

Phytochemical screening of leaves of *Moringa olifera* Lam. (Munga)-A traditional medicine

Sandeep Kurmi^{1*}, Priyanka Yadav² and Sumeet Dwivedi³

1, Regional College of Nursing, Jabalpur, M.P., India

2, Shri Ram College of Pharmacy, Jabalpur, M.P., India

3, Department of Pharmacognosy, Ujjain Institute of Pharmaceutical Sciences, Ujjain, M.P., India

Abstract

Plants found their uses as food materials while others showed beneficial effect against various human suffering such as injuries and diseases. Thus, the drug of plant origin served through the ages as mainstay in the treatment of human ailment and preservation of health. Historical reference seems to show that even 5000 years ago the people in China and Egypt were well aware of a large number of drugs and poisons, some of which like opium aconite and croton are still in use in traditional as well as modern system of medicine. Traditionally *Moringa olifera* Lam. has been used for asthma, expectorant, tumor, epilepsy, scurvy, constipating disorders, anemia, wound, anti-inflammatory, anodyne, anthelmintic etc. the present paper deals with the extraction and phytochemical screening of leaves of the plant.

Keywords: *Moringa olifera*, Leaves, Phytochemical screening

Introduction

Living organisms protect itself in competition of life in many ways. Thus from the very beginning of his existence, man has familiarized himself with plants and used them in variety of ways throughout ages in search of food and to cope successfully with human sufferings, primitive men begin to distinguish the plants suitable for nutritional purpose from others with definitive pharmacological action. Therefore, some plants found their uses as food materials while others showed beneficial effect against various human suffering such as injuries and diseases. Thus, the drug of plant origin served through the ages as mainstay in the treatment of human ailment and preservation of health. Historical reference seems to show that even 5000 years ago the people in China and Egypt were well aware of a large number of drugs and poisons, some of which like opium aconite and croton are still in use in traditional as well as modern system of medicine.¹

Moringa (Moringa oleifera Lam.) commonly known as Munga/Sahijan/Surjana/drumstick tree or horseradish tree is a versatile tree useful not only for human beings but also for animals and also in various industrial applications. People in India have been using it as an item of their daily food for nearly 5000 years. The *Moringa* plant originated initially in the Northern part of India some 5000 years back and soon moved into the Southern parts as well, where it was known as 'Murungai keerai' (*Moringa* leaves) and 'Murungai kaai' (*Moringa* vegetable). The *Moringa* tree had spread to most part of Asia, nearly the whole of Africa, South America, southern part of North America and some pockets in Europe. It has been found useful in nutrition, agriculture, soil control, water purification, industrial applications, cattle feed etc and also for

treating various types of illnesses in humans and livestock. People in India have been using it as an item of their daily food for nearly 5000 years².

Moringa olifera Lam. tree has miraculous powers and scientists have unfold the power and potential of these revered tree. It is now being cultivated and grown in a number of countries to fully tap its potential and use on a commercial basis. The *Moringa* plant is a perennial, evergreen tree that grows up to 20 ft (6.1 m) tall, with a straight trunk with corky, whitish bark. It grows well in hot, semi-arid and humid regions and in well-drained sandy or loamy soils. The tree has tuberous taproot and brittle stem is with corky bark. The leaves are pale green, compound, tripinnate, 30-60 cm (11.8 to 23.6 in) in length, with many small leaflets. The lateral leaflets are elliptic in shape while the terminal one is obovate and slightly larger than the lateral ones. The fruit pods are pendulous, green turning greenish brown, triangular and split lengthwise into 3 parts when dry. The pods are 1 to 4 ft (30-120 cm) long and 1.8 cm (0.7in) wide and tapering at both ends. The pods contain about 10 to 20 seeds embedded in the fleshy pith. The seeds are dark brown and the kernel is surrounded by a lightly wooded shell with three papery wings³.

The main constituents of *Moringa* plant are two alkaloids: moringine and moringinine deic, palmitic and stearic acid, saponins, glycoside, gum, protein Vitamins: A (8855 IU per 100g), B1, B2, B3, C Minerals: calcium, iron, phosphorus, magnesi. Structures of selected phytochemicals from *Moringa* spp.: 4-(4'-O-acetyl- α -rhamnopyranosyloxy)benzylisothiocyanate, 4-(4'-L-rhamnopyranosyloxy)benzylisothiocyanate, niazimicin, pterygospermin, benzylisothiocyanate and 4-(α -L-rhamnopyranosyloxy)benzyl glucosinolate. The leaves have a high protein content of 27% and are rich in vitamins A and C, calcium, iron and phosphorus. The Bureau of Plant Industry, in its report, stated that weight per weight, *Moringa* leaves have the calcium equivalent of 4 glasses of milk, the vitamin C content of 7 oranges, potassium of 3 bananas, 3 times the iron of spinach, 4 times the amount of vitamin A in carrots and 5 times the protein milk⁴

Medicinal uses³⁻⁶

The leaves, flowers and pods are used as significant sources of vitamins A, B and C, riboflavin, nicotinic acid, folic acid, pyridoxine, ascorbic acid, beta-carotene, calcium, iron, and alpha-tocopherol. The pod is considered good sources of the essential amino acids. A compound found in the flowers and roots of the *moringa* tree, pterygospermin, have powerful antibiotic and fungicidal effects. The leaves are cooked and used like spinach. In addition to being used fresh as a substitute for spinach, its leaves are commonly dried and crushed into a powder, and used in soups and sauces. Amino acids in green leaf vegetables vary considerably, and many that are staples, are low in the sulphur bearing aminoacids methionine and cystine. The flowers are edible when cooked, and are said to taste like

*Corresponding Author

E-mail: sandeep1542@yahoo.com

Mob. +91-9993751280



mushrooms. The Moringa seeds yield 38–40% edible oil (called ben oil from the high concentration of behenic acid contained in the oil). The refined oil is clear, odorless, and resists rancidity at least as well as any other botanical oil. The seed cake remaining after oil extraction may be used as a fertilizer or as a flocculent to purify water. Oil from the seed, called Oil of Ben, is used for earache and in ointments for skin conditions. The oil rubbed on the skin is said to prevent mosquitoes from biting. Flowers infused in honey are used as a cough remedy. Seeds crushed to a powder are used to clarify turbid, dirty water. A great fodder for cattle Moringa tree has been of great use not only to the human beings in terms of their health in one form or the other but also for their livestock. Moringa makes a great fodder for cattle. The weight of livestock increased up to 32 per cent

One agriculturist fed his cows with just 2 kg of dry matter of Moringa per day in addition to the normal food he had been through moringa feed and their milk yield of cow increased 43 percent. The dried leaves appear to be much more effective. Feeding them with and the milk production increased by 58 percent. The seed oil is used in arts and for lubricating watches and other delicate machinery, and useful in the manufacture of perfumes and hairdressings. The pressed cake obtained after oil extraction may be used as a fertilizer. The industrial uses of the drumstick tree include the use of its wood in paper and textile industries, bark in the tanning industry, and the seeds in water purification. The ben oil has also been shown to be particularly effective in the manufacture of soap producing a stable lather with high washing efficiency suitable for some African countries.



Fig 1: Tree of *Moringa olifera* Lam



Fig 3: Bark of *Moringa olifera* Lam.



Fig 2: leaves of *Moringa olifera* Lam.



Fig.4: Flower of *Moringa olifera* Lam.

Fig.5: Pods of *Moringa olifera* Lam.Fig.6: Leaves & flower *Moringa olifera* Lam.

Material and Methods

Moringa olifera Lam. belongs to family Moringaceae is medicinally important plant, commonly grown in some parts of our country and used in the treatment of various disease and disorders of human ailments by tribal and rural people of our country. So, far no any systematic study was undertaken, therefore, the plant was selected for present investigation. The leaves of the selected plant were collected in the months of July, 2011 from the local area of Jabalpur District of Madhya Pradesh and were identified and authenticated by Dr. S. N. Dwivedi, HOD, Department of Botany, Janata PG College, APS University, Rewa, M.P., India and voucher specimen no. JC/MO-8891 was deposited in our laboratory for further references. The extraction of plant material (leaves) was carried by successive solvent extraction. The fresh leaves were dried under shade and were coarsely powdered. The weight amount of powdered leaves (150gm) was placed in soxhlet apparatus and was subjected to successive solvent extraction with petroleum ether, ethyl acetate, chloroform, ethanol and water. Various phytochemical screening of the extracts was performed⁵⁻⁷.

Results and discussion

The plant *Moringa olifera* Lam. is an indigenous tree which was chosen for the present investigation. The plant belongs to the family Moringaceae. The scanty availability of information on this plant facilitates the study on it. This attempt was made to study the extraction of plant material and phytochemical screening of leaves of the plant. The dried and coarse powdered leaves of *Moringa olifera* Lam. was extracted with successive solvent extraction of leaves was done using various solvents such as petroleum ether, ethyl acetate, chloroform, ethanol and water. Soxhlet apparatus was used to perform extraction. The results of the extracts were mentioned in table 1. The various leaves extract of the plant of *Moringa olifera* Lam. were subjected to phytochemical screening which reveal the presence of various pharmacological active constitute. The results of extracts are presented in table 2. Petroleum ether extract: volatile oil, glycoside and tannins, Ethyl extract: tannin and alkaloid, Chloroform extract: alkaloid, volatile oil and tannins, Ethanol extract: alkaloid, carbohydrate, protein, volatile oil and tannins, Water extract: alkaloid, saponin, protein, flavanoid, tannins, carbohydrate and glycoside.

Table 1: Percentage yield of various extract of *Moringa olifera* Lam.

S/No.	Solvents	Estimated percentage (w/w)	Color of extracts
1.	Petroleum ether	1.2	Greenish
2.	Ethyl acetate	0.9	Light green
3.	Chloroform	1.4	Light brown
4.	Ethanol	2.4	Dark brown
5.	Water	1.0	Light brown

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Table 2: Preliminary phytochemical screening of various extracts of leaves of *Moringa olifera* Lam.

S./No.	Tests	PEE	EAE	CE	EE	AE
1.	Alkaloid Dragendroff's test Hager's tests	+	+	+	+	+
2.	Carbohydrates Selvinof's test Molish test	+	-	-	+	+
3.	Amino acid Millons test	-	-	-	+	+
4.	Tannins Aq. FeCl ₃ Test Gelatine Test	-	-	+	+	-
5.	Flavonoids: Zinc Hcl test Alkaline test	+	-	+	-	+
6.	Protein Heat test Biuret test	-	-	+	+	-
7.	Saponins Foam test	-	-	-	-	+
8.	Volatile oil Sudan III	-	-	-	+	-
9.	Glycoside Legal test Saponin glycoside	+	-	-	-	+
10.	Fat and fixed oil Copper sulphate	-	-	-	+	+
11.	Steroid Salkowski test	-	-	-	-	-

Abbr: + = Present, - = Absent, PEE= Petroleum ether extract, EAE =Ethyl acetate extract, CE= Chloroform extract, EE=Ethanol extract, AE = aqueous extract