International Journal of Research in Pharmacy and Pharmaceutical Sciences
ISSN: 2455-698X; Impact Factor: RJIF 5.22
Received: 08-01-2021; Accepted: 09-02-2021; Published: 20-03-2021
www.pharmacyjournal.in
Volume 6; Issue 2; 2021; Page No. 19-21

Pharmacognostic studies on *Momordica charantia* L.

Vijay Danapur[1*], Sringeswara AN[2]
[1] Vriksha Vijnan Private Limited, Chikkallasandra, Bangalore, Karnataka, India
[2] Mahatma Gandhi Botanical Garden, University of Agricultural Sciences, GKVK Campus, Bangalore, Karnataka, India

Abstract
Since ancient times, plants and herbal preparations have been used as medicine. Research carried out in last few decades has certified several such claims of use of several plants of traditional medicine. *Momordica charantia* is used in various systems of traditional medicine for several ailments (antidiabetic, abortifacient, anthelmintic, contraceptive, dysmenorrhea, eczema, emmenagogue, antimalarial, galactagogue, gout, jaundice, abdominal pain, kidney (stone), laxative, leprosy, leucorrhea, piles, pneumonia, psoriasis, purgative, rheumatism, fever and scabies). Most importantly, there are studies to show the efficacy in various cancers (lymphoid leukemia, lymphoma, choriocarcinoma, melanoma, breast cancer, skin tumor, prostatic cancer, squamous carcinoma of tongue and larynx, human bladder carcinomas and Hodgkin's disease).

Keywords: *Momordica charantia* TLC physicochemical anatomical microbial limits

Introduction
Momordica charantia is a tropical and subtropical vine of the family Cucurbitaceae, widely grown for edible fruit, which is among the most bitter of all vegetables. English names for the plant and its fruit include bitter melon or bitter gourd. The original home of the species is not known, other than that it is a native of the tropics. It is widely grown in India, South Asia, Southeast Asia, China, Africa and the Caribbean. Bitter melons have been used in various Asian traditional medicine systems for a long time. Like most bitter-tasting foods, bitter melon stimulates digestion. While this can be helpful in people with sluggish digestion, dyspepsia, and constipation, it can sometimes make heartburn and ulcers worse. The fact that bitter melon is also a demulcent and at least mild inflammation modulator, however, means that it rarely does have these negative effects, based on clinical experience and traditional reports. Herbaceous, slender climber with slightly pubescent stems and leaves; leaves to 10-12 cm long, palmately 5-7-lobed; the lobes, sinuate-dentate; flowers yellow; peduncle with a reniform bracteole; corolla 1.5-2 cm long; fruit obovoid or oblong-cylindric, coarsely ridged and bumpy-tuberculate, to 20 cm, orange or dark yellow when ripe, splitting open to reveal the seeds, these black but covered with a soft, fleshy red aril, 12-16 mm long [1].

In a study conducted to evaluate the potential of seed and fruit extract of on various human cancer cell lines, including lung cancer (A549), breast cancer (MCF-7), chronic myeloid leukemia (K562) and T cell leukemia (Jurkat) through MTT assay, showed ethanolic fruit extract to have better potency [2]. In a randomized, double-blinded, placebo-controlled, clinical trial, 12 patients received 2000 mg/day *M. charantia* for 3 months showed significant decreases in weight, body mass index, fat percentage, glycated hemoglobin A1c (A1C), 2-h glucose in OGTT, etc in comparison to placebo thus acting as a strong anti-diabetic agent [3].Polysaccharides of *Momordica charantia* were checked for anti-oxidant potential by scavenging capacity of hydroxyl radicals, superoxide anion, DPPH free radical emerged as a good candidate [4]. In an agar-well diffusion method of estimation of anti-microbial activity of leaves of *M. charantia* against *Pseudomonas aeruginosa, Escherichia coli,* Staphylococcus aureus *and Bacillus subtilis,* both aqueous and ethanol extracts inhibited the growth of all the tested pathogenic bacteria [5].

Reviewing the above literature and also knowing the historical uses and utilization of Bitter gourd one can consider bitter gourd as a good source in management of various diseases. Keeping its wide range of medicinal properties it is important to standardise this plant. Hence this Pharmacognostic study.

Materials and Methods
Voucher specimen: The plant materials were collected and Identity was confirmed with the voucher specimen using [6]. Physico-chemical values such as the percentage of total ash, acid-insoluble ash, and water and alcohol-soluble extractives were calculated as per the Ayurvedic Pharmacopeia of India, [7].TLC fingerprinting profile carried as per [8]. For the Anatomical studies, transverse sections (TS) and powder microscopy studies were prepared and stained [9, 10]. A standard guideline for total microbial Limit count was provided by WHO [11].

Results and Discussions
Pharmacognosy

Table 1: Pharmacognosy features

Physicochemical Constants			Organoleptic Characters	
Parametrs	**Values**	**Limit**	**Parametrs**	**Values**
TA	17.5%	NMT 11%	Taste	Bitter
AIA	0.1%	NMT 1%	Color	Brownish
ASE	12.9%	NLT 28%	Odour	Mild
WSE	32.5%	NLT 6%	Texture	Fibrous

TA - Total Ash; AIA - Acid Insoluble Ash; ASE - Alcohol Soluble Extractive; WSE - Water Soluble Extractive, NMT- Not More Than, NLT- Not Less Than Limit as prescribed by Ayurvedic Pharmacopeia of India

The physcio-chemical values were not within the limit. The deviation from the parameter of could be due to the presence of adulteration such as salts, silica or improper handling of raw materials (table1).

Table 2: TLC Profile

TLC Finger Printing Profile								
Under Visible Light								
Rf Values	-	-	-	-	-	-	-	-
Sprayed with 10% H_2SO_4								
Rf Values	0.35	0.4	0.62	0.77	0.96	-	-	-
Sprayed with Anisaldehyde								
Rf Values	0.07	0.15	0.31	0.4	0.49	0.61	0.77	0.96
Under Short UV (254 nm)								
Rf Values	0.61	0.77	0.96	-	-	-	-	-
Under Long UV (366 nm)								
Rf Values	-	-	-	-	-	-	-	-

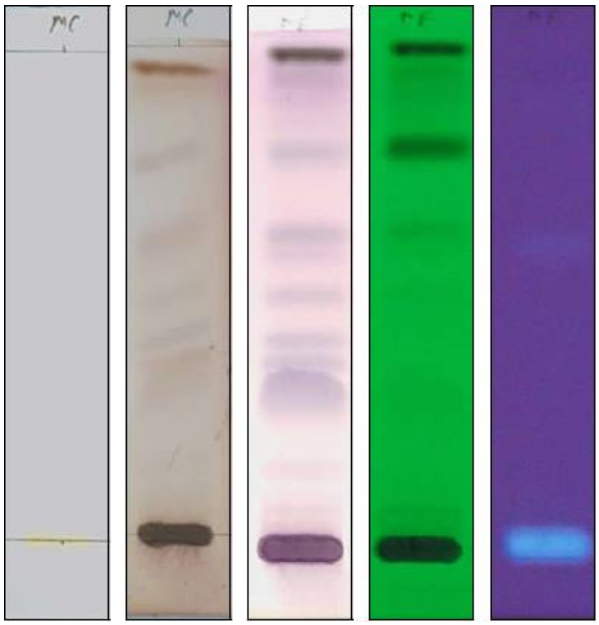

Fig 1: TLC Profile

Momordica charantia showed no band under visible light, 5 bands when sprayed with 10% H_2SO_4 and 8 bands when sprayed with Anisaldehyde. Further 3, 0 band were observed under short and long UV light respectively. The results are qualitative TLC finger print profile of plant under study (table 2, fig 1)

Anatomical Characters

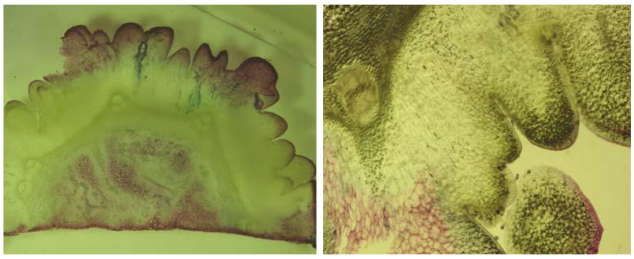

Fig 2: Anatomical Characters of *Momordica charantia*

Single layer of epidermis followed by a large cortical region with parenchymatous cells, In the cortical region fibro vascular bundles are seen, Vascular bundles are collateral and circular which are situated on the cortical region, Vascular bundles are surrounded by thick endodermis, Phloem cells are covered by proto xylem and metaxylem, metaxylem cells are situated towards epidermal region and proto xylem cells are present pith region, At the center of the fruit abundant air spaces are present with airenchyma cells (fig 2).

Powder Characters: Powder Colour: Creamish yellow:

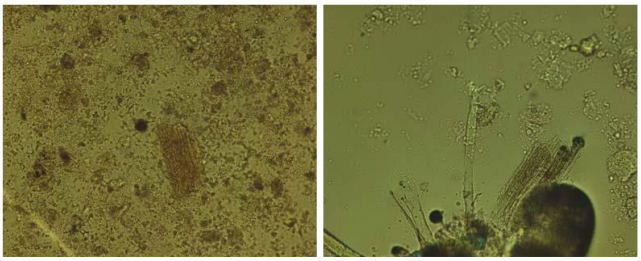

Fig 3: Powder characteristics of *Momordica charantia*

1. Polygonal parenchyma cells and epidermal cells,
2. Many number of fibers, palisade parenchyma cells, present,
3. Stone cells and starch grains are present.

Powder microscopy enables the acquisition of knowledge about the various broken parts of the sample that are particular and play a crucial role in the recognition of the raw sample (fig 3).

Microbial Limit Test

Total Aerobic Bacterial Count (TABC): 2.5 x 10^3

Total Yeast and Mould Count (TYMC): 2.1 x 10^3

(Microbial contamination limit for raw herbs - TABC: $<10^7$, TYMC: $<10^5$)

All criteria were within the limits specified by the WHO Guidelines and Indian Herbal Pharmacopeia

Conclusion

In the present study, pharmacognostic parameters of *Momordica charantia*, a therapeutically important plant has been studied to standardize and authenticate the plant material. Physicochemical values did not obey with the limits as prescribed by Ayurevedic pharmacopeia of India which could suggest improper handling of plants. TLC profile can act as fingerprint profile of the plant. Organoleptic, anatomical and powder microscopic studies are unique to the given plant. Microbial limit of the raw herb was well with the limit recommend

References

1. Anilakumar KR, Kumar GP, Ilaiyaraja N. Nutritional, pharmacological and medicinal properties of Momordica charantia. International Journal of Nutrition and Food Sciences. 2015; 4(1):75-83.
2. Güneş H, Alper M, Çelikoğlu N. Anticancer effect of the fruit and seed extracts of Momordica charantia L. (Cucurbitaceae) on human cancer cell lines. Tropical Journal of Pharmaceutical Research, 2019, 18(10).
3. Cortez-Navarrete M, Martínez-Abundis E, Pérez-Rubio KG, González-Ortiz M, Méndez-del Villar M.

Momordica charantia administration improves insulin secretion in type 2 diabetes mellitus. Journal of medicinal food. 2018; 21(7):672-677.
4. Chen F, Huang G, Yang Z, Hou Y. Antioxidant activity of Momordica charantia polysaccharide and its derivatives. International journal of biological macromolecules. 2019; 138:673-680.
5. Mada SB, Garba A, Mohammed HA, Muhammad A, Olagunju A, Muhammad AB. Antimicrobial activity and phytochemical screening of aqueous and ethanol extracts of Momordica charantia L. leaves. Journal of Medicinal Plants Research. 2013; 7(10):579-586.
6. Gamble JS. Flora of the Presidency of Madras. Newmann and Adlard London West, 1935, 1-3.
7. The Ayurvedic Pharmacopoeia of India, Ministry of Health and Family welfare, Govt. of India. 2001; l:1-4.
8. Stahl E Thin layer chromatography, Springer International Student Edition New York, 1965.
9. Wallis TE. Text Book of Pharmacognosy, Fifth Edition, CBS Publication and Distributors, 1957, 389-396.
10. Johansen D. A. Plant Micro technique. McGraw-Hill, New York, 1940, 523.
11. WHO. Quality Control methods for Medicinal Plant materials, WHO, Geneva, 1998, 22.