

A Comprehensive Review On Therapeutic And Pharmacological Efficacy Of Borassus Flabellifer, Digera Muricata And Kings Mantel.

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Abstract:

Ancient Traditional herbal medicines are used to treat a variety of unhealthy conditions with little to no toxic side effects. It has played a significant role in health systems around the world. A number of health issues, including hypertension, diabetes mellitus, cancer, asthma, wound healing, pharyngitis and tuberculosis can be treated naturally with traditional herbaceous medicinal plants. Because of their numerous pharmacological qualities, herbal plants with high concentrations of bioactive phytochemical components, such as alkaloids, tannins, polyphenols and flavonoids have been utilized to treat disease conditions. India has long been recognised as a rich source of therapeutic plants, and many herbal medicine methods are regarded as "living traditions." Among them Borassus flabellifer, Digera muricata and Kings mantel is a medicinally important plant being used for its medicinal properties. Indian medicinal plants and their current state of medical plant study, however, are not the subject of a collective report. Therefore, the main goal of this analysis is to identify and summarise the most often used Indian medicinal plants that have been domesticated in India and its surrounding nations based on a thorough review of both domestic and foreign research publications. The review primarily lists notable Indian medicinal plants, their extracts and their associated pharmacological qualities such as antioxidant, anti-microbial, anti-diabetic and anti-cancer capabilities. The purpose of this review is to present a thorough and comprehensive scientific assessment of the major phytochemicals and their pharmacological effects in preparation for the potential future recreation of new forms of ethnomedicine.

Keywords: Herbal medicines, Borassus flabellifer, Digera muricata and Kings mantel.

Introduction:

Improve the knowledge about the herbal medicinal plants and it is used for the rectifier of general ailments from the primordial epoch. Herbal medicines are greatly appreciated in the developed world of primary health care because of their safety, lesser side effects and efficacy. The traditional herbal plants are used for the medical purposes and health system for several thousands of years. Herbal medicines deal with the Siddha Traditional System of Medicine ⁽¹⁾. In this outline, Borassus flabellifer, Digera muricata and Kings mantel herbal plants are discussed in this workflow. In these herbal plants are medicinally used different parts of the plant are being used for their medicinal properties. A number of health issues, including hypertension, diabetes mellitus, cancer, asthma, wound healing, pharyngitis and tuberculosis can be treated naturally with traditional herbaceous medicinal plants. It has played a significant role in health systems around the world ⁽²⁾.

Borassus flabellifer:

The Borassus flabellifer plant grows in most of the regions of India, Burma, Sri Lanka, Bangladesh and tropical Africa. Borassus flabellifer Linn. is high stature, one with a sturdy trunk, unbranched and distinctly differ as male and female ⁽³⁾. It has been used for several medicinal purposes ⁽⁴⁾.

Taxonomic study:

Kingdom	Plantae
Subkingdom	Viridiplantae
Infrakingdom	Streptophyta
Superdivision	Embryophyta
Division	Tracheophyta
Subdivision	Spermatophyta
Class	Magnoliopsida
Superorder	Liliana
Order	Arecales
Family	Arecaceae
Genus	Borassus L
Species	Borassus flabellifer L. - toddy palm

Vernacular name

Telugu : Tatichettu

English : palmyra palm, toddy palmHindi : Taad

Tamil : Talam

Sanskrit : TaalahBengali : Taala

Malayalam : karimpanaKannada : Olegari

Macroscopical Evaluation :

Borassus flabellifer is a robust tree, can live more than 100 y, reach a height of 30 metres (98 ft), green-bluish leaves with several dozen fronds spreading 3 m (9.8 ft) across⁽⁶⁾. The base of young leaf stalks is used for straining the Toddy and for making torches. Leaves used for a few things that are thatching, mats, baskets, fans, hats, umbrellas⁽⁵⁾. Flowers are used for the investigation of analgesic and antipyretic effects, anti-inflammatory activity, hematological and biochemical parameters, immunosuppressant properties. Young shoots of the B. flabellifer tested for mutagenicity, mitogenic activity and neurotoxic effect. Fruits are fibrous and large, usually three nuts are present each of which encloses a seed. The stem of the leaves has thorny edges. Male and female inflorescences are differently present.

Microscopical Evaluation :

The fresh root of Borassus flabellifer was taken and cut to the transverse section using a microscope. Phloroglucinol and hydrochloric acid in the ratio 1:1 was used as a stain and mounted on a glass slide and focused under a microscope. The outer layer is rhizodermis and it is made up of thin walled. The rectangular parenchymatous cells are arranged compactly without intercellular spaces. Exodermis is present and composed of sclerified parenchyma(2 - 3 layers). Cortex was extensive, wide and made up of thin walled parenchyma showing intercellular spaces. Beneath the surface layer aerenchyma cells with large intercellular space were found. Pericycle, vascular bundles, and medulla or pith were found to be a stele region. 18-20 pairs of vascular bundles are present. Radial polyarch xylem and phloem cells are located. Wide central part of the stele is pith or medulla and it's made up of thin parenchymatous cells.

In microscopical observations of this study we investigated the sclerified parenchyma present in the scattered powdered. Xylem vessels and phloem cells are found in lignified lumen and spiral arrangements. Calcium oxalates - prismatic and rectangular in shape. The circular to oval in shape starch grains are found.

Phytochemical study :

Amino acids, sterols and fatty acids – free amino acids like lysine, aspartate, glutamate and phenylalanine⁽⁷⁾. It also contains saponin flabellifer Carbohydrates – simple and main digestible sugars like sucrose, fructose and glucose dominates. Carotenoids – beta carotene a mixture of 4 main carotenoids a carotene and beta-zeacarofene lycopene and zeta-carotene. Other constituents- vitamin-c and vitamin B complex.

Extraction study :

Methanol extraction ⁽⁹⁾– Borassus leaves was analysed for the presence of major chemical constituents using qualitative phytochemical tests. It shows the presence of flavonoids, glycosides, tannins, proteins, steroids, triterpenoids, carbohydrates, fats and fixed oils.

Pharmacological uses :

Used as an Anthelmintic activity, antioxidant, Hemolytic activity, antibacterial activity of the fruits. Used to treat wound healing, immunomodulatory and diuretic, antimalarial^(8,9).

In-vitro and In Vivo studies:

Plant	In-vitro activity	Plant part used	In vivo activity	Animal	Reference
Borassus flabellifer	Antimicrobial activity, Anthelmintic activity, Antifungal activity, Antioxidant activity, α -glucosidase inhibitory activity, Hemolytic activity, In-vitro Anticancer activity using SRB assay and Cytotoxic activity.	Seed coat, sap, fruits, leaves, Palm yrah flour.	Anti-inflammatory activity, Analgesic activity, Antipyretic activity, Hypoglycemic activity, Anticonvulsant activity	Rat	10

Digera Muricata :

It is an annual herb, growing to 20-70cm tall. It is widely distributed in eastern tropical Africa and subtropical Asia. In India, it is widespread in Andhra Pradesh, Maharashtra and Rajasthan. The leaf, roots, stem, seeds and flowers of this plant have medicinal properties and are traditionally used as medicinal plants. All parts of the plant have been used as crude drug for the treatment of kidney stone and urinary tract disorders.

Taxonomic study:

Kingdom	Plantae
Subkingdom	Tracheobionta
Superdivision	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Caryophyllidae
Family	Amaranthaceae
Order	Caryophyllales
Genus	Digera forssk
Species	Muricata
Subspecies	Digera muricata muricata
Subspecies	Digera muricata trinervis
Variety	Digera muricatamacroptera

Vernacular names ⁽¹²⁾:

Telugu : Chinchali koorā

Hindi : Lat Mahuria, English : False amaranth

Tamil : Toya Keeri, kattu keerai Marathi : Gitana, Getna

Sanskrit : Aranya, Aranyavastuka, kuranjara, kunanjara Bangali : Lata mouri Ful, Gun gutia

Kannada : Goraji playa, kankali soppu, Chenchali soppu.

Macroscopical Evaluation :

Digera muricata is also known as " Lat Mahuria" and it is a wild edible plant⁽¹³⁾. These plants are distributed throughout India. The seeds are used to treat urinary tract disorders and also flowers. The root part is useful from the mother after childbirth for lactation purposes. Stem – used as an alternative for secondary infertility. Leaves and shoots – locally used as a vegetable and given to relieve constipation. Seeds and flowers – used to treat digestive disorders. In the study the entire plant investigation of pharmacological and phytochemical analysis.

Microscopical Evaluation :

A small piece of stem or leaves are taken from the transverse section using the microscope. Using the staining procedures like aniline blue and safranin. Observe the various colour reactions such as shown by the Ruthenium red for mucilage, millon's reagent for protein, aqueous NaOH for flavonoids, weak iodine solution for starch, ferric chloride for the phenolic compounds and Dragendorff's reagent for the alkaloids.

Phytochemical study :

Primary metabolites – carbohydrates, proteins, lipids, phenols, chlorophylls, amino acids etc. Secondary constituents – alkaloids, terpenoids, flavonoids, saponins, coumarins, cardiac glycosides, tannins and anthraquinone. Sterols – alpha and beta-spinasterol, beta-sitosterol, stigmasterol. Enzymes – superoxide and peroxidase. Acids – Tetracosanoic acid, palmitic acid, octacosanoic acid, betulinic acid. Others – Tinosporin, Rutin, hyperoxide, mannitol. The above chemical constituents are observed in this study ⁽¹⁴⁾.

Extraction study :

Ethyl alcohol extract – it is a diuretic and also used to treat a number of diseases like diabetes, kidney stones in the urinary tract and constipation.

Pharmacological uses:

This herb is used as a laxative, cooling, and astringent bowel. Treatment of diabetic conditions. Increased lactation purpose is to be evaluated. Treat the urinary discharges. Entire plant crudes are treated to digestive system disorders. Relieve constipation, kidney stone treatment, alternative for secondary infertility is found to be associated with hepatic disorders. Improves blood content, expectorant, antiperiodic, coolant and stomach in.

In-vitro and Invivo studies :

Plant	In-vitro activity	Plant part used	Invivo activity	Animal	Reference
Digera muricata	antidiabetic activity, antibacterial activity, antifungal activity, α-amylase activity (DNSA) inhibition.	Stem, root, leaves and flowers are used	Nephrotoxicity	Rat	15

Kings Mantel :

It is an upright shrub growing up to 4 ft. The shoots are quadrangular and each angle bears a narrow wing. Leaves are ovate-elliptic shaped, and oppositely arranged⁽¹¹⁾. Leaf margin is entire or wavy or occasionally with a broad triangular shaped tooth above the middle.

Taxonomic study :

Kingdom	Plantae
Subkingdom	Viridiplantae
Infrakingdom	Streptophyta
Superdivision	Embryophyta
Subdivision	Spermatophyta
Order	Lamiales
Family	Acanthaceae
Genus	Thunbergia
Species	Thunbergia erecta and kings mantel (commonname)

Vernacular names:

Telugu: Indrathige, Indratige, Jimandaarathige, Palatheega

English : sweet clock vine, bush clock vine

Hindi : chiminea

Malayalam: Noorvan-valli

Macroscopic Evaluation :

King's mantle climbs to a length of 2 meters and is finely hairy. Its leaves are rather broad, long-pointed, often coarsely few-toothed, slender-stalked, and from 5 to 10 centimeters long. Flowers are white, 2 inches wide and scentless. Root, stem and leaves are used as the traditional herbal medicine. It has been used to treat insomnia, anti-inflammatory, antipyretic, analgesic activity, anti-diabetic, antibacterial activity and antioxidant activity.

Phytochemical study⁽¹⁶⁾ :

In research analysis based on these observed chemical constituents⁽¹⁷⁾ of the *Digeramuricata* plant such as Beta – sitosterol-3-O-beta-D-glucoside, Apigenin, Apigenin-7-O-beta-D-glucoside, 3-methoxy-4-hydroxy benzoic acid, trans-ferulic acid, 3,4,5- trimethoxyphenol-1-O-beta-D-glucoside, acacetin-7-O-beta-D-glucoside, Acacetin 7-O-(alpha-D-apio-furanosyl)(1-6)-beta-D-glucoside, Benzyl-7-O-beta-xylopyranosyl(1''-2'')-beta-D-glucoside, Rosmarinic acid.

Extraction study:

Methanol and ethanol extraction⁽¹⁸⁾ -used as this extraction processing from the chemical constituents are identified.

Method – chromatography like column chromatography, thin-layer chromatography.

Pharmacological uses :

Medicinal Application and Pharmacological Activities⁽¹⁶⁾ of king's mantle. The king's mantle plant pharmacological and therapeutic bases cure several thousands of diseases. Antimicrobial activity, antioxidant activity, antidiabetic activity, Antiurolithiatic Activity, Sedative and Anxiolytic Activities. Use as Potential Anticholinesterase and Anti-Ageing agents. It is used to treat psychiatric conditions.

In-vitro and In vivo studies :

Plant	In-vitro activity	Plant part used	In vivo activity	Animal	Reference
King's mantle or <i>Thunbergia erecta</i> (20)	Antimicrobial activity, antioxidant activity, antidiabetic activity, Antiurolithiatic Activity, Sedative and Anxiolytic Activities.	Leaves, stem, shoot apex and roots.	Sedative and Anxiolytic Activities.	Mice	19

Conclusion :

In this study describes the pharmacological and therapeutically used as the traditional herbal medicinal plants. Some of the selective plants are collected and evaluated in the review based therapeutic and pharmacological study. Among them *Borassus flabellifer*, *digera muricata* and *Kings mantel* is a medicinally important plant being used for its medicinal properties. *Borassus flabellifer* herbal plant study evaluation based on identified the chemical constituents, methanol extraction, uses of the entire plant part studied. *Digera muricata* plant evaluation based on observative information collected from the chemical constituents is present and ethyl alcohol extract indicates the diuretic and part of the study also used as some disorders are treated. *King's mantle* plant describes the uses of the entire parts of the traditional medicines. And also used to identify the chemical constituents and used for treatment of various disorders. Therapeutic and pharmacological based on the three herbal plants are evaluated from the part of the plant to be studied, chemical constituents such as carbohydrates, proteins, fats, tannins, antioxidants, sterols, enzymes etc., are useful for herbal therapeutic medicine. These three herbal plants are used to treat the number of diseases like urinary disorders, hepatic problems, kidney stones, anti-inflammatory, antibacterial, antifungal, antioxidant, psychiatry conditions etc., and also increase the lactation purpose. By reviewing current studies about the *Borassus flabellifer*, *Digera muricata*, *Kings mantel* herbal plants have played a significant role in health systems around the world.

Reference :

1. Ramya S. Review on traditional and phyto-pharmacological aspects of *Borassus flabellifer* (Palmyra Tree). *Int J Rev Pharmacol Health Res.* 2018;1(1).
2. Krishnaveni TS, Arunachalam R, Chandrakumar M, Parthasarathi G, Nisha R. Potential review on palmyra (*Borassus Flabellifer* L.). *Advances in Research.* 2020;21(9):29-40.
3. Singchai B, Kansane KU, Chourykaew B. Phytochemical screening and biological activities of *Borassus flabellifer* L. *Asian Journal of Pharmaceutical and Clinical Research.* 2015;8(3):151-3.
4. Jamkhande PG, Suryawanshi VA, Kaylankar TM, Patwekar SL. Biological activities of leaves of ethnomedicinal plant, *Borassus flabellifer* Linn.(Palmyra palm): An antibacterial, antifungal and antioxidant evaluation. *Bulletin of Faculty of Pharmacy, Cairo University.* 2016 Jun 1;54(1):59-66.
5. Washer SJ, Jamkhande PG. Biological Activities of Leaves of Ethanomedicinal Plant, *Borassus flabellifer* Linn (Palmyra Palm): An Antibacterial, Antifungal and Antioxidant Evaluation. *Journal of Ravishankar University.* 2016 Jul 1;29(1).
6. Jerry A. A Comprehensive review on the medicinal properties of *Borassus flabellifer*. *Journal of Academia and Industrial Research.* 2018 Dec;7(7):93-7.
7. Sukanya DA, Thanet P, Chatchai W. Alpha-glucosidase inhibitory activity and phytochemical investigation of *Borassus flabellifer* Linn. *African Journal of Pharmacy and Pharmacology.* 2017 Jan 22;11(3):45-52.
8. Sahni C, Shakil NA, Jha V, Gupta RK. Screening of nutritional, phytochemical, antioxidant and antibacterial activity of the roots of *Borassus flabellifer* (Asian Palmyra Palm). *Journal of Pharmacognosy and Phytochemistry.* 2014 Nov 1;3(4).
9. SHANMUGALINGAM V, SATHASIVAMPILLAĪ SV, SRĪVIJEĪNDRAN S. Pharmacological activities of *Borassus flabellifer* L. extracts and isolated compounds. *International Journal of Innovative Research and Reviews.* 2021;5(2):23-31.
10. Saranya K, Sivakumar G, Gopalasatheeskumar K, Arulkumaran G. An updated overview on phytochemical screening and pharmacological screening of *Borassus flabellifer* Linn. *PharmaTutor.* 2019 May 1;7(5):15-9.
11. Utkarsh N Chimote, Yash R Menghani, Kamala K Chandak, Millind J Umekar. A brief study on *thunbergia erecta*: A review. *Int. J. Pharmacognosy Pharm. Sci.* 2022;4(1):8-11.
12. Sharma N, Vijayvergia R. A Review on *Digera muricata* (L.) Mart-a great versatile medicinal plant. *Int. J. Pharm. Sci. Rev. Res.* 2013 May;20(1):114-9.
13. Manimekalai P, Kaveena R, Naveena S, Nivetha S, Nivetha N. A review on pharmacognostical and phytochemical study of (*Digera muricata* L.). *Journal of Medicinal Plants.* 2020;8(5):52-6.

14. Usmani S, Hussain A, Farooqui AH. Pharmacognostical and phytochemical analysis of *Digera muricata* Linn. growing as a weed in fields of Uttar Pradesh region of India. *Int J. Pharm Pharm Sci.* 2013;5(1):142-5.
15. Ramalashmi K. In vitro antidiabetic potential and GC-MS analysis of *Digera muricata* and *Amaranthus cruentus*. *J Med Plants Stud.* 2019;7(4):10-6.
16. Mohi-Ud-Din R, Mir RH, Mir PA, Farooq S, Raza SN, Raja WY, Masoodi MH, Singh IP, Bhat ZA. Ethnomedicinal uses, phytochemistry and pharmacological aspects of the genus *Berberis* Linn: a comprehensive review. *Combinatorial Chemistry & High Throughput Screening.* 2021 Jun 1;24(5):624-44.
17. Suwannakud K, Boonthai P, Noikotr K, Chaveerach A, Tanee T, Sudmoon R, Siripiyasing P, Saemram N. Efficiency Evaluation and Usages of *Thunbergia alata*, *Thunbergia erecta* and their Combination. *Indian Journal of Pharmaceutical Sciences.* 2021 Jun 25;83(3):494-503.
18. Tukiran PW, Wardana AP. *Thunbergia erecta* L. FLOWER AS AN ALTERNATIVE ACID-BASE NATURAL INDICATORS. *Rasayan Journal of Chemistry.* 2018;11(2):773-9.
19. Begum A, Hossen A, Moly AA, Bhuiyan MM, Shahed-Al MS. In Vivo Sedative and Anxiolytic Activities of *Thunbergia erecta* (Acanthaceae) Leaves Activate Gamma-Aminobutyric Acid (GABA) Mediated Hyperpolarization in Swiss Albino Mice. *Pharmacology & Pharmacy.* 2019 Apr 12;10(4):177-93.
20. Refaey MS, Abdelhamid RA, Elimam H, Elshaier YA, Ali AA, Orabi MA. Bioactive constituents from *Thunbergia erecta* as potential anticholinesterase and anti-ageing agents: Experimental and in silico studies. *Bioorganic Chemistry.* 2021 Mar 1;108:104643.

