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OVERVIEW OF *OUGEINIA OOJEINENSIS*: MEDICINAL PLANT

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ABSTRACT

Ougeinia oojeinensis (Fabaceae) commonly known as Tinsa, mostly found sub-tropical regions of India. Whole parts of the plant are rich in secondary metabolites, which impart mariculous medicinal uses to the plant. 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 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.

KEYWORDS: *Ougeinia oojeinensis*, pharmacological, pharmacognostical, phytochemical

1. INTRODUCTION

Human beings always made use of plants to alleviate suffering and diseases. From thousands of years nature has been a source of medicinal agents. Those plants that have pharmacological activity are termed as medicinal plants or herbs. Medicinal plants offer alternative remedies with tremendous opportunities. Many traditional healing herbs and plant parts have been shown to have medicinal value especially in the rural areas and that these can be used to prevent and cure several human diseases. In addition, plant based drugs remain an important source of therapeutic agents because of their availability, relatively cheaper cost and non-toxic nature, when compared to modern medicine (Narayanaswamy, 2001). Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and herbivorous mammals. Many of these phytochemical have beneficial effects on long-term health when consumed by humans, and can be used to effectively treat human diseases.

Ougeinia oojeinensis belongs to the family Fabaceae. It is an herb found all around the world, and all parts of India mostly in the outer Himalayas and sub-Himalayan tracts from Jammu to Bhutan. Commonly it is known as Tinsa, Sandan, Panjan (Sharma, 2001) (Singh, 2002).The extract of the whole plant *O.oojeinensis* were shows anti-inflammatory and analgesic, hepatoprotective, antioxidant, anthelmintic, hypoglycemic, antidiabetic and wound healing activity. Phytochemical investigated on *O.oojeinensis* have reported the presence of lupeol, hydroxlupeol, betulin and isoflavanones such as dalbergioidin, homoferreirin and ougenin. The bark and leaves are used in the treatment of jaundice, diarrhoea, dysentery, urorrhagia, diabetes, verminosis, leprosy, leucoderma, haemorrhages, fevers, ulcers etc.

Systemic literature survey is the main basis for the planning of any scientific work and due to the same reasons here the review of literature regarding the *Ougeinia oojeinensis* (Roxb) Hochr, has been done under various heading like pharmacognostical review, phytochemical review, pharmacological review and ethanomedical information.

Botanical classification of *Ougeinia oojeinensis:* Arrangement of plant into groups and subgroups is commonly spoken as classification. The foundation of taxonomical is mainly laid down by International code of botanical nomenclature, binomial nomenclature mainly indicates in designating a plant in terms of it, genus name and species names. A large number of plant families have certain distinguishing characteristics that permits crude drug from these families to be studied at one time. It is scientific way of naming, describing and arranging the plants in an orderly manner.

Bentham and Hooker named the family as the sub-family Papilionaceae under the family Leguminosae of the Order Rosales of the series Calyciflorae. According to Engler too, there is a sub-

family of the family Leguminosae and the order of Rosales, Hutchinson was the first to raise the rank and named it as the family Fabaceae and the Order to which it belongs as Leguminales. But here the traditional approach of Bentham and Hooker is followed. Mainly confined to the temperate regions of both the northern and southern hemisphere. This family includes about 375 genera and over 5,000 species (Sass, 1940) (Anonymous, 1997) (Gamble, 1967).

Botanical description: Leaves pinnately 3-foliolate; leaflets large, stipellate; stipules free, deciduous. Flowers in densely fascicled recemes in leaf – axils and on old wood; pedicels filiform, fascicled along the rhachis; bracts small, scale-like; bracteoles beneath the calyx, minute, persistent. Calyx-tube campanulate, the lobes obtuse, in 2 lips, the upper of 2 connate, the lower of 3. Corolla exserted, rose-coloured or white, the petals clawed; standard suborbicular; wings obliquely oblong, spurred, slightly adnate to the obtuse incurved keel, Stamens diadelphous, 9 and 1; anthers uniform. Ovary scssile, many – ovuled; style incurved, subulate; stigma capitate. Pod linear, elongate, flat, of 2 or more oblong, large, more or less distinct, scarcely dehiscent joints. Seeds compressed, reniform; cotyledons foliaceous; strophiole (Chatterjee, 1999).

Geographical source: *Ougeinia oojeinensis* found in the outer Himalayas and sub-Himalayan tracts from Jammu to Bhutan up to an altitude of 1500 m and extending through the whole of northern and central India into the greater part of Deccan peninsula.

Sandan is common, sometimes almost gregarious in mixed deciduous forests. It is common also in sal forests; at higher elevations in the Himalayas, it is associated with *Pinus roxburghii sarg*. It grows on a wide variety of soils and thrives even on poor ground, where, however, it does not attain large dimension. It is a characteristics species of landslip banks and sides of rivers and exposed situation; on alluvial loam it attains a comparatively large size (Sharma , 2001) (Singh, 2002).

Chemical constituents: Genistein, Ferreirin, neophellamuretin, orobol, wedelolactone, homoferririn, ougenin (5, 2′ ,4′ - trihydroxy – 7 – methoxy – 6 – methyl -isoflavanone), 5,7,2′,4′- tetrahydroxy-isoflavanone, betulin, dalbergioidin, kaempferol, lupeol and hydroxylupeol have been reported from the plant (Rastogi, 1969) (Nair, 1983) (Longmann, 2001). Balakrishna *et al*. (1962), reported the isolation of three isoflavanones such as dalbergioidin, homoferreirin and ougeinin from the heart wood of *Ougeinia dalbergioides*(Balakrishna, 1962).

Mukherjee *et al.* (1963), reported the isolation of lupeol and hydroxylupeol from stem bark of *Ougeinia dalbergioides* (Mukherjee, 1963). Ghosh *et al.* (1963), reported two pentacyclic triterpene alcohol, identified as lupeol and betulin from the bark of *Ougeinia dalbergioides* (Ghosh, 1963). Bala *et al.* (2002), reported High – Performance Liquid Chromatographic analysis of genistein ougeinin, homoferririn, 2′,4′,5,7-tetrahydroxy-6-methyl isoflavone and 2′,4′,8-trihydroxy-6-methoxy-7-methyl isoflavone present in heartwood extract ofof *Ougeinia dalbergioides* (Bala, 2002).

Pharmacognostical review: The plant chosen for the present study has undergoes periodical changes in the nomenclature. It was named *Dalbergia oojeinensis* Roxb in year 1832. Later it was named *Ougeinia dalbergioides* Benth in year 1876 And the latest authentic name for the plant chosen is *Ougeinia oojeinensis* (Roxb.) Hochr according to journal Bull. Soc. Bot. Geneva in year 1909.

The morphological as a medium deciduous pretty tree, 6-12m in height with a short crooked trunk and dark brown deeply cracked bark; leaves pinnately 3-foliate, leaflets large, rigidly coriaceous, the terminal broadly elliptic or roundish, sometime trapezoidal, main nerves 4-8 pairs, prominent, flower numerous, white or pink in short fascicled racemes from the node of old branches; fruits linear, elongate, flat pods, light brown in colour, seeds 2-5 per pod (Longmann, 2009) (Balakrishna, 1962).

Pharmacological Review: Khare C.P. in Encyclopedia of Indian Medicinal Plants had mention that 50% of ethonolic extract of *Ougeinia oojeinensis* (Roxb.) Hochr stem bark showed antispasmodic action on isolated guinea – pig ileum and weak CNS – depressant effect in mice. The extract of the whole plant showed anti – inflammatory effect against carrageenin-induced paw oedema and analgesic effect in rats. The ethanolic extract of the stem bark and the whole plant showed hypotensive action in cat/dog (Khare, 2004). Sahu *et al.* (2008) reported the antioxidant activity of ethanolic bark extract of *Ougeinia oojeinensis* (Roxb.) Hochr on the CCl_4-induced liver damage in rats. In hepatotoxic rats, liver damage was studied by assessing parameters such as lipid peroxidation levels, catalase activity, glutathione peroxidase activity and superoxide dismutase activities were employed as biomarkers of liver damage, under control condition and after the administration of 100 mg/kg and 200 mg/kg,

respectively. Result suggests that the ethanolic bark extract of *O.oojeinensis* showed a significant antioxidant activity. Superoxide dismutase, catalase and glutathione peroxidase activities were increased, whereas lipid peroxidation is significantly decreased in the ethanolic bark extract-treated group, in comparison to the CCl_4 group. Hence, the ethanolic bark extract, at the aforementioned doses, showed significant protection under CCl_4-induced hepatocellular injury (Sahu, 2008).

Sahu *et al.* (2009) reported the hepatoprotective effect of bark of ethanol extract of *Ougeinia oojeinensis* in male wistar albino rats treated with carbon tetrachloride. Liver damage was studied by assessing parameters such as serum glutamate oxaloacetate transaminase, glutamate pyruvate transaminase, alkaline phosphatase, acid phosphatase and bilirubin in serum. The effect of administration of ethanolic extract at dose of 100 mg/kg and 200 mg/kg on the above parameter was further investigated. Results revealed that the suspension of ethanolic extract showed significant hepatoprotective activity ($P<0.05$) by reducing the levels of the biochemical parameters in experimental animals. The ethanolic extract of both doses afforded significant protection against CCL_4 induced hepatocellular injury. Histopathological studies too, are in conformity with findings (Sahu, 2009).

Gunasekaran *et al.* (2009), were evaluated *in-vitro* anthelmintic activity using earth worms, round worms and tape worms by aqueous and alcoholic extracts. Two different doses of 50mg/ml and 100mg/ml concentration of two different extracts on comparison with albendazole. *In-vivo* anthelmintic activity was done on sheep. The extract of *Ougeinia oojeinensis* exhibited a dose dependent inhibition of spontaneous motility (paralysis) and evoked responses to pin prick. Both the extract shows the significant anthelminitic activity (Gunasekaran, 2009).

Sahu *et al.* (2010) had investigated the wound healing potency of ethanol and aqueous bark extracts of *O.oojeinensis.* Excision wound model was used to evaluate the wound healing activity of both the extracts on wistar rats. Both the ethanol and aqueous bark extracts promoted the wound healing activity significantly, when compared to the control group of animals. Ethanol extract possess better wound healing property than the aqueous extract (Sahu RK, 2009).

Gunasekaran *et al.* (2011), reported the wound healing activity of aqueous and ethanol extracts of *Ougeinia oojeinensis* root was evaluated using excision, incision and dead space wound models on albino rats, the doses selected were the ED_{50} values as determined in the acute toxicity studies, administered orally. Among the two extracts, the maximum activity was recorded in the ethanol extract followed by aqueous extract. However when compared with the control both the extracts were found to possess significant wound healing promoting activity. The results were comparable with the Framycetin sulphate cream used as reference drug (Gunasekaran R, 2011).

Velmurugan *et al.* (2011), was evaluated the hypoglycemic and hypolipidemic effect of ethanolic extract of *Ougeinia oojeinensis* (200mg/kg) bark with measurements including, body weight, blood glucose level, urine glucose and biochemical parameters and was also tested for its efficacy in alloxan-induced diabetic rats. The extracts showed significant ($p<0.01$) antihyperglycemic and hypolipidemic activity as compared to diabetic control. The extract shows beneficial effects on blood glucose and urine glucose level. It also reduces the elevated biochemical parameters (Velmurugan, 2011).

Singh *et al.* (2011) evaluated the antidiabetic potential of the methanol and aqueous extracts of leaves of *Ougeinia oojeinensis*. This was tested in normal and streptozotocin-induced diabetic rats, using oral administration of methanol and an aqueous extract (100 and 200 mg/kg body weight) of *Ougeinia oojeinensis* leaves. The experimental data revealed that both extracts has significant antihyperglycemic activity in streptozotocin-induced rats compared to the standard drug (Singh, 2011).

Shinde *et al.* (2011), was studied antioxidant activity of hydroethanolic extract of stem bark of O*ugeinia oojeinensis* using various *in vitro* assays. The antioxidant activity of the extract was evaluated by using the free radical scavenging activity assay (DPPH method). The findings indicated promising antioxidant activity of the hydroethanolic extract of stem bark of O*ugeinia oojeinensis* (Shinde, 2011).

Singh *et al.* (2011) evaluated the *in-vitro* antioxidant activity of the methanol and aqueous extracts of leaves of *Ougeinia oojeinensis* by means of the 1, 1-diphenyl-2-picrylhydrazyl (DPPH),

nitric oxide (NO) and superoxide (SOD) free radical scavenging assays. All the parameters were found to dose dependent (Singh, 2011).

Gunasekaran *et al.* (2011), studied pharmacognostical and phytochemical parameters like ash values, extractive values, loss on drying and fluorescence analysis of the bark powder are performed of *Ougeinia oojeinensis.* Their investigation revealed the immense value of standardization and botanical identification of the plant material for further investigations (Gunasekaran, 2011).

Verma *et al.* (2012), was determined protective effect of *Ougeinia oojeinensis* extract on alloxan induced diabetes in experimental animals. Studies revealed effective regulation of hematological parameter. Extract also demonstrated insulinomometic effect and inhibit glucose metabolizing enzyme (Verma, 2012).

Ethanomedicine information: The bark and leaves are used in the treatment of jaundice. The bark is astringent, acrid, cooling, stimulant, anti-inflammatory, constipating, urinary astringent, anthelmintic, sudorific, depurative, styptic, febrifuge and rejuvenating. The leaves are used in different combination for blood purification. The healers of Bastar region use it both internally and externally in treatment of leprosy. The gum is used in treatment of diarrhoea and dysentery. Among the hill tribes of Chota Nagpur a decoction of the bark is given when the urine is highly coloured. Decoction of tinsa is one of the eight remedies for kustha and used as bath and intake. Decoction of tinsa should be taken according to the method as prescribed in case of nagabala for rasayana action. It is useful in vitiated condition of pitta, burning sensation, inflammations, diarrhoea, dysentery, urorrhagia, diabetes, verminosis, leprosy, leucoderma, haemorrhages, fevers, ulcers, gonorrhoea, anaemia and general debility (Pandey, 2005) (Sharma , 1996) (Yoganarasimhan, 2000).

2. CONCLUSION

The plant holds great promise as a commonly available medicinal plant and it is indeed no surprise that the plant is referred to in the Indian traditional circles. From the available literature on various aspects of the plant traditional to biochemical and ethnobotanical to pharmacological however there many gaps which need to be filled by concurrent researchers in different disciplines. One must make the best use of the naturally available resources which provide valuable raw material for advanced research.

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