Research Article

Pharmacognostical and Phytochemical Evaluation of *Momordica Balsamina* Fruits

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ABSTRACT

The plant *Momordica balsamina* Linn. belongs to family Cucurbitaceae and found in Punjab, Rajasthan and Saurashtra. The African people use the fruit of *Momordica balsamina* Linn. as a medicine for a variety of ailments. Since no reports are available on the pharmacognostical and phytochemical evaluation regarding the fruits of *Momordica balsamina* Linn., so present study was devoted to study macroscopy, microscopical, physiochemical and phytochemical properties of the fruit. From the study we have found that Immature fruit is green, ovoid, 2.5-7.5 cm long, narrow to both ends, rostrate, fleshy, smooth or muricate and bitter in taste. Mature fruit is red, berry type of fruit and tuberculate in shape. Seeds are ash coloured, ellipsoid, compressed, rugulose on the flat faces and with a grooved margin which is tuberculate on edges. Microscopically, fruits show epidermis with stomata, Uniseriate and multicellular glandular trichomes, hypodermis, prismatic crystals of calcium oxalates, mesocarp, vascular bundles and latex cells. The total ash, acid-insoluble and water-soluble ash were observed to be 9.5%, 0.25% and 8.25%. The Phytochemical screening showed the presence of carbohydrates, proteins, phenolic compounds, flavonoids, alkaloids, steroids and saponins.

Keywords: Cucurbitaceae, Extraction, *Momordia balsamina,* Pharmacognostical evaluation, Phytochemical evaluation.

INTRODUCTION

Drug consists of fresh fruits of *Momordica balsamina* Linn. (family Cucurbitaceae) is a monoecious climber found in Punjab, western Uttar Pradesh, Rajasthan and Saurashtra. It is commonly known as Balsam apple (English), Jungli karela (Hindi), Pamma De Merville (French) and Dagdagu (Kanuri)and Ejinrin (Nigeria).[1] Most of the plants of genus Momordica has been found to possess antihyperglycemic, anticholesterol, immunosuppressive, antiulcerogenic, anti-HIV, Antimicrobial and antifeedant.[2-3]

Momordica balsamina is a native of tropical regions of Africa. Leaves and fruits are used as vegetable. Fruit pulp of the plant is infused in olive or almond oil and this preparation is used as an application to chopped hands, burns and haemorrhoids and mashed fruit are used as a poultice. Zulu use infusion of this plant for stomach and intestinal complaints. Leaf infusion is used as anti-emetic. Leaf extract is used for the management of high fever, excessive uterine bleeding and for the treatment of syphilis. It is also used in the treatment of rheumatism, hepatitis and skin diseases, diabetics, and gastroenteritis.[4]

Figure 1: Fruit of M. balsamina

Figure 2: Fruit of M.balsamina

MATERIALS AND METHODS

Fruits of M. balsamina were procured from local market in July 2008, Moga, Punjab and were authenticated by Dr. H.B.Singh, Director, Department of Raw Material Herbarium & Museum, National Institute of Science Communication and information Research (NISCAIR) with reference No. (NISCAIR/RHM 1062/93). The fruit pulp was separated, shade dried.

Macroscopy and Microscopy

After authentification, different macroscopic characters including colour, taste, odour, shape, size, apex, margin, base and venation were noted.[5] The transverse section of the fruits was cleared with chloral hydrate, moistened with phloroglucinol and few drops of hydrochloric acid (1:1) were added. It was allowed to stand for 5 minutes and mounted in 50% glycerine. In powder microscopy, diagnostic features of the fruit describing the cells of the epidermis, stomata, trichomes, testa, calcium oxalate crystals and starch grains were observed.[6]

Determination of Physical Parameters

The powdered fruits were subjected to evaluate various parameters like total ash value, acid-insoluble ash value, water- soluble ash value, alcohol soluble and water soluble extractive value.[7]

Extraction of *Momordica balsamina* fruit

Coarsely powdered drug were defatted with petroleum ether (60-80°C) and dried marc was further extracted with hydroalcohol (90% methanol) using soxhlet apparatus. The methanol extract so obtained was freed from solvent in a vacuum evaporator. Dried marc was re-extracted three times with distilled water at room temperature for 24 hr and the aqueous extract was dried by rotary evaporator. Yields were calculated on the basis of %w/w.[7]

Qualitative chemical investigation of Extracts

Chemical tests were conducted for all extracts to identify the various phytoconstituents like alkaloids, glycosides, carbohydrates, phenolics, steroids, amino acids, fatty acids, flavonoids and saponins.[8]

RESULTS AND DISCUSSIONS

Pharmacognostic studies of *Momordica balsamina* fruit

A) Morphological evaluation of fruit of Momordica balsamina Linn.

Immature fruit is green, ovoid, 2.5-7.5 cm long, narrow to both ends, rostrate, fleshy, smooth or muricate and bitter in taste. Mature fruit is red, berry type of fruit and tuberculate in shape. Seeds are ash coloured, ellipsoid, compressed, rugulose on the flat faces and with a grooved margin which is tuberculate on edges.

B) Transverse section of fruit of Momordica balsamina Linn.

Transversely cut surface of the fruit is circular in outline, outer mesocarp encircling the inner whitish, pithy, spherical mesocarp occupying the major area of the section with scattered seeds encircled by arillus, placentation parietal.

Microscopic investigation of the fruit had revealed that epidermis consists of thin-walled cells traversed with stomata. Uniseriate and multicellular glandular trichomes were present. Hypodermis consisted of thin-walled chlorenchymatous tissue, containing prismatic crystals of calcium oxalates. Outer and middle mesocarp were spongy parenchymatous and porous. Vascular bundles (6-8) and latex cells were present.

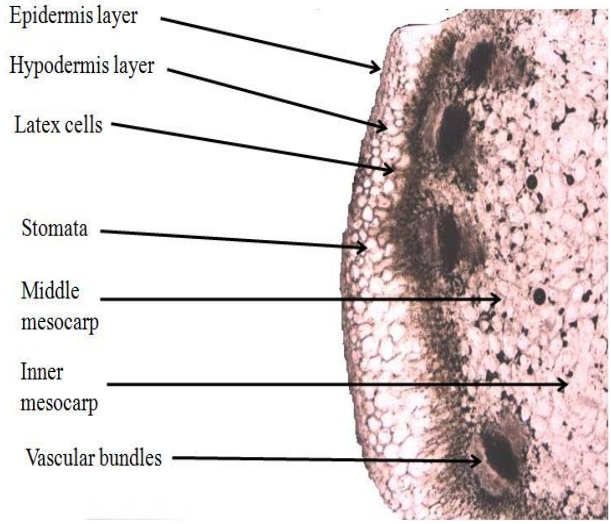

Figure 3: T.S. of fruit of *Momordica balsamina*

C) Powder Microscopy

Powder was yellow-brown in colour, odourless and bitter in taste. Microscopical examination showed glandular trichomes with uniseriate stalk and multicellular head, epidermal cells traversed with anomocytic stomata. Latex cells, simple starch grains and prismatic crystals of calcium oxalate, palisade like cells and spongy parenchyma cells containing starch grains and spirally thickened xylem vessels were observed.

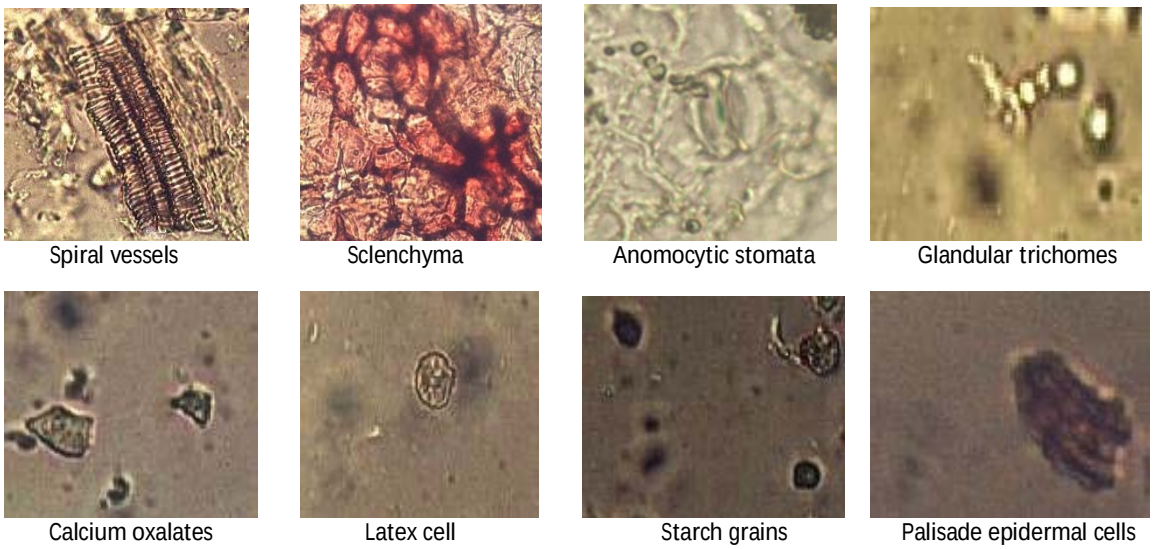

Figure 4: Powder microscopy of M. balsamina fruits

Physical parameters

Physical parameters of *Momordica balsamina* fruit powder are mentioned in Table 1.

Table 1: Physical parameters of M. balsamina

Physical Parameters	%w/w
Total ash	9.5
Acid insoluble ash	0.25
Water soluble ash	8.25
Alcohol soluble extractive	11.20
Water soluble extractive	63.80

Phytochemical evaluation of *Momordica balsamina* Linn. Fruit

A) Extraction of M. balsamina fruit

The fruit powder was successively extracted with petroleum ether and 90% methanol by soxhlation & maceration with water. The results were given in Table 2. The petroleum ether extract was yellow-coloured semisolid mass and the yield was 1.5% w/w, 90% methanolic extract was dark brown mass and the yield was 15.80% w/w and aqueous extract was light brown colour and the yield was 7.9% w/w.

Table 2: Extraction of M. balsamina fruit

Type of Extract	Method of extraction	Yield (%w/w)	Appearance
Petroleum ether (60-80°C)	Soxhlation	1.50	Yellow coloured, semisolid mass
90% Methanol	Soxhlation	15.80	Dark brown mass
Aqueous	Cold Maceration	7.9	Light brown mass

Table 3: Qualitative chemical evaluation of Momordica balsamina Linn. Extract

Nature	Petroleum ether	90% methanol	Aqueous
Carbohydrates	-	+	+
Proteins	-	-	-
Steroids	+	-	-
Phenolic compounds	-	+	+
Flavonoids	-	+	+
Amino acids	-	+	+
Alkaloids	+	+	+
Saponins		-	+
Glycosides	-	-	-

(+) = Present (-) = Absent

B) Preliminary Phytochemical screening

Successive extract of M. balsamina Linn. Fruit was screened for various chemical tests and results were mentioned in Table 3.

CONCLUSION

The quantitative determination of pharmacognostic parameters is helpful in standardization for the crude drug. Physical and chemical evaluation of crude drug help in detection of adulteration and purity of the drug Presence of many phytoconstituents may find use of this drug to cure some ailments.

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