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Review Article

Overview of Ougeinia Oojeinensis: Medicinal Plant

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ABSTRACT

Ougeinia Oojeinensis is commonly known as Tinsa, and it belongs to the family Fabacea, mostly found in sub-tropical regions of india. The parts of plant are rich in secondary metabolites and have various medicinal uses. The bioactive constituents isolated from Ougeinia oojeinensis are genistein, ougenin, dalbergioidin, kaempferol, lupeol, Ferreirin, neophellamuretin, orobol, wedelolactone, homoferririn isoflavanone and betulin etc.The plant has found applications in pharmaceuticals. The bark is used as astringent, acrid, cooling, stimulant, anti-inflammatory, constipating, urinary astringent, anthelmintic, sudorific, depurative, styptic, febrifuge and rejuvenating. The extract of the whole plant showed anti – inflammatory, hypotensive action, antioxidant activity, hepatoprotective, anthelmintic, hypoglycemic and wound healing activities. This review attempts to encompass the available literature of Ougeinia oojeinensis with respect to its ethanomedical information and summary of its pharmacognostical and pharmacological activities for further investigations and forms an important aspect of drug studies.

INTRODUCTION

Ougeinia oojeinensis or tinsa belongs to the family of Fabaceace (Pea family). Various parts like leaves, bark, roots and flowers are used in traditional Indian medicine. It is flowering tree native to India and Nepal. Ougeinia has some medicinal properties like Anti-inflammatory (in bark) Anti -oxidant, Anti-spasmodic, Anti-diabetics and Analgesic. The Desmodium Tree also known (Desmodium oojeinense) is a moderately sized deciduous species, typically reaching a height of 6 to 20 meters. It is characterized by a short, gnarled trunk and dark brown bark that is deeply fissured. It is the only tree species within the Desmodium genus. Its scientific name, Oojeinensis, is derived from the historic city of Ujjain—where, notably, wood from

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this tree was used in constructing the pillars of Madaji Scindia's palace. The tree bears trifoliate leaves, with each leaflet being large, leathery, and stiff. The central leaflet is often broadly oval, nearly round, or even trapezoidal in shape, with 4 to 8 pairs of prominent veins. Its blossoms, either white or pink, grow in abundance and appear in short, clustered racemes emerging from the nodes of older branches. Fruits appear as flat, linear pods of a light brown hue, typically containing between 2 and 5 seeds. This species is native to regions of India and Nepal, especially thriving in the Himalayan foothills at elevations between 1200 and 1300 meters, stretching from Kashmir to central Nepal [1].

Botanical Classification of Ougeinia Oojeinensis

Botanical classification refers to the systematic arrangement of plants into hierarchical groups based on shared characteristics. This system is governed by the International Code of Botanical Nomenclature and utilizes binomial nomenclature to assign each plant a two-part Latin name: the genus and species. A member of the Fabaceae family, Ougeinia Oojeinensis (Roxb.) Hochr is sometimes referred to as Sandan or the Ujjain Desmodium Tree. Historically, Bentham and Hooker classified this species under the subfamily Papilionaceae within the family Leguminosae, order Rosales, and series Calyciflorae. Engler also recognized it within the same subfamily and order. However, Hutchinson elevated its rank to the family Fabaceae and placed it under the order Leguminales. For consistency, the traditional classification by Bentham and Hooker is followed here. This family encompasses approximately 375 genera and over 5,000 species, predominantly found in temperate regions of both the northern and southern hemispheres.

Taxonomy and Distribution

Ougeinia Oojeinensis is taxonomically classified as follows:

Kingdom: Plantae
Division: Magnoliophyta
Subclass: Magnoliopsida
Order: Fabales
Family: Fabaceae
Genus: Ougeinia
Species: Oojeinensis [2]

Morphology and anatomy

A medium- to big deciduous tree, Ougeinia Oojeinensis can grow up to 20 meters in height. Its morphology includes the following characteristics:

Trunk:

The tree has a straight, sturdy trunk with a grayish bark that becomes rough and fissured with age.
Flowers: The flowers of this plant produce a fragrant arrangement in dense clusters. The flowers are small, greenish-white, and have papilionaceous structures.

Fruits: The fruits are elongated pods, 10-15cm long, and contain several seeds. Ougeinia Oojeinensis has long been valued in traditional medicine, with various parts of the plant, such as the bark, leaves, seeds, and oil, being used for their therapeutic benefits:

Wound Healing: The bark and oil are traditionally applied to wounds to support healing and reduce inflammation.
Skin Conditions: The oil extracted from the plant is used to treat skin issues including eczema, dermatitis, and fungal infections.

Respiratory Ailments: Infusions or decoctions made from the bark or leaves are taken to relieve

respiratory problems such as cough, bronchitis, and asthma.

Digestive Disorders: Plant parts are utilized in traditional remedies for digestive complaints, including diarrhea and dysentery.

Oral Health: Chewing the bark or using its extracts is believed to help maintain oral hygiene and treat mouth ulcers.

Phytochemical Composition of Ougeinia Oojeinensis:

Many phytochemicals are reported to be present in Ougeinia Oojeinensis, which greatly enhances its therapeutic qualities. Some of the key phytochemical constituents identified in various parts of the plant include:

Flavonoids: This plant is abundant in flavonoids such as quercetin, kaempferol, myricetin, and rutin. Flavonoids are renowned for their potent antioxidant, anti-inflammatory, and anticancer activities.

Triterpenoids: Ougeinia oojeinensis contains a variety of triterpenoids, including ursolic acid and oleanolic acid. These compounds are recognized for their anti-inflammatory, hepatoprotective, and antimicrobial properties.

Phenolic Compounds: The plant is a rich source of phenolic compounds like gallic acid, ellagic acid, and catechins. These phenolic compounds exhibit strong antioxidant, anti-inflammatory, and antimicrobial effects.

Alkaloids: Alkaloids such as ougeinidine and ougeinensine are present in the plant. These alkaloids are known for their diverse biological activities, including analgesic, antimicrobial, and anti-inflammatory effects [9].

Glycosides: Ougeinia Oojeinensis contains sterols, such as β-sitosterol and stigmasterol, which are recognized for their anti-inflammatory, immunomodulatory, and anticancer effects.

Essential Oils: The leaves and seeds of Ougeinia Oojeinensis produce essential oils rich in volatile compounds like limonene, linalool, and α-pinene. These oils are believed to have antimicrobial, insecticidal, and anti-inflammatory properties [3]

Pharmacognostical Review:

Sahu and Roy et al. (2008) The administration of ethanolic extract of bark of Ougeinia oojeinensis decreases the CCl4-induced elevated enzyme levels, suggesting the protection of structural integrity of hepatocyte cell membrane or the extracts' ability to repair injured liver cells. The effectiveness of the normal functional conditions of the liver cell is indicated by the dropped position of serum bilirubin. The present study revealed that the ethanolic extracts of both pilules retain a significant protective effect against hepatotoxicity induced by carbon tetrachloride [4]

Jagtap et al., 2010 The stem bark extract of Oojeinensis showed strong antibacterial activity against Bacillus subtilis, Candida albicans, and Escherichia coli (40–80 mg/1)[5]

Sahu Ram Kumar et al. (2010) revealed the improvement of crack mending effect induced by O.Oojeinensis bark of different gel expression extracts (ethanol and aqueous extracts of 0.2% w/w gel) in treated groups, untreated groups (control), and neomycin (standard drug)-treated groups of animals. Ethanol and aqueous extracts gel formulation-treated groups showed significant wound healing from the fourth day onwards, which was compared to that of the standard drug-treated group. The crack check time was lower, and the chance of crack contraction was much

higher with the ethanol extract gel expression-treated group. In the treated groups, the rate of crack contraction was adjusted to reach an outside value on the sixteenth day. The ethanol extract-treated brutes showed hastier epithelialization of cracks (17.31 ± 1.65) than the brutes treated with arid extract (20.63 ± 0.89)[6].

Singh et al. (2011) When methanol and thirsty extracts of O.Oojeinensis were administered to glucose-loaded normal rats stayed for 18h, a drop in tube glucose position was observed after 30 min. Both extracts reduced tube glucose position to normal at 90 min. During the study, it was set up that both extracts significantly control the blood glucose position in streptozotocin-induced diabetic rats. The methanol and thirsty extracts induced a significant reduction in blood glucose position in STZ-induced diabetic rats as compared to the diabetic control group. But methanol extract showed more significant antidiabetic exertion as compared to thirsty extract. The possible medium by which O.Oojeinensis brings about its hypoglycemic action in diabetic rats may be by potentiating the moulin effect of the tube by adding either the pancreatic caching of insulin from the being cells or by its release from the set form[7].

Singh et al. (2011) The antioxidant capability of O.Oojeinensis was assessed by establishing its effectiveness against types of exertion that give of hydrogen, nitric oxide, and superoxide. of methanol and aqueous extracts strongly scavenged DPPH radical, with the ICs being 125.31 and 146.12 µg/ml singly. O.Oojeinensis of methanol and thirsty extracts also fairly inhibited nitric oxide in a dose-dependent manner, with the ICs being 189.75 and 223.77 ml singly. Studies in beast models have suggested a part for NO in the pathogenesis of inflammation and pain, and NOS impediments have been shown to have salutary goods on some aspects of the inflammation and kerchief changes seen in models of inflammatory bowel complaint. thus establishing the operation of the plant in the Indian indigenous system as an anti-seditious agent. The methanol and thiospy extract of O.Oojeinensis retain potent antioxidant exertion[8].

Shinde, P.P., et al. (2011) the free Radical scavenging activity of methanol extract of stem bark of Ougeinia Oojeinensis was 81.07, and the standard ascorbic acid was 89.35. The IC50 values of the extract and standard were 53.50 µg/ml and 25.00 µg/ml, respectively. The reducing power of the EBO was truly potent, and the power of the extract was increased with the quality of the sample. The plant extract could reduce the iron ions. The hydroethanolic extract of the stem bark of Ougeinia Oojeinensis has been found to exhibit potent antioxidant and free radical scavenging properties. It possesses reducing action and chelates iron as well. These in-vitro assays indicate that this plant extract is a significant source of natural antioxidants, which might be helpful in preventing the progress of various oxidative stress-induced conditions[9].

C. Velmurugan et al. (2011) found that quotidian administration of Ougeinia Oojeniensis (200 mg/kg) up to 14 days showed antidiabetic and hypolipidemic effects in diabetic rats. In a diabetic model rat, an increase in blood and urine sugar situations in diabetic rats was prevented by Ougeinina Oojeinensis (290 mg/kg). The goods were analogous to the standard drug glibenclamide. The maturity of the trials vindicated the benefits of medicinal shops with hypoglycemic goods in the operation of diabetes mellitus. Sardessal et al. (2014) found that the ethanolic extract of Ougeinia Oojeinensis has significant microbial exertion against all the tested microorganisms,which is cited by the zone, and

the extract showed an implicit exertion against Salmonella typhimurium ATCC 23564 and Candida albicans[10].

Manohar Lal Samyal et al. (2014) found that oral administration of an ethanol extract of the dinghy and root of Ougeinia Oojeinensis displayed a significant antidiabetic effect in controlling the blood glucose position. Also, the data showed that at the end of treatment, HDL increased while total cholesterol, triglycerides, and LDL dropped. This confirms the potent antihyperlipidemic effect of conacts. It can therefore be concluded that this factory excerpt promises an effective advance in its implicit development as an important oral remedial agent for controlling and managing diabetes mellitus[11].

Mariyan R. Patel et al. (2016) performed pharmacognostic and phytochemical evaluation of O.Oojeinensis dinghy excerpts using different cleaners (petroleum ether, toluene, acetone, chloroform, and water) and reported bitsy and macroscopic characteristics. The study also reported colorful physicochemical parameters like total ash, water-soluble ash, acid-insoluble ash, and total phenolic compound [12].

Patel M.R. et al. (2017) Two composites were insulated from the methanolic exctract of Ougeinia dalbergioides by preparative TLC using toluene chloroform methanol (8.8.8.82.2) as the mobile phase. These composites were set up to be triterpene by scattering with anisaldehyde-H_2SO_4 as a scattering reagent. Melting-TLC with morals and UV and FTIR spectroscopy data were used to validate triterpenes that were similar to betulin and lupeol. The contemporaneous HPTLC quantification of lupeol and betulin in acetone and methanol extracts showed that the quantities of lupeol in the acetone extract and methanol extract were 9.9 µg/mg of extract and 8.3 µg/mg of extract, respectively. The quantum of betulin in the acetone extract and methanol extract were 6.29 µg/mg of extract and 12 µg/mg of extract, respectively. Parameters analogous to linearity, delicacy, perfection, particularity, limit of discovery, and limit of quantification are used to validate the system[14].

Dhananjay Rai, V. Soni et al. (2021) The study found that Ougeinia oojeinensis extract may be beneficial in the treatment of type 1 and type 2 diabetes with aberrant lipid profiles.These plants anti-diabetic properties might be attributable to bioactive triterpenoids , steroids, and flavonoids. In a nutshell, phospholipids complex-based formulations might be a helpful technique for improving therapeutic effectiveness,dose reduction, and dosing regimen modification. To make a claim for their antidiabetic effectiveness, more research has to be done in human volunteers[15].

Shete et al. (2022) handed in a comprehensive review on the pharmacognostical and pharmacological exertion of Ougeinia oojeinensis, agitating its bioactive constituents and remedial operations. These studies highlight Ougeinia oojeinensis's pharmacological potential in managing oxidative stress, inflammation, obesity, hyperlipidemia, and diabetes, warranting further disquisition to explore its clinical operations and remedial effectiveness.

Jagadeeshwar et al. (2023): reported that methanolic extracts derived from the bark of Ougeinia oojeinensis exhibited both anti-oxidant and anti-inflammatory properties, implying its value in therapeutic formulations [16].

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