Review Article

A Review on Phytopharmacological Profile of *Kigelia pinnata* (Jacq.)

***Khursheed Siddiqui, Avijit Mazumder, Gunosindhu Chakraborthy**

Department of Pharmaceutical Technology, Noida Institute of Engineering and Technology, 19, Knowledge Park-II, Institutional Area, Greater Noida, Uttar Pradesh 201306, India.

ABSTRACT

Herbal medicine is treated as the oldest form in the health care system which generally involves the mankind for treating various notable diseases. This nature has been a continuous source of herbal medicinal agents from which thousands of molecules are being isolated for the treatment of various ailments. About 80% of the world's population rely mainly on traditional medicines for their primary health care. This review summarizes the research carried out on the plant *Kigelia pinnata. Kigelia pinnata* belonging to the family Bignoniaceae is cultivated in many parts of India as an ornamental and roadside tree. It is also known as Balamkheera in Hindi and distributed all over India but found abundantly in west Bengal. Its various parts are used against wide range of ailments. The plant poses traditional uses like anticancer, antiulcer, anti-aging, antioxidant, and anti malarial. It is also widely applied in the treatment of genital infections, gynaecological disorders, renal ailments, fainting, epilepsy, rheumatism, sickle-cell anaemia, psoriasis, eczema, central nervous system depression, respiratory ailments, skin complaint, body weakness, leprosy, worm infestation and tumors etc. Its medicinal properties are due to presence of numerous secondary metabolites like alkaloids, glycosides and terpenoids. Other chemical compounds which are isolated from the plant are iridoids, napthoquinone, monoterpenoid naphtoquinone, isocumarins and flavonoids. Hence this article aims to provide a comprehensive review on chemical constituents, pharmacological properties on *Kigelia pinnata.*

Keywords: Bignoniaceae, kigelia pinnata, medicinal properties, traditional uses

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***Address for correspondence:**
Khursheed Siddiqui,
Department of Pharmaceutical Technology, Noida Institute of Engineering and Technology, 19, Knowledge Park-II, Institutional Area, Greater Noida, Uttar Pradesh 201306, India.
E-mail:pharmakhursheed35@gmail.com

INTRODUCTION

Herbal medicines have been main the source of primary healthcare all over the world. From ancient times, plants have been catering as a rich source of effective and safe medicines. About 80% of world populations still rely on traditional medicines. There has been an increased demand for the pharmaceutical products obtained from herbs all over the world because of fact that the allopathic drugs possess side effects. Safe effective and inexpensive indigenous remedies are gaining popularity among the people of both urban and rural areas especially in India and China [1]. *Kigelia pinnata* (Jacq.)DC. of Bignoniaceae family is widely distributed in the South Central and West Africa [2]. It is known as cucumber or sausage tree because of the huge fruits, which hangs from long fibrous stalks. It is also known as Balamkheera in Hindi and distributed all over India but found abundantly in West Bengal. The plant grows approximately 10 m high with odd pinnately, composite opposite leaves; leaflets are ovate to oblong in shape and 4-18 cm long. The flower are found in spring or summer season, hanging ancillary panicles up to 2 m long, corolla of fused petals, irregularly bell shaped, 9-13 cm long two lipped, yellowish on outside and purple on inside. Fruits are oblong, hard 30-50 cm long, hanging on stalk for several months but not split easily [3-5]. The present review will give an emphasis on the contribution of *Kigelia pinnata* in modern system of herbal medicine. It will also reflect about the pharmacological and various phytoconstituents which are used for curing mankind suffering from various diseases. The figures of the plant are listed and numbered consecutive below.

Figure 1: Leaves of *Kigelia pinnata*

Figure 2: Flower of *Kigelia pinnata*

Figure 3: Fruits of *Kigelia pinnata*

TRADITIONAL USES

The *Kigelia* plant possess a long history of use by rural communities, particularly for its medicinal properties. These properties are found in every part of the tree, including fruit, bark, roots and leaves, which are employed for medical purposes [6-7]. The *kigelia* plant have medicinal properties not only because of its perceived characteristics such as bitterness, astringent taste or smell but also because of forces that it seems to emit in connection with its location, orientation and association with other plants [8-9].The plant possess traditional uses like anticancer, antiulcer, anti-aging, antioxidant, and anti malarial. It is also widely applied in the treatment of genital infections, gynecological disorders, renal ailments, fainting, epilepsy, rheumatism, sickle-cell anemia, psoriasis, eczema, central nervous system depression, respiratory ailments, skin complaint, body weakness, leprosy, worm infestation and tumors etc[10].

CHEMICAL CONSTITUENTS

It is important to know which secondary metabolites are found in plants because these may provide a basis for its traditional uses, particularly if they are the same as, or similar in structure to compounds from other species which display relevant activity. Qualitative tests for the presence of plant secondary metabolites such as carbohydrates, alkaloids, tannins, flavonoids, saponin and glycosides were carried out by many researchers to find out the exact moiety responsible for its activities. Chemical compounds were isolated and identified from *Kigelia* plant like iridoids, napthoquinone, mono terpenoid napthoquinone, isocoumarins, lignans, sterols and flavonoids [11-12].

- Govindachari *et al.,* isolated kiglin and 6-methoxymellein together with two known compounds stigmasterol and lapachol from the root extract of *Kigelia pinnata* [13].
- Desai *et al.,* isolated kigelin, β- sitosterol, 3 di-methylkigelin and ferulic acid from the bark extract of *Kigelia pinnata* [14].
- Joshi *et al.,* isolated norviburtinal and pinnatal from the root bark extract of *Kigelia pinnata* [15].
- Dorothy *et al.,* isolated Meroterpenoids and naphthaquinones from the root bark extract of *Kigelia pinnata* [16].
- Jackson *et al.,* isolated norviburtinal and isopinnatal from the dichloromethane extract of root and stem bark of *Kigelia pinnata* [17].
- Picerno *et al.,* isolated verminoside from the root bark extract of *Kigelia pinnata* [18].
- Bharti *et al.,* isolated three known irridoids; specioside, verminoside and minecoside from the butanol extract of stem bark extract of *Kigelia pinnata* [19].
- Atolani *et al.,* isolated six new phytoconstituent; hentriacontane, β-tocopherol, 3,4,di-hydro-8-phytene, transphytol, methyllinoleate and 1,3,3,5,6,6- hexamethyl cyclohexa-1,4-

diene from the leaves extract of *Kigelia pinnata* [20].

PHARMACOLOGICAL ACTIVITIES

Analgesic:

The analgesic effect of *Kigelia pinnata* extract has not been previously reported and the mechanism by which it occurs is mostly likely via inhibition of prostaglandin synthesis. Rawat *et al*., (2011) evaluated the analgesic potential of *Kigelia pinnata* leaf extract in wistar rat at a dose of 200 mg/kg and 400mg/kg against the standard drug pentozocine at a dose of 10mg/kg by hot plate and tail flick method and the study revealed that the extract of *Kigelia pinnata* leaf exhibited significant ($p<0.001$) analgesic effect against thermal noxious stimuli, thus it may be said that the extract is acting accordingly to the CNS [21].

Anti-inflammatory:

Rawat *et al*., (2012) evaluated the anti-inflammatory potential of *Kigelia pinnata* leaf extract in wistar rats at a dose of 200mg/kg and 400mg/kg against the standard drug indomethacin at a dose of 10mg/kg by carrageenan induced paw edema method. The study revealed the fact that there was a significant reduction in the paw edema volume. [22].

Antineoplastic:

Momekoc *et al.,* (2012) evaluated the antineoplastic effect of mehtanolic extract from *Kigelia pinnata* stem bark against lewis lung carcinoma (LLC) bearing BDF-1 mice using cytotoxicity (MTT assay) and pro-apoptotic activity. Extract displayed prominent cytotoxicity activity against a panel of human tumor cell lines and increased the life span of treated animals and tumor growth inhibition. On the basis of the *in vitro* studies and the observed *in vivo* antineoplastic potential of the plant it could be concluded that there is enormous scope for future investigations on *Kigelia pinnata* as a source of potential anticancer agents [23].

Wound Healing:

Rai *et al*., (2010) evaluated the wound healing activity of *Kigelia pinnata* bark extract on albino rats using incision, excision and dead space wound models, at two different dose levels of 250 mg/kg and 500mg/kg and study revealed a significant increase in skin tensile strength and dead-space wound model showed a significant increase in dry granuloma weight, granuloma breaking strength and the level of hydroxyproline content at both doses levels [24].

Anti-Diabetic:

Bole *et al*., (2014) evaluated the anti-diabetic activity of *Kigelia pinnata* leaves extract by amylase inhibition assay and it revealed that antidiabetic activity by alpha amylase inhibition showed potent activity [25].

Anti-oxidant:

Atolani *et al,* (2011) evaluated the anti-oxidant potential of *Kigelia pinnata* in root oil and its extract by using Total phenolic content and Free radical scavenging activity against standard α-tocopherol. It was found that the *Kigelia pinnata* root which is rich in phytohemicals showed a potent antioxidant activity. Thus study indicate that ethyl acetate fraction of root has the highest antioxidant activity against DPPH model [26].

Bole *et al*., (2014) evaluated the free radical activity of *Kigelia pinnata* leaves extract through *in-vitro* DDPH Assay and Reducing power Assay against standard Ascorbic acid. The anti oxidant activity of extract was found to be promising comparable with standard [27].

Anti-urolithic:

Kumar *et al*., (2012) evaluated the ethanolic extract of *Kigelia pinnata* fruit against ethylene glycol induced urolithiasis in rats and anti-urolithic activity was confirmed by measuring the serum marker, urinary parameters and it was significantly reducing and prevening the formation of urinary stones [28].

Anticonvulsant:

Singh *et al*., (2010) evaluated the anticonvulsant activity of *Kigelia pinnata* bark in methanolic and aqueous extracts using PTZ and MES induced convulsion in wistar rats. The results of the extracts possessed a potent protection against PTZ and MES induced convulsion models [29].

Hypolipidemic:

Kumar *et al.,*(2012) evaluated the Hypolipidemic activity of *Kigelia pinnata* flower extract in streptozocin induced diabetic wistar rats and it was found that daily oral treatment with the extract and standard drug for 21 days significantly

reduced blood glucose, serum cholesterol and triglycerides levels. High density lipoprotein-cholesterol level was found to be improved ($P<0.01$) as compared to hypolipidemic effect [30].

CONCLUSION

So, from the present study it was revealed that the medicinal plants are local heritage with global importance. Generally pharmacologist should study the traditional system of medicine in scientific way and validate by screening plant extract for pharmacological activity. There are number of plants which are used traditionally by the tribal people of India but they are not validated scientifically. Thus an alternative approach by natural remedies is viable to allopathic medications as they cause undesirable side effects*. Kigelia pinnata* is well known traditionally for its medicinal purposes in the world.

Thus to conclude by considering all the scientific reports from previous researchers, the present review will give an insight information about *Kigelia pinnata* because of its various pharmacological functions like analgesic, antidiabetic, wound healing, antioxidant and many more. The therapies which are adapted from the allopathy are limited due to its efficacy, serious adverse effects and costly preparations. Thus an attempt has been made to bring together the reports or findings penetrating to phytochemical constituents and its therapeutic uses and other parts of the world working as phytopharmacologist are in turn to give their best for the evidence-based alternative therapy to cure different ailments occurring in humans and other foreign bodies.

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