinal plants against acne-inducing bacteria. Trop J Pharma Res 6 (2), 717-23 (2007)
11. Viswanatha GL, Shylaja H, R. Srinath, K. Nandakumar, Ramesh C. Preliminary phytochemical studies and antimicrobial activity of stem bark of Thespesiapopulnea. Pharmacologyonline 2, 467-70 (2008)
12. Arthanari S, K. Venkateshwaran, J. Vanitha, VS Saravanan, M. Ganesh, M. Vasudevan, T. Sivakumar. Synergistic activity of methanolic extract of Thespesiapopulnea (Malvaceae) flowers with oxytetracycline. Bangladesh J Pharmacol 4(1), 13-16 (2009)
13. Shrivastav S, Sindhu RK, Sanjeev Kumar, Pradeep Kumar. Anti-psoriatic and phytochemical evaluation of Thespesiapopulnea bark extracts Int J Pharm Pharma Sci 1(1): 176-85 (2009)
14. Shivakumar, Nagappa AN. Wound healing activity of the leaves of Thespesiapopulnea. J Nat Reme 7(1), 120-24 (2007)
15. Nagappa AN, Cheriyan B. Wound healing activity of the aqueous extract of Thespesiapopulnea fruit. Fitoterapia 72(5), 503- 06 (2001)
16. Vasudevan. Antinociceptive and anti-inflammatory effects of Thespesiapopulnea bark extract. J Ethnopharmacol 109(2), 264-70 (2007)

17. T. Satyanarayana, T. Sarita, M Balaji, A Ramesh, Murthy KB. Antihyperglycemic and hypoglycemic effect of Thespesiapopulnea fruit in normal and alloxan-induced diabetes in rabbits. Saudi Pharma J 12(2-3), 107-11 (2004)
18. KavimaniS, Ilango R, Karpagam S, Suryaprabha K, Jaykar B. Antisteroidogenic activity of floral extract of Thespesiapopulnea in mouse ovary. Indian J Exp Bio 37(12), 1241-42 (1999)
19. Viswanatha GL, R. Srinath, K. Nandakumar, H. Shylaja, K. Lakshman. Antidiarrheal activity of alcoholic and aqueous extracts of stem bark of Thespesiapopulnea in rodents. Pharmacologyonline 3, 222-30 (2007)
20. Vasudevan M, Parle M. Memory-enhancing activity of Thespesiapopulnea in rats. Pharmaceutical Biology 45(4), 267-73 (2007)
21. Parthasarathy, study on preliminary phytochemical and diuretic activity of bark of Thespesiapopulnea. Int J Pharm Sci Res 1(2), 72-77 (2010)
22. Anandjiwala S, Bagul MS, M Parabia, M Rajani. Evaluation of free radical scavenging sactivity of an ayurvedic formulation, Panchvalkala. Indian J Pharma Sci 70(1), 31-35 (2008)