

BIOACTIVE MECHANISMS OF TWO ANTIDIABETIC FLOWERS OWNING ANTICANCEROUS ASSETS

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Abstract:

In Jharkhand, oral, lung and stomach cancers are the primary cancers amongst men.

Murraya koengii L. Different parts of the plant have certain difference in composition of phytochemicals.

Index Terms- Pharmacological activities, Cancer risk, Bioactive compounds, Glucosinolates, Carbazole alkaloids.

INTRODUCTION

There is an exception in cancer cells. Two types of tumor are observed benign; that do not invade the healthy surrounding and another one is malignant; that is invasive and affects the healthy tissues.

Hence, cancer is a malignant tumor or it exhibit metastasis. [1][2] It is the leading cause of mortality worldwide. environment and carcinogenic virus infections [3][4] . Due to an increase in number of cancer cases, an alternative approach is under trial from the past which have very limited effectiveness in present day cancer treatment therapies.

Due to lack of knowledge and awareness among people regarding cancer, the state might suffer from mortality due to this disease. In Jharkhand, oral, lung and stomach cancers are the primary cancers amongst men.

Natural products or phytonutrients appear to be potent therapeutics for viral diseases and cancers [6][7][8] . Much intervention in cancer cases involves surgery and chemotherapy that aims to eliminate cancer tissues [9] . In addition, there is an increase in the number of cancer drugs that have been found to exhibit a relatively short clinical life span and then to become ineffective. In addition, the very potent drugs frequently exhibit serious side effects. Hence, there is an urgent need to search and develop new anticancer agents that are safe as well as being effective[10] . Thus, possible remedies have been sought from plants/plant extracts.

ETHNOMEDICINAL PLANTS

Moringa oleifera ‘a miracle tree’

Moringa oleifera Lam (syn. *M. pterygosperma* Gaertn.) is a versatile and exceptionally nutritious vegetable tree with a variety of potential uses. It is the most widely cultivated species of a Moringaceae family[11][12] . It is distributed among Sub Himalayan Tracts, Assam, Bengal and Peninsular India [13] . It can grow well in the humid tropics or hot dry lands, can survive in destitute soils, and is little affected by drought [14] . It tolerates a wide range of rainfall with minimum annual rainfall requirements estimated at 250 mm and maximum at over 3000 mm and a pH of 5.0–9.0 [15] .

It has a straight trunk with corky and gummy bark. Young twigs and shoots are covered in short dense hairs [16][17][18][19][20] . The leaves are compound, tripinnate with many small leaflets. The leaflets are glabrous & entire & pale green.

Flowers are white, scented in large axillary down panicles, hermaphroditic, surrounded by five unequal, thinly veined, yellowish-white petals; pods are green, pendulous, tapering at both ends, 30-120 cm long & 1.8 cm wide. The seeds are three-angled [21][22][23]



M.oleifera Lam tree showing compound leaves



M.oleifera tree showing the trunk.

Traditional/ Ethno-medicinal properties of M.oleifera Lam

Additionally, besides being edible, all the parts of the Moringa tree (e.g., root, bark, gum, leaves, fruit [pods], flowers, seed and seed oil) have long been employed for According to Fuglie [27] many uses for Moringa include: alley cropping (biomass production), animal forage (leaves and treated seed-cake), biogas (from leaves), domestic cleaning agent (crushed leaves), green manure (from leaves), gum (from tree trunks), medicine (all plant parts), biopesticide (soil incorporation of leaves to prevent seedling damping off), water purification (powdered seeds).

In South Asia, the plant is used for the treatment of inflammation and infectious diseases along with cardiovascular, gastrointestinal, haematological and hepatorenal disorders [28][29][30][31] . Root, bark, gum, flowers & fruit pods are used as antifertility, anti-inflammatory, anti-lithic, rheumatism, abortifacient, anti-bacterial, anti-fungal, cure eye-diseases, prevent spleen enlargement [32] . A folk remedy for stomach complaints, cancer[33][34] , gastric ulcers, skin diseases, increase lactation, cramps, sore gums and as a blood cleanser and blood builder.

Phytochemistry of M.oleifera Lam

It contains Vitamins such as Vitamin A, C and E; polyphenols such as flavonoids and phenolic acid, chlorogenic acid; alkaloids; glucosinolates; isothiocyanates; tannins; saponin. Leaves as reported contain bioactive compounds such as niazirin and niazirin [36] , five flavonol glycoside[37] . Roots has been reported to contain high concentrations of benzylglucosinolate [38] .

The polysaccharide contains d-galactose, 6-O-Me-D-galactose, D-galacturonic acid, L-arabinose, and L-rhamnose in a molar ratio of 1:1:1:1 [39]. Stem Bark has been reported to contain two alkaloids, namely moringine and moringinine (Kerharo, 1969), 4-(α -L-rhamnopyranosyloxy)-benzylglucosinolate [40][41]. Fruit pods and seeds: has been reported to contain 4(α -L rhamnosyloxy) benzyl isothiocyanate from seeds of *Moringa oleifera* [43]. F. Anwar & U.Rashid (2007) reported various sterols, tocopherols and fatty acids present in the seeds and seed oil[44].

Secondary Metabolites in *M.oleifera* Lam with Anti-cancerous properties

This plant family is rich in unique group of glycoside compounds called glucosinolates and isothiocyanates, 2 nitrile glycosides. In addition, β -sitosterol, glycerol-1-(9-octadecanoate), 3-O-(6'-O-oleoyl- β -D-glucopyranosyl)- β -sitosterol, and β sitosterol-3-O- β -D-glucopyranoside have also been identified with anticancer properties.

A.P. Guevara et al. (1999) investigated that the ethanolic extract of seeds of *M.oleifera* contain various antitumor compounds like.

A.Murakami et al. (1998) reported antitumor potential of three thiocarbamate (TC) and isothiocyanate (ITC)-related compounds on tumor promoter teleocidin B-4- induced Epstein-Barr virus from the leaves of *Moringa oleifera* [46]. The seeds of *M.oleifera* constitute 49.1% and 50.9% essential oil [47]. Some fatty acids reported to exhibit anti-cancer activity against many malignant cell lines in vitro, as well as reducing the tumor growth and cancer incidence in animal models are octadecenoic, hexadecanoic, and docosanoic acids [48][49]. Furthermore, Mustafa et al. (2004) investigated the anticancer activities of different fatty acid analogs of podophyllotoxin on SK-MEL, KB, BT-549, SK-OV-3 and HL-60 cell lines. Their fatty acid analogs incorporated 10-hydroxydecanoic, 12-hydroxydodecanoic, 15-hydroxypentadecanoic, 16-hydroxyhexadecanoic, 12-hydroxyoctadecanoic, 9-enoic, eicosa-Z-5,8,11,14-tetraenoic, eicosa-Z-8,11, 14-trienoic, eicosa-Z-11,14-dienoic, eicosa-Z-11-enoic and eicosanoic acids. They found that their analogs, except for eicosa-Z-11-enoic and eicosanoic acids, exhibited cytotoxic effects against the different cancer cell lines [50].

lead to the modification of membrane fatty acid composition of tumor cells [51].

Murraya koenigii: 'Meethi neem'

The genus *Murraya* was named after John Andrew Murray, a Swedish botanist and a professor of Medicine and Botany, in the University of Gottingen. It is one of the 150 genera from the family Rutaceae. *Murraya koenigii*, *Murraya paniculata* and *Murraya exotica* have been found in India. It is native to tropical Asia from Himalaya foothill's of India to Srilanka eastward through Myanmar, Indonesia, Southern China and Hainan.

Phytochemistry *M. koenigii* (L.) Spreng.

Phytochemicals such as carbohydrates, alkaloids, sterols, tannins, volatile oils, saponins, anthroquinone, glycosides and flavonoids are reported [70]. P-gurjunene, P-caryophyllene, P-elemene and O-phellandrene are responsible for its intense aroma. The plant is rich in carbazole alkaloids [71]. Various carbazole alkaloids reported are Mahanine [72], Girinimbiol [73], Benzisofuranone [74], Mahanimbicine [75] and bicyclomahanimbicine, Murrastifoline-F [76], Bismurrayafoline E [77]. Tachibana et.al has isolated 8, 10'-{3,3',11, 11'-tetrahydro-9,9' dihydroxy- 3,3',5, 8'-tetra methyl -3,3'-bis (4-methyl-3-pentenyl)}bis pyrano (3,2 a) carbazole (a dimeric carbazole alkaloid) from methylene chloride extract of *M.*

Secondary Metabolites in *M.koenigii* (L.) Spreng. with Anti-cancerous properties

A carbazole alkaloid, Koenoline isolated from root bark exhibit cytotoxic activity against KB cell culture system [81]. Further investigation from the stem of *M.koenigii*, the carbazole alkaloids have effect on the growth of the human leukemia cell line HL-60. Also the carbazole alkaloids such as mahanine, Pyrafoline-D and murrastifoline-I showed significant cytotoxicity against HL-60 cells and induced the loss of mitochondrial membrane potential [82].

DISCUSSION

Phytochemicals or secondary metabolites are important bioactive components present in plants. These bioactive components are responsible for showing efficacy in various pharmacological properties such as anti-diabetic, anti-inflammatory, free-radical scavenging properties, blood disorders, piles, anaemia, antidiarrheal, febrifuge, blood purifier, antifungal, etc.

In this review it was tried to explore different morphological characteristics having variation in phytochemical composition as per report gathered from literatures. This will confirm that abundance of phytochemicals in that part of the plant can be exploited to produce new herbal drugs. It has also been focussed on anti-cancerous properties of the anti-diabetic plants. These plants are basically anti-diabetic plant as reported by Ayurveda, Siddha and Unani but it can also show anti-cancerous activity too. Many research papers have also confirmed few isolated bioactive compounds behave as an important anti-cancerous agent.

CONCLUSION

Different parts of the plant can be exploited for understanding various pharmacological activities. Bioactive compounds must be isolated further to explore their properties. So here we can conclude that anti-cancerous agents from different parts of plants can be collected or prepared for preparing herbal drugs for curing cancer.

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