

A REVIEW ON PHYTOCHEMICAL AND PHARMACOLOGICAL PROPERTIES OF THESPESIA POPULNEA LINN

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❖ ABSTRACT

At the present time, the plant research is in focus throughout the world and data have collected to show the boundless potential of plants used in many traditional systems. *Thespesia populnea* Linn (Family-Malvaceae) which is one of the precious drug used in the herbal medicine and recognized as Paras-Pipal. It's cultivation is done for ornament and shade and it bear flowers throughout the year in the tropics. Medicinal properties like antifertility, antibacterial, anti-inflammatory, antioxidant, purgative, and hepatoprotective activities has shown by several parts of plant. The certain hepatic diseases can be treated by yellow juice of fruits. Internal administration of decoction of the bark can cure skin diseases and decoction of fruits can used as antidote for poisoning. The seed possesses purgative properties and plant is useful in

malaria. The plant contain various biologically active compounds such as flavonoids, Sesquiterpenoids, tannin, saponins, alkanes, essential oil, sugars, fatty acids, and antioxidants are present in the plant. This contribution provides a comprehensive review of its ethno-medicinal uses, chemical constituents and pharmacological profile as a medicinal plant.

KEYWORD: Thespesia populnea, Pharmacological activities, Malvaceae.

❖ INTRODUCTION

The medicinal plants are considered a valuable gift provided by nature free of cost and they have been used by humans from the olden period. The plants provide foodstuff, attire, shelter, and medicine. Most of the herbal profits seem to have been developed through observation of

wild animals and by trial and error methods. Nowadays, people beginning to find and to use more herbs having therapeutic power. The conventional use of medicine is known as a way to learn about probable future medicines. Because of wide biological and medicinal values, high safety margins and reduced rate of herbal medicine, it has an excessive response and used as a source of simple health care in economically developing countries. From ancient days they have been used by the peoples of various cultures as a safe beneficial approach. According to WHO, about 80% of the population specially in developing countries are mostly dependent on folk medicine from plants for their healthcare.^[1]

Thespesia Populnea Is A Very Essential Medicinal Plant. It is generally called as a Hibiscus Populnea, Portia tree, Indian tulip tree. It is belonging to family Malvaceae. It is a large tree that originates in the tropical regions and coastal forest of India. It is the common plant of coastal stand across old-world tropics.^[2]



❖ Taxonomical classification

Kingdom - Plantae

Sub-Kingdom - Tracheobionta

Super-division - Spermatophyta

Division - Magnoliophyta

Class - Magnoliopsida

Subclass - Dilleniidae

Order - Malvales

Family - Malvaceae

Genus - *Thespesia*.Sol.ex.Correa

Species - *Thespesia Populnea* (L.) Sol.ex.Correa

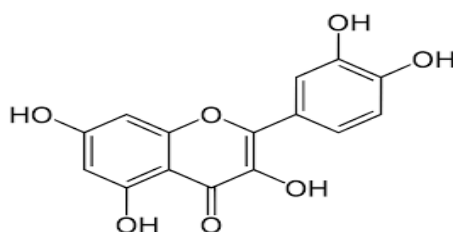
It is an effective medication for scabies, psoriasis, skin diseases, dysentery, piles, and diabetes. The leaves are alternate, simple with petioles of length 5-10cm long. Flowers are hibiscus-like single at upper leaf axils, corolla yellow with a red center. The fruits are globose. The seed is black and hairy.^[3]

❖ Chemical constituent

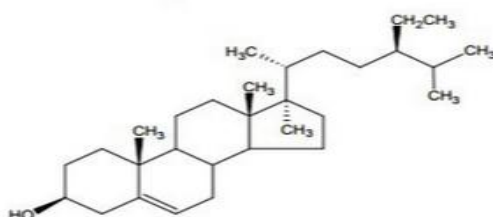
- Air-dried flowers of *Thespesia populnea* contain Kaempferol, β -Sitosterol, gossypetin, Quercetin.
- Heartwoods reported contains Sesquiterpenoids named populnea A-H. It also contains 6 Sesquiterpenoids quinones of the mansonone group containing the cadalene skeleton. Four were identified as mansonone C, D, E, and F. The other 2 are new natural products belonging to this group and are named thespesone I and thespone II.
- The Stem bark of *Thespesia populnea* contain carbohydrates, tannins, alkaloids, phenols, flavonoids, Proteins, saponins, gums and mucilage, and terpenes.
- Leaves of *Thespesia populnea* contain lupeol, β -sitosterol as the major constituents they also contain the presence of lupenone, Quercetin.

❖ Chemical structure

1) Quercetin



2) β -sitosterol



❖ Pharmacological activities

1. Memory enhancing activity

Ethanollic extract of *Thespesia populnea* bark was used. For assessment of memory-enhancing activity elevated plus maze, Hebb-Williams maze was used. In both aged and young mice *Thespesia populnea* shows a decrease in cholesterol level which is compared to the control group. *Thespesia populnea* extract showed significant cholesterol-lowering property comparable to Piracetam (a standard drug) which is a nootropic agent in the current study. Also, we observed that *Thespesia populnea* bark has a great memory-enhancing activity in mice. Because of its memory-enhancing Property, it may prove that *Thespesia populnea* also used for an anti-Alzheimer agent.^[4]

2. Antioxidant activity

For this activity, aqueous and methanolic extract of *Thespesia populnea* bark studied in rats by inducing liver injury with carbon tetrachloride: olive oil (1:1). The increasing level of Glutathione Peroxidase (GPx), Glutathione-s-transferase (GST), catalase and there is a decreased level of lipid peroxidation (LPO). The dose 500mg/kg of *Thespesia populnea* bark shows significant antioxidant activity against carbon tetrachloride-induced liver injury in rats.^[5]

3. Wound healing activity

For the evaluation of wound healing activity, 200mg/kg body weight was selected. For this study, the excision wound model was used. In this study, leaves of *Thespesia populnea* was studied result suggested that local application and systemic administration of aqueous extract of plant shows the more significant activity as compared to petroleum ether and alcoholic extract of *Thespesia populnea*.^[6]

4. Hepatoprotective activity

For the Hepatoprotective study, *Thespesia populnea* bark was extracted with methanol and water. Any sex of Wistar albino rats was used for this study. The extract was assessed for hepatoprotective activity against the carbon tetrachloride-induced liver injury. In the current study, both aqueous and methanolic extract shows significant hepatoprotective activity against liver injury induced by carbon tetrachloride. The methanolic extract shows higher hepatoprotective as compared to aqueous extract of *Thespesia populnea* bark.^[7]

5. Analgesic and Anti-inflammatory activity

For evaluation of analgesic and anti-inflammatory activities, two extracts were used i.e. Aqueous and ethanol extract of *Thespesia populnea* leaves. 100mg/kg, 200mg/kg and 400mg/kg orally administered dose of ethanolic and aqueous extract shows significant analgesic activity. The extract also decreases paw oedema induced by carrageenan in rats. Furthermore, the extracts showed anti-inflammatory activity in carrageenan-induced inflammation.^[8]

6. Immunomodulatory activity

For the Immunomodulatory activity, the methanolic extract of *Thespesia populnea* was used. Levamisole (50mg/kg) was used as the standard Immunomodulatory drug and cyclophosphamide (30 mg/kg) was used as the standard immunosuppressant drug. The Immunomodulatory property was measured with the help of the delayed-type hypersensitivity (DTH), humeral antibody (HA), titer response to SRBC and cyclophosphamide-induced myelosuppression. The phytochemical screening suggests that the flavonoid, triterpenoid, proteins, amino acid, phenolic and steroidal compounds.^[9]

7. Anti-diarrheal activity

For the assessment of antidiarrheal activity fraction of aqueous extract of stem of *Thespesia populnea* was used. From aqueous extract, three fractions were made these three fractions are ethyl acetate fractions (EAF), methanolic fractions (MF) and a residual fraction (RF) and studied for anti-diarrheal activity in castor oil-induced diarrhea model. In this castor oil-induced diarrhea model the residual fraction and methanolic fraction have significant reduced cumulative wet fecal mass and ethyl acetate fraction not show any significant anti-diarrheal activity. The residual fraction is more potent than a methanolic fraction.^[10]

8. Hypoglycemic and Anti-hyperglycemic effect

For hypoglycemic and anti-hyperglycemic effect alcoholic extract of fruits of *Thespesia populnea* was used in both normal and alloxan-induced diabetes in the rabbit. The dose of extract given to both normal as well as diabetic rabbits produced significant decreases in blood glucose at 6h after the administration of the extract. The study indicated that significant anti-diabetic activity of fruits *Thespesia populnea* and it supports the traditional usage of fruits by Ayurvedic physicians for control of diabetes.^[11]

9. Anti-implantation activity

In this present study in preliminary anti-implantation activity two different groups of fatty acids C1 and C2, which is present in seeds of *Thespesia populnea*. It is extracted successively with petroleum ether and then ethyl acetate. The graded dose of extract was tested for anti-implantation activity in Sprague-Dawley female rats of normal estrus cycle after overnight cohabitation with males of proven fertility. The day when spermatozoa were detected in vaginal smear was treated 1st day of pregnancy. The compounds were administered to female rats from the 1st day to 7th day of pregnancy on the 10th-day rat were laparotomized under light anesthesia.^[12]

CONCLUSION

The literature survey discovered that the *Thespesia populnea* is an essential medicinal plant with varied pharmacological spectrum. *Thespesia populnea* shows the presence of various chemical constituents that are responsible for the medicinal and pharmacological properties. The key focus on the pharmacological potentials of *Thespesia populnea*, which is very helpful to the researcher to add more about this valuable plant. The assessment was carried out to know the formulation and uses of *Thespesia populnea* in their practical clinical applications, which can be used for the safety of mankind.

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