REVIEW ARTICLE

PHYTOCHEMICAL AND ANTICANCER ACTIVITY OF AERIAL PARTS OF MORINGA OLEIFERA LAM

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ABSTRACT;

The aim of the present study was to find out anticancer property of Moringa oleifera lam of the family Moringaceae popularly called “MIRACLE TREE”. Is a native of sub Himalayan tracts of Northern India and is widely cultivated in tropical and subtropical regions. Moringa is nature’s medicine cabinet. It is best known as excellent source of nutrition and natural energy booster. The various parts of this plant such as the leaves, roots, seed, bark, fruit, flower and immature pods act as cardiac and circulatory stimulants, Anti- cancer, Anti- inflammatory, Anti-diuretic, Antiulcer, Anti-diabetic, Antibacterial are being employed for the treatment of different ailments in the indigenous system. Moringa oleifera is a multi-purpose herbal plant used as human food and an alternative medicinal purpose worldwide. Almost all parts from Moringa can be used as source and nutrition with other useful values

KEY WORDS: *Moringa oleifera, leaf, Anticancer (Breast, Cervical), Cytotoxic, Phytochemical screening.*

INTRODUCTION

Pharmacognostical studies on Moringa oleifera LAM, has begun early in 1950s which led to the discovery of anticancer and antibacterial pterygospermin in the plant. The plant kingdom represents a rich storehouse of organic compounds, many of which have been used for medicinal purposes and could serve as lead for the development of novel agents having good efficiency in various pathological disorders in the coming years. Moringa oleifera’s traditional claims such as Anticancer, Anti-inflammatory, Antibacterial properties. The leaves are rich in iron and therefore highly recommended for expectant mothers. The rich source of B-carotene, protein, vitamin-C, calcium and potassium and act as good source of natural antioxidants. In

the presence of various types of antioxidant compounds such as ascorbic acid, flavonoids, phenolics, and carotenoids. The *Moringa oleifera* is used for Anticancer (breast cancer, cervical cancer), Anti-inflammatory, Anti-diabetic, Antimicrobial, Anti-hypertensive, Anti-ulcer, cholesterol lowering. The plants are used to treat lots of health problems like nervous disorder (such as muscle spasmodic, epilepsy, headache, hysteria) and also used for anemia, skin infections, blackheads, fever pain in joints, respiratory disorder, lactation hypertension and diabetes. Since all essential amino acids are present *Moringa* may be rightly called a complete food for total nutrition.

Morphological Features:

Moringa oleifera is fast-growing, deciduous tree. It can reach as high of 10-12m (32-40) and the trunk, can reach a diameter of 45cm (1.5ft). The bark has a whitish-grey colour and is surrounded by thick cork. It is found wild and cultivated throughout the plains, especially in hedges and house yards, these under the tropical insular climate, and it plentiful near the sandy beaches and rivers. The flowers are about 1.0-1.5(1\2m), and long 2.0cm(3\4m) broad. It can grow well in the humid tropics or hot dry lands, can survive destitute soils and is little affected by drought. It tolerates a wide range of rainfall with minimum annual rainfall requirements estimated at 250mm and a pH of 5.0-9.0. Materials and methods: Collection of plant material The leaves were collected from the *Moringa oleifera* from the Materials and methods: Collection of plant material The leaves were collected from the *Moringa oleifera* from the herbal garden. It was ensured that the plant was healthy and uninfected. The leaves were washed under running tap water to eliminate dust and other foreign particles and to cleanse the leaves thoroughly and dried.

Preparation of Leaf Extracts:

Fresh leaves (20-30gm) of *Moringa oleifera* were shade dried at room temperature (32-35°C) to constant weight over a period of 5 days. The dried leaves were ground into powder using a mortar and pestle. 25g of the powdered leaves were separately extracted in 500ml conical flask with 90% ethanol and water. The conical flask were plugged with rubber corks, then shaken at 120rpm for 30 min and allowed to stand at room temperature for 5 days with occasional manual agitation of the flask using a sterile glass rod at every 24 hours. The extracts were separately filtered using sterile Whatman no.1. Filter paper.

Nutritional Analysis:

Moringa leaves are extremely nutritious. In fact they contain larger amounts of several nutrients than common food often associated with these nutrients. These include vitamin C, which fights a host of illness including colds and flu; vitamin A, which acts as a shield against eye disease, skin disease, heart disease, diarrhea and many other diseases, and the high source of calcium, B-carotene, potassium as well as protein. Due to the presence of several types of antioxidant compounds such as flavonoids, phenolics, calcium, iron, ascorbic acid, and carotenoids, which builds strong bones and teeth and helps to prevent osteoporosis.

ANTI-CANCER

Moringa is revealed to possess potential therapeutic effects to fight cancer, has been recognised by folk medicine practitioners as it has antitumor properties and cancer prevention potential. A few isolated bioactive compounds from the seeds were tested for antitumor promoting activity using 7,12-dimethylbenzanthracene (DMBA) as initiator and 12-o-tetradecanoylphorbol-13-acetate (TPA) as tumor promoter and the anticancer prevent. The present study aimed to assess the cytotoxic effect of *Moringa oleifera* plant leaf extracts on three different cell lines (MCF-7, MDA-MB-468 and MDA-MB231). Different doses of plant extract and standard were taken and introduced into cancer cell lines were recorded at 72hrs respectively it clearly showed by effect cell growth inhibition. *Moringa oleifera* leaves extracts found in the indigenous environment as an anti-cancer agent. In the presence of fatty acids could have attributed to the chemopreventive effect of BMO which modulates apoptosis in

colon carcinogenesis. The impact of Moringa extracts on different cancer cell lines was investigated showing that Moringa root core were shown in table No. 1.

Breast Cancer

These are few of medicinal plants were used for treatment of breast cancer have been documented. The present aimed to assess the cytotoxic effect of moringa oleifera plant leaf extracts on three different cell lines (MCF7, MDA-MB-468 and MDA-MB-231). Different doses of plant extract and standard were taken and introduced into cancer cell lines were recorded at 72hrs respectively it clearly showed by effect cell growth inhibition of human breast cancer cell lines MCF-7, MDA-MB-468 and MDA-MB-231) in dose and specific time duration for inhibition of cell. M.oleifera leaf extracts have antiproliferative and pro-apoptotic effects on the breast cancer cell lines in a concentration and time dependent manner, which suggested their potential to be used as a therapeutic strategy for breast cancer.

Cervical (UTERUS) Cancer

The leaves of Moringa oleifera were tested for their anti cancer effects in combination with oncolytic vesicular stomatitis (VSV).The ethanolic extract of Moringa oleifera was effective inhibiting proliferation of cervical cancer. The combination of oncolytic viral therapy with Moringa oleifera represents an alternative therapeutic option for the treatment of cervical cancer.

ANTI- INFLAMMATORY

The crude ethanolic extract of dried seeds was tested for anti-inflammatory activity using carrageenan induced inflammation in the paw of mice by various workers and found to inhibit 85% of inflammation at a dose of 3mg /kg body weight, while the nature green seeds inhibited edema by 77% at the same dose. Hot water infusion of flowers, leaves, seeds also showed anti-inflammatory activity against carrageenan induced hind paw edema and its were shown in table No. 2.

ANTI ULCER

The methanol fraction of M. Oleifera leaf extract showed antiulcerogenic and hepatoprotective effects in rats. Aqueous leaf extract also showed antiulcer effect indicating that the antiulcer component is widely distributed in this plant. Moringa roots have also been reported to possess hepatoprotective effect which may be due to the presence of quercetin a well known flavonoid with hepatoprotective activity and shown in table No. 3.

EYE INFECTION

Through there are many causes of blindness vitamin A, deficiency causes impaired dark adaption and night blindness. Eating Moringa leaves, pods and leaf powder which contain high proportion of vitamin A can help to prevent night blindness and eye problem in children. Ingesting drumstick leaves (B -carotene and leutin) with oil helps in improving vitamin A nutrition and perhaps delays the onset of cataract. Also the juice can be instilled into eyes in cases of conjunctivitis.

CARDIAC AND CIRCULATORY STIMULANT

All parts of the tree are reported to be used as cardiac and circulatory stimulant. Moringinine acts on the sympathetic nervous system and act as a cardiac stimulant.

Table No. 1 The Leaves Extracts of Moringa oleifera Lam.

No	Bioactivity	Test cell	Parameters tests	Activity of extracts				Comments
				AQ	EH	MH	AC	
1.	Anti-cancer	PC3 Cell lines	In silico docking of ligands			H12		Studies are few but promising
			Cancer cell growth inhibition			H42		

Table No. 2 The Ethanolic Extracts of Dried Seeds of Moringa oleifera Lam.

No	Bioactivity	Test cell	Parameters tests	Activity of extracts				Comments
				AQ	EH	MH	AC	
1.	Anti inflammatory	RAW264.7	Inhibition of IFM mediators		H25			Involment of NF – KB path way is confirmed.
			Inhibition of proIFM cytokiness		H25			
			Inhibition of antiIFM cytokiness		H25			
			Protein denaturation		H47			
			Inhibition of edema	L49				

Table No. 3 The Methanol Extracts of Leaves of Moringa oleifera Lam.

No	Bioactivity	Test cell	Parameters tests	Activity of extracts			
				AQ	EH	MH	AC
1.	Anti ulcer	Aspirin ulcers in rats	Decrease in ulcer index			L54	

CONCLUSION

The multiple benefits of Moringa oleifera made it a true miracle of nature. Moringa extracts on different cancer cell lines was investigated the root core. These findings suggested the leaf extracts of moringa collected from the widely distributed in different India region possess anti-cancer activity that can be used to develop new drugs for treatment. Numerous studies have been conducted to the plants not yet developed as a drug by pharmaceutical industries.

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