CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

https://zenodo.org/records/13359229

https://www.iajps.com/volumes/volume11-august-2024/22-issue-08-august-24/

Available online at: http://www.iajps.com *Research Article*

PHYTOCHEMICAL ANALYSIS OF HYDROALCOHOLIC EXTRACT OF THE *MORINGA OLEIFERA* LAM GUM

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Abstract:

AIM: A preliminary phytochemical investigation of the hydroalcoholic extract of Moringa oleifera Lam's gum is the goal of this work.

Techniques: The dried powder of M. oleifera Lam gum was extracted using a water-ethanol mixture, and its contents were analyzed for tannins, alkaloids, steroids, triterpenoids,

flavonoids, cardiac glycosides, saponins, carbohydrates, phytosterols, proteins, and amino acids, along with a positive control and blank.

Findings: It appears that there are tannins, alkaloids, flavonoids, triterpenoids, cardiac glycosides, phytosterols and carbohydrates.

In this extract, the tests for proteins, fixed oils, and fats came back negative.

Key word: Moringa oleifera, Extract, Gum, Phytochemical Analysis

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Please cite this article in press Athulya V O et al., ***Phytochemical Analysis Of Hydroalcoholic Extract Of The Moringa Oleifera Lam Gum.,****Indo Am. J. P. Sci, 2024; 11 (8).*

INTRODUCTION:

Moringa oleifera Lam, a well-known and widely grown species in the Moringaceae family, has numerous medicinal values from leaves, roots, bark, gum, seeds, flowers, and fruits.

Several names for the plant exist, such as "Mother's Best Friend," "ben oil tree," "drumstick tree," horseradish tree, and miracle tree. It is used in indigenous medicine for treating inflammation, infection diseases, and disorders. anticancer properties.

Phytochemical analysis shows the presence of potential bioactive components that have Anti-oxidant, Anti Inflammatory and free radicle scavenging properties.

MATERIALS AND METHODS:

Collection and Authentication of plant

Fresh gum from the *Moringa oleifera lam* plant was collected in the months of April to July from the locality of Cheruvandoor in the Kottayam District of Kerala State, India.

The Gum of Moringa oleifera plant was authenticated by Dr. Rogimon P. Thomas, Ph.D.

Associate Professor & Head Department of Botany, CMS College Kottayam (Autonomous), Kerala, India

Extraction Method

The gum of *Moringa oleifera* was first dried in the shade, then in a desiccator. The gum was then ground into a powder using a mortar and pestle to reduce its size, and lastly, it was powdered into fine particles using an electrical grinder. The extraction process was done using the cold maceration method. About 100 grams of dried gum powder were extracted over the course of seven days with sporadic shaking for an hour each day using hydroalcoholic solution of water : ethanol (90 ml : 210 ml) ratio. The extract was obtained, filtered through Whatman filter paper NO 1, and then evaporated in a heating mantle at 40 °C. It was then kept dry in a desiccator.




Preliminary phytochemical screening:
The preliminary phytochemical screening was carried out according to the recommended standard procedures (Kokate, 1997) (Wallis, 1985) (Khandalwal, 2008).

Phytochemical analysis A stock concentration of 1 % (W/ V) of extract obtained using hydroalcoholic solution of water : ethanol (90ml:210 ml) ratio These extracts along with positive and negative controls were tested

Phytochemical analysis
A stock concentration of 1 % (W/ V) of extract obtained water and ethanol. These extracts along with positive and negative controls were tested for the presence of active phytochemicals viz: tannins, alkaloids, phytosterols, triterpenoids, flavonoids, cardiac glycosides, glycosides, saponins, carbohydrates, proteins, amino acids and fixed oils & fats following standard methods:

I. Tannins
1. Ferric chloride Test:
Added a few drops of 5% ferric chloride solution to 2 ml of the test solution. Formation of blue colour indicated the presence of hydrolysable tannins.
2. Gelatin Test:
Added five drops of 1% gelatin containing 10% sodium chloride to 1 ml of the test solution. Formation of white precipitates confirmed the test.

II. Alkaloids
Approximately 50 mg of extract was dissolved in 5 ml of distilled water. Further 2M hydrochloric acid was added until an acid reaction occurred and filtered. The filtrate was
tested for the presence of alkaloids as detailed below
1. Dragendorff's Test:
To 2 ml of the filtrate was added 1 ml of Dragendorff's reagent along the side of the test tube. Formation of orange or orange reddish brown precipitate indicated the
test as positive.
2. Mayer's Test
To 1 ml of test solution or filtrate was added a drop or two of the Mayer's
reagent along the sides of the test tube. A white or a creamy precipitate confirmed the test as positive.
3. **Hager's Test**:
To 1 ml of test solution or filtrate, a drop or two of Hager's reagent was added.
The formation of yellow precipitate indicated the test as positive.
4. **Wagner Test:**
Two drops of Wagner's reagent was added to 1ml of the test solution along the side of the test tube. The formation of yellow or brown precipitate confirmed the test as positive for alkaloids.

III. Phytosterols
1. Liebermann-Burchard's Test:
The extract (2 mg) was dissolved in 2 ml of acetic anhydride, heated till boiling, cooled and then 1 ml of concentrated sulfuric acid was added along the side of the test tube. A brown ring formation at the junction and the turning of the upper layer to dark green colour confirmed the test for the presence of phytosterols.

IV. Triterpenoids
1. Salkowski Test:
Approximately 2 mg of dry extract was shaken with 1 ml of chloroform and a few drops of concentrated sulfuric acid were added along the side of the test tube. A red brown colour formed at the interface indicated the test as positive for triterpenoids.

V. Flavonoids
1. Shinoda test: -
A few magnesium turnings and 5 drops of concentrated hydrochloric acid was added drop wise to 1 ml of test solution. A pink, scarlet, crimson red or occasionally green to blue colour appeared after few minutes confirmed the test.

2. Alkaline reagent test: -
Addition of 5 drops of 5% sodium hydroxide to 1 ml of the test solution resulted an increase in the intensity of the yellow colour which became colourless on addition of a few drops of 2 M hydrochloric acid which indicated the presence of flavonoids.
3. Lead acetate test: -
A few drops of 10% lead acetate added to 1ml of the test solution resulted in the formation of yellow precipitate confirmed the presence of flavonoids

VI. Saponins
1. Foam Test:
5 ml of the test solution taken in a test tube was shaken well for five minutes. Formation of stable foam confirmed the test.
2. Olive oil test:
Added a few drops of olive oil to 2ml of the test solution and shaken well. The formation of a soluble emulsion confirmed the test.

VII. Cardiac glycosides
1. Keller - Killiani test:
Added 0.4 ml of glacial acetic acid and a few drops of 5% ferric chloride solution to a little of dry extract.

Further 0.5 ml of concentrated sulfuric acid was added along the side of the test tube carefully. The formation of blue colour in acetic acid layer confirmed the test

VIII. Test for carbohydrates

1. Molisch's test:

To 1 ml of test solution added a few drops of 1 % alpha-naphthol and 2-3 ml concentrated sulfuric acid along the side of test tube. The reddish violet or purple ring formed at the junction of two liquids confirmed the test.

2. Barfoed's test:

2ml of reagent was added to 2 ml of the test solution, mixed &
kept a in boiling water bath for 1 min. Red precipitate formed indicates the presence of monosaccharides.

3. Seliwanoffs test:

To 3 ml of Seliwanoffs reagent was added to 1 ml of the test sample and heated on a water bath for one minute. The formation of rose red colour confirmed carbohydrates

4. Fehling's test:

Dissolved 2 mg dry extract in 1 ml of distilled water and added 1ml of Fehling's(A+B) solution, shaken and heated on a water bath for 10 minutes. The brick red precipitate formed confirmed the test.

IX. Test for proteins

1. Biuret test:

To 2 ml of the test solution added 5 drops of 1% copper sulphate solution and 2 ml of 10% NaOH. Mix thoroughly. Formation of purple or violet colour confirmed proteins. X. Test for amino acids

1. Millon's test:

Added 5 drops of Millon's reagent to 1 ml of test solution and heated on a water bath for 10 min, cooled and added 1% sodium nitrite solution. Appearance of red colour confirmed the test.

X. Fats and fixed oils

To 5 drops of the sample was added 1 ml of 1% copper sulphate solution and a few drops of 10% NaOH. Mix thoroughly. Formation of purple or violet colour confirmed proteins.

RESULTS AND DISCUSSION:

Phytochemicals screening: hydro-alcoholic extract of gum of Moringa oleifera Lam

Test		***water ethanol mixture***
Tannin	Ferric chloride	+
	Gelatin	-
Alkaloids	Dragendorff's	+
	Hager's	+
	Mayer's	+
	Wagner's	+
Phytosterols	Liebermann-Burchard	+
Triterpenoids	Salkowski	+
	Shinoda	+
	Lead acetate	+

Flavonoids	Alkaline reagent	-
Saponins	Foam	-
	Olive oil	-
Cardiac Glycoside	Keller Killani	+
Carbohydrates	Molisch's	+
	Barfoed's	-
	Fehling's	+
	Seliwanoff's	-
Proteins	Biuret	-
Amino acid	Millon's	-
Fixed Oils And Fats		-

Phytochemical Analisis of hydo alcoholic (ethanolic) Extract of gum of *Murinja oleifera* LAM using Ethanol water mixture

➢ **Alkaloids**

1. *Dragendroff Test*

A. Blank

B. Hydroalcoholic extract

1) *Dragendorff's Test*

2) *Mayer's Test*

3) *Wagner's Test*

4) *Hager's Test*

Tannin

1) *Ferric chloride Test*

2) *Gelatin Test*

Flavonoids

1) Shinoda Test

2) Lead acetate test

Cardiac Glycoside

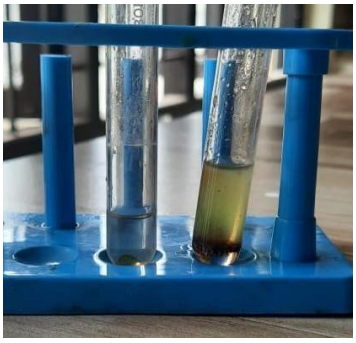
1) *Keller Killani Test*

Triterpenoids

1) *Salkowski Test*

Phytosterols

1) *Liebermann-Burchard*



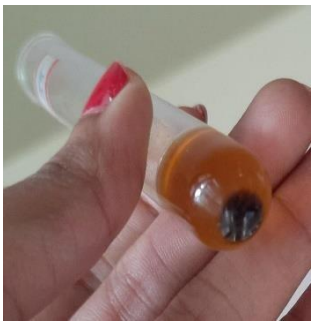
A. Blank

B. Hydroalcoholic extract

➢ **Carbohydrates**

1) *Molisch's Test*

Fehling's Test



CONCLUSION:

The outcomes of the phytochemical tests used indicated that hydrolysable tannins were present in the hydroalcoholic extracts.

The results of Dragendorff's alkaloids test in hydroalcoholic extract were positive. In this case, the Libermann-Burchard test for phytosterols came out positive.

Moreover, the triterpenoid Salkowski test produced good results.

Both the Shinoda and lead acetate assays revealed a significant level of flavonoids.

The extract did not pass the foam test, and the saponin tests conducted on olive oil likewise yielded unsatisfactory results. This Kellar-Killani test result for cardiac glycoside was positive.

The results of the Molisch and Fehling's test showed that this extract contained a significant amount of carbs.

Low levels of carbohydrates were found in Barfoed's test.

The unfavourable outcomes of Seliwanoff's test revealed that the lowest level of keto sugars was present.

REFERENCES:

1. Lowell J and Fuglie NY: The miracle Tree: Moringa oleifera, Natural nutrition for tropics. Church World service; Darkar.1999: 68pp
2. Mishra G, Singh P, Verma R, Kumar S, Srivatsav S, Jha KK, and Khosa RL. Traditional uses, phytochemistry and pharmacological

properties of Moringa oleifera plant: An overview. Der Pharmacia Littre. 2011; 3(2): p.141-164.
3. Fahey, JW. Moringa oleifera: A review of the medical evidence for its nutritional, therapeutic and prophylactic properties. Part 1. Trees for life Journal. 2005; 1(5): p 5- 20.
4. Dahiru, D.,Onubiyi JA, and Umaru HA. Phytochemical screening and Antiulcerogenic effect of Moringa oleifera aqueous leaf extract; Afr.J.Trad.CAM 2006; 3(3): p.70-75.
5. Kasolo JN Gabriel S. Bimenya, Lonzy Ojok, Joseph Ochieng and Jasper W. Ogwal-Okeng.Phytochemicals and uses of Moringa oleifera leaves in Ugandan rural communities. Journal of Medicinal Plants Research 2010; 4(9): p. 753-757.
6. Koruthu DP, Manivarnan NK,Gopinath A and Abraham R. Antibacterial evaluation, reducing power assay and phytochemical screening of Moringa oleifera leaf extracts: effect of solvent polarity. International Journal of Pharmaceutical sciences and research. 2011; 2(11): p. 2991-2995.
7. Shahriar M. Hossain MI, Bahar AN M, Akhter S, Haque MA. and Bhuiyan MA. Preliminary Phytochemical Screening, In-Vitro Antioxidant and Cytotoxic Activity of Five Different extracts of Moringa Oleifera Leaf; Journal of Applied Pharmaceutical Science. 2012 ;02 (05); p.65-68.
8. Manaheji H, Jafari S, Zaringhalam J, Rezazadeh S, Taghizadfarid R. Analgesic effects of methanolic extract of the leaf or root of Moringa oleifera on complete Freund's Adjuvant – induced arthritis in rats; J. Chinese Integrative Medicine.2011; 9(2): p.216- 219.
9. Harborne JB, Phytochemical method, A Guide to Modern technique of Plant Analysis. 3rd Edition, Chapman and Hall. New York: -198, (1998)
10. Kokate CK. A textbook of Practical pharmacognosy .5th Edition, Vallabh Prakashan New Delhi: 107-111, (2005).
11. Rastogi T, Bhutda V, Moon K, Aswar PB & Khadabadi SS. Comparative Studies on Anthelmintic Activity of Moringa oleifera & Vitex negund. Asian J. Research Chem. 2009; 2(2): p.181-182.
12. Chuang PH, Lee CW, Chou JY, Murugan M, Shieh BJ and Chen HM. Anti-fungal activity of crude extracts and essential oil of Moringa oleifera Lam. Biosource Technol 2007; 98: p.232-236.
13. .Prakash,A. Ovarian response to aqueous extract of Moringa oleifera. 1998. Fitoterapia. 1998; 59: p 89–91. 14. Shukla S, Mathur R, Prakash AO. Effects of aqueous extract of Moringa oleifera Lam. on the periodicity of oestrous cycle in adult intact rats. Indian Journal of Pharmacological Science. 1981; 49: p. 218–219.
14. Jaiswal D, Rai PK, Kumar A, Mehta S, Watal G. Effects of Moringa oleifera Lam, leaves aqueous extract therapy on hyperglycaemic rats. J. Ethnopharmacology.2009; 123: p.392-396.
15. Burali SC, Kanagralkar V, Sravani OS, Patil SL; The beneficial effect of ethanolic extract of Moringa oleifera on osteoporosis. Inter.J.Pharmaceutical Applications. 2010; 1(1): p.50-58.
16. . Gupta A., Gautam MK., Singh RK.,Vijaykumar M. Rao CV, Goel RK & Anuparba S. Immunomodulatory effect of Moringa oleifera Lam extract on cyclophosphamide induced toxicity in mice. Ind.J.Exp.Biol. 2010; (48): p.1157-1160.
17. Siddhartha D and Guha D. Role of Moringa oleifera on enterochromaffin cell count and serotonin content of experimental ulcer model. Ind.J.Exp.Biol. 2007; p .726-731.
18. Patel RK, Patel MM, Patel MP, Kanzaria NR, Vaghela KR and Patel N. J. Hepatoprotective Activity of Moringa oleifera Lam. fruit on isolated rat hepatocytes. Phcog Mag. 2008; 4(15):118- 123.
19. Makkar HPS, Becker K. Nutrional value and antinutritional components of whole and ethanol extracted Moringa oleifera leaves. Animal feed science and technology. 1996; (1-4) 63: p 211-228.
20. Rathi BS Bodhank SL & Baheti AM. Evaluation of aqueous leaves extract of Moringa oleifera Linn. for wound healing in albino rats. Ind.J.Exp.Biol. 2006; (44): p.898-901.
21. Tahiliani P, Kar A. Role of Moringa oleifera leaf extract in regulation of thyroid hormone status in adult male and female rats. Pharmacological Research.2000;(41):p. 319–323
22. Roopalatha UC and Vijay mala (Grover) Nair, phytochemical analysis of successive re-extracts of the leaves of Moringa oleifera lam. International Journal of Pharmacy and Pharmaceutical Sciences Vol 5, Suppl 3, 2013 P630-631