

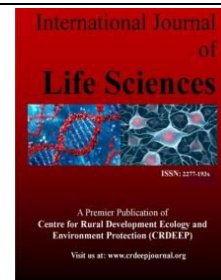
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**Review Paper****Role of an Important Medicinal Plant *Inula racemosa* Hook.F. (Asteraceae) In Various diseases: A Review****Prachi Sharma and Prahlad Dube\***

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Prahlad Dube**Article history:**Received: 13-05-2019  
Accepted: 16-05-2019  
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Published: 26-05-2019**Key words:***Inula racemosa*, Pushkarmula, sesquiterpene lactones, cardio protective.**ABSTRACT**

*Inula racemosa* Hook.F. (Asteraceae), usually known as Pushkarmula, found almost in all parts of the India. *Inula racemosa* is an important medicinal plant in Indian System of Medicine (Ayurveda). The plant *Inula racemosa* Hook.F. is used by ethnic group for the treatment of asthma, chronic bronchitis, pulmonary disorders, tuberculosis, skin diseases, cardiac disorders, obesity, lung cancer, etc. The major phytochemical compounds present in the roots of *Inula racemosa* belongs to sesquiterpene lactones, which have a wide range of biological activities. Pharmacological activities reported from the plant are anti-inflammatory, analgesic, antifungal, antibacterial, hepatoprotective, anti-allergic, antioxidant, anti-asthmatic, adaptogenic, adrenal beta blocking, hypoglycaemic and cardio protective activity.

**Introduction**

Biodiversity is the store house of species richness and acts as a cushion against potentially dangerous environmental changes and economic reforms (Tondon *et al.*, 2009). Currently 80% of the world population depends on plant-derived medicine for the first line of primary health care for human alleviation because it has no side effects. The global demand for herbal medicine is not only large, but growing (Farnsworth and Soejarto, 1991; Pei 2001).

It is interesting to note that plants that possess therapeutic properties or exert beneficial pharmacological effects on the human body are generally designated as "Medicinal Plants" (Sandhya *et al.*, 2006). Medicinal plants have their values because of the different chemical compounds found in various organs like leaves, roots, stem, seeds, bark etc. these have been determined by their pharmacological action of active principles, which produce specific physiological action in human body (Anon, 2007a). The important bioactive substances (present as secondary plant metabolites) are alkaloids, glycosides, fatty oils, resins, gums, mucilage, tannins, quinines, valuable oils, etc. (Srivastava, 2000).

The country- India is a vast repository of medicinal plants that are used in traditional medical treatments (Chopra *et al.*, 1956) and is rightly called the "Botanical garden of the World" (Gupta and Tandon., 2004). The medicinal plants are listed in various indigenous systems such as Siddha (600), Ayurveda (700) and

Amchi (600), Unani (700), Allopathy which 30 plant species for ailments (Rabe *et al.*, 1997). India has 2.4% of world's area with 8% of global biodiversity and it is one of the 12th mega diversity hotspot countries of the world with a rich diversity of biotic resources (Bapat *et al.*, 2008).

Secondary compounds are often characteristic of *Inula racemosa* Hook. F. It is a tall stout shrub up to 1.5 m, bearing large leathery leaves, rough above, densely hairy beneath, toothed and arranged in a racemose manner that belongs to Asteraceae family. It is an important medicinal plant, its roots expectorant and seeds are aphrodisiac (Jabeen *et al.*, 2007).

*Inula racemosa* Hook. F has an anti-inflammatory, carminative, diuretic, and antiseptic property. The plant is used in chronic bronchitis and rheumatism. Pushkarmul is used to boost appetite and digestion. Hence, it is beneficial in anorexia i.e. loss of appetite and dyspepsia (Chaturvedi *et al.*, 1995).

**Ethnomedicinal uses**

*Inula racemosa* Hook. F. root is used as expectorant and resolvent indurations. It is described as Rasayana (rejuvenator and immunomodulator) by Ayurveda Acharya and used for this purpose by Ayurveda physicians. According to Bhava Prakash it is tikta (bitter pungent) in taste. When it is administered mitigates vata-kaphaj Jvara, Sotha, Aruchi, saws and parswasool. It is specific medicine for cough, dyspnoea, asthma, pleurisy, tuberculosis and chest pain special pre cardiac

pain, the roots is given orally in rheumatic pains and liver problems. The liniment is externally used for relieving pain. The root of *Inula racemosa* Hook. F. is an important ingredient of several poly-herbal formulations those are for cardiac disease and inflammatory conditions of spleen and liver (Sharma, 2014).

### Pharmacology

#### Anti-depressant activity

The present study carried out on the extract *Inula racemosa* (roots) to show the adaptogenic activity. Forced swimming test (FST) is a screening model for antidepressants / adaptogens. Two swimming sessions were conducted: a 15 min pre-test followed 24 hr later by a 6 min test. The total duration of immobility behaviour was recorded during the second 6 min test. Mouse was judged immobile, when it remained floating in water, in an upright position making only small movements to keep the head above water. The experimental animals were euthanized and their brains were removed immediately, and the prefrontal cortexes (PFC) were dissected out on ice for biochemical analysis. LD50 of the test drug was found to be greater than 2000mg/kg body weight. The animals treated with formulation of extract (100mg/kg) and (200mg/kg) showed significant decrease in the immobility period with simultaneous increase in anti-oxidant markers as well as adrenaline and serotonin levels. The above study indicates positive adaptogenic activity of the extract *Inula racemosa* (roots), by forced swim test and resultant biochemical studies (Gnanasekaran *et al.*, 2012)

#### Antioxidant Activity

Antioxidant activity of 70% ethanol extract of the roots of *I. racemosa* was performed in Albino rats. The effect of daily oral administration of alcoholic extract (suspended in 1% gum acacia) of the roots of *I. racemosa* to rats for 21 days was investigated for lipid peroxide formation and reduced glutathione (GSH) content. The level of GSH in blood and liver was found significantly higher in treated animals as compared to control (1% gum acacia). Result showed that *I. racemosa* has antioxidant properties because greater availability of GSH to the cell would lead to higher rate of destruction of deleterious hydrogen peroxide and lipid peroxides by glutathione peroxidase (Srivastava *et al.*, 2012)

#### Antimutagenic Effects

Protective effect of aqueous root extract of *I. racemosa* was evaluated on 4-nitroquinoline-1-oxide -induced DNA damage and apoptosis in mice bone marrow cells. Aqueous root extract of *I. racemosa* (100, 200 and 400 mgkg<sup>-1</sup>, b.w.) with or without treatment with 4-nitroquinoline-1-oxide (4-NQO) were administered orally for five consecutive days. Antiapoptotic effect of aqueous root extract of *I. racemosa* (400 mgkg<sup>-1</sup>, b.w.) was measured by the use of Annexin V-FITC assay kit. 4-NQO-induced genetic damage in mice was modulated by aqueous root extract of *I. racemosa* via effective restoration of micronuclei and apoptotic cells formations. The potential protective effects might be due to the synergistic effects of secondary metabolites present in aqueous root extract of *I. racemosa* (Arumugam and Murugan, 2013)

#### Metabolic syndrome

A report has been investigated to reveal the metabolic syndrome. Metabolic Syndrome (MS) is a multi-factorial metabolic disorder affecting millions of people worldwide. Insulin resistance and abdominal obesity vice-versa affects each other and it may lead to poorly understood complex set of

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biological mechanism at cellular level, which play a significant role in the genesis of MS and other associated risk factors. In this perspective Ayurveda strongly focused on two concepts of diseases first one related to outcome of over-nutrition and second one related to under-nutrition. The disease MS is the outcome of over nutrition due to defective tissue metabolism. This study reveals to observe the safety and efficacy of an Ayurvedic drug Cap. Puškarmūl in the patients of Metabolic Syndrome. A total 60 patients of MS of either sex were enrolled in the present study and were followed for a period of 3 months with monthly follow ups. The patients were divided in to 3 groups on the basis of their treatment strategies. The study showed significant improvement in BMI (p=0.000) in group B & C, SBP (p= 0.10 in group B & p= 0.001 in group C) and dyslipidemia (p= 0.000 in group B & p= 0.001 in group C for S. cholesterol) in patients of MS (Singh and Pandey, 2014).

#### Hypolipidemic agent

It reduced fatty acids, triglycerides, total serum lipids and cholesterol (Ojha *et al.*, 2011). Singh *et al.* (1993) tried *Pushkar guggalon* 200 hypolipidaemia patients and observed good results.

#### Acute Toxicity Study

Acute toxicity studies of hydro-alcoholic extract of the roots of *I. racemosa* was performed in wister rats. LD50 value of hydro-alcoholic was found to be 2100 mgkg<sup>-1</sup> (Srivastava *et al.*, 1999).

### Conclusion

*Inula racemosa* Hook.F. (Asteraceae) is an important medicinal plant which possesses several medicinal properties. Allopathic medicines are quite expensive and have several side effects on the contrary herbal plants are affordable with less or no side effects. Phytochemicals reported in the plant *Inula racemosa* helps to cure several diseases. This review mainly focussed on the role of the plant in treating several diseases.

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