PHARMACOLOGICAL PROPERTIES OF MURAYYA KOENIGII – A REVIEW

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Abstract: Medicinal plant products nowadays play an important role in the world population. People use herbal product because they are considered as safe, inexpensive and less side effects. *Murraya koenigii* contains phytochemicals such as saponins, proteins, steroids, tannin, carbohydrates, alkaloids, flavonoids and glycoside. It has antimicrobial, antifungal, antidiarrheal, anticancer, antidiabetics and anti-inflammation. It has the skin improving effect.

IndexTerms - *Murraya koenigii*, antimicrobial, antifungal, anti-inflammation, antioxidant activity.

I.INTRODUCTION:

India is rich in medicinal herbs and therefore it can be accurately called the Botanical Garden of the World. In India now-a-day's people are focused on the medicinal system like Ayurveda, Siddha and local health tradition Medicinal plant has been used in many ways to produce a large number of medicinal agents from which modern drugs can be produced (Shah Rajesh Kumar *et al.,* 2013). One such medicinal plant is *Murraya koenigii* belonging to the family Rutaceae is native to India and now distributed in Southern Asia (Yukari Tachibana *et al.,* 2001). It contains phytocompounds like koenimbine, koenine, mahanimbine, murrayazolidine, murrayazoline, murrayacine, girinimbine and mukoeic acid (Dheeraj K.Gahlawat *et al.,* 2014). It produces various antioxidant compounds to counteract Reactive oxygen species (ROS) to survive (Maryam Zahin *et al.,* 2013). The essential oil from the *Murraya koenigii* has moisturize the skin (Jasim Uddin Chowdhury *et al.,* 2008).

Taxonomy of plant:

Kingdom - Plantae

Sub-kingdom - Tracheobionta

Super Division - Spermatophyta

Division - Magnoliophyta

Class - Magnoliopsida

Subclass - Rosidae

Order - Spindales

Family - Rutaceae

Genus - *Murraya*

Species - *koenigii* L. Spreng.

Morphology:

Murraya koenigii is more or less deciduous shrub or tree up to 6m in height and 15-40cm in diameter with short trunk, thin, smooth, grey or brown bark and elance shady crown (Shah Rajesh Kumar *et al.,* 2013). Leaves have a green color and characteristic odour and taste. Exstipulate, bipinnately compound 30cm long, each bearing 24 leaflets having reticulate venation. Flowers are white, lebracteate, scented smell and round to oblong 1.4 to 1.6cm long, 1 to 1.2cm in diameter (JK Roop., 2018). The number of fruits per cluster varying from 32 to 80 and it has small ovoid or sub-globose, glandular. Seed is 11mm long, 8mm in diameter with thin pericarp enclosing one or two spinach green color (Priyanka Gupta *et al.,* 2011), (Satish Chand Saini *et al.,* 2015).

Traditional uses:

Fresh leaves, dried leaf powder and essential oil of *Murraya koenigii* have been extensively used as flavoring agent in soaps. The essential oil is used in soap industry, cosmetic industry and aromatherapy. Roots and bark are stimulated and are applied externally for skin eruptions (Priyanka Gupta *et al.*, 2011), (Satish Chand Saini *et al.*, 2015). It is traditionally used as a whole or in part as antimetic (Bhavik Chauhan *et al.*, 2017), antidiarrheal (Praveen Sharma *et al.*, 2012), febrifuge (Vandana Jain *et al.*, 2012), blood purifier (Mamta Parnami *et al.*, 2018), antifungal (Gabriel Charles Disegha *et al.*, 2014), anti-inflammatory (Abhishek Mathur *et al.*, 2011), body aches (Vandana Jain *et al.*, 2012) for kidney pain and vomiting (Hemant Dhongade *et al.*, 2013).

Volatile oil:

The composition of volatile oil compounds that found in *Murraya koenigii* leaves are linalol, trans-sabinene hydrate, trans 2-cyclohexen-1.01, cis-2-cycloxen-1-2 para-cymen-8-ol, β-Terpinol, Trans-piperitol, chrysanthenyl acetate, lavandedyl acetate, bornyl acetate, α-copaene, β-elemene, (z)-jasmone, β-caryophylene, aromadendrene, α- humulene, dutanedicric acid, β-selinene, naphthalene, α-selinene, nerolidol, trans-nerolidol, cycloheptane, sapthulenol, caryophyclene oxide, viridifloral, 2-naphthalene methanol, atrivertal, juniper camphor, cubenol, β-cadina, 4-dinene, Selina-6-en-4-ol, and phytol. These components have sun protection effect and improve pigmentation (Zafar Iqbal *et al.*, 2017), (Bhavik Chauhan *et al.*, 2017).

Antioxidant activity:

Murraya koenigii has high antioxidant activities (Azlim Almey *et al.*, 2010). The *Murraya koenigii* extract from leaves provide a higher amount of polyphenols and antioxidant activity. Normally it has natural antioxidant activity (Poonam Ankush Jadhav *et al.*, 2017). The antioxidative properties of the leaf extract using different solvents were evaluated based on the oil stability index and also together with their radical scavenging ability against 1-1-diphenyl 2 picrylhydrazyl (DPPH) (Yukari Tachibana *et al.*, 2001), (Mradu Gupta *et al.*, 2010).

Antimicrobial and antifungal activity:

Murraya koenigii showed significant antibacterial activity against *Staphylococcus aureus* and *Staphylococcus epidermidis* (Vandana jain *et al.*, 2012). *Murraya koenigii* roots showed strong antimicrobial activity (Divya Gupta *et al.*, 2018) (Harish K Handral *et al.*, 2012). In antifungal activity the acetone extract of the fresh leaves gives three bioactive carbazole alkaloids named as mahanimbine, murrayanol and mahanine, which has shown mosquitocidal, antimicrobial and topoisomerase I and II inhibition activity (Shah Rajesh Kumar *et al.*, 2013). Due to the antimicrobial activity it is used in traditional medicines to treat skin infections (Manvi Malwal *et al.*, 2010).

Antidiabetic activity:

Mahanimbine a chemical constituent of *Murraya koenigii* was isolated from column chromatography of the petroleum ether extract of the dried plant. From this mehanimbine decreases the blood sugar level in the body because it shows the appreciable alpha-amylase inhibitory effect as compared with acarbose. It decreased the blood sugar level after 21 of the treatment (B. Maheswari Reddy *et al.*, 2018), (Ahmed SK *et al.*, 2017), (B. Dineshkumar *et al.*, 2010).

Antidiarrhoeal activity:

The bioassay guided fractionation of the n-hexane extracts of the seeds of *Murraya koenigii* resulted in the isolation of three bioactive carbazole alkaloids, kurryam, koenimbine and koenine (Praveen Sharma *et al*., 2012) These three components exhibited significant inhibitory activity against castor oil-induced diarrhea. The n-hexane also produced a significant reduction in gastro-intestinal motility (S,D,Bonde *et al.*,2011), (Ajay S *et al.*, 2011).

Anti-Inflammatory activity:

The methanol and aqueous extract of *Murraya koenigii* leaves are effective against carrageenan-induced edema (Muthulinggam Nishan *et al.*, 2015). *Murraya koenigii* leaves also show antitrichomonal activity against *Trichomonas gallinae.* The mast cell stabilization and antihistaminic effects of Enhanced Emergency Medical Kits (EEMK) were suggested to the probable mechanism for its anti-inflammatory action (Priyanka Gupta *et al.*, 2011).

Anticancer activity:

The isolated carbazole alkaloid that highly present in the *Murraya koenigii* leaves have effects on the growth of the human leukemia cell line HL-60 (B.Maheswari Reddy *et al.*, 2018). Absence of necrotic cell, lesion or shrinkage in cells of liver and kidney of the animals were observed suggesting the non-toxic nature of the treatment. It has rapidly increases the rate of connective tissue formation. Koenoline isolated form root bark exhibited cytotoxic activity against the KB cell culture test system. It has been found to induce apoptosis in human myeloid cancer cell (HL-60) (J. Patterson *et al.*, 2015), (Vandana Jain *et al.*, 2012).

Radiation protection activity:

The methanolic extract of *Murraya koenigii* showed protection gamma radiation (Vandana Jain *et al.,* 2012). The oil extract of *Murraya koenigii* that helps to protect the skin from UV radiation (Jyoti Shinde *et al.,* 2016). The sun protection factor of curry leaf oil cream exhibited less activity (Rekha B.Patil *et al.,* 2010). It can be used to maintain the natural pigmentation of the skin or it can be used to adjuvant the other formulation to enhance the activity. *Murraya koenigii* as a photo-protective agent against UVB induce acute oxidative damage such as sunburn, darkening and thickening of the outer layer of the skin and melanoma. Studies being carried out in assessing the photo-protective effect of chloroform extract of *Murraya koenigii* applied in various concentration of UVB.(Pande A R *et al.,* 2016).

Cosmetic uses:

Hyaluronidase inhibitors extracted from *Murraya koenigii* are formulated in a cream base. It has main role in skin lightening cosmetic for its moisturizing, antioxidant and hyaluronidase inhibitory activity. The ingredient showed skin lightening and improving rough skin effect (Dheeraj K.Gahlawat *et al.,* 2014), (Vandana Jain *et al.,* 2012). The leaves of *Murraya koenigii* contains very strong anti-oxidant properties, antibacterial, antifungal and antiprotozoal properties, these make a great remedy for skin infections like acne. The oil extract may help to protect the skin from sun and UV radiation (Dheeraj K.Gahlawat *et al.,* 2014), (Jyoti Shinde *et al.,* 2016).

Conclusion

Murraya koenigii is a multi-potential medicinal plant. It cures diabetics, ulcer, diarrhea, and wound healing activity. It is suitable for rough skin and also it has the efficiency to cure the acne from the skin and improve the pigmentation or maintain the pigments. Therefore, this review article possesses a great potential for effective treatment by herbal medicine and has given valuable information for development of newer herbal formulation.

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