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A comparative Phyochemical studies on the leaf of Swertiachirata and Zizyphusmauritiana leaf extracts.

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Abstract

Swertiachirata is a genus in the gentian family and Zizyphusmauritiana is also known as Indian jujube is a tropical plant belonging to family Rhamnaceae.Both these plants have widespread use in traditional medicines for the treatment of malaria,loss of apetite cancer ,diabetes,woundhealing,antioxidant etc.

Objective:Phytochemical Chemical Analysis of leaf extracts of Swertiachirata and Zizyphusmauritiana was carried which shows the presence of various active constituents like carbohydrates,alkalois,glycosides,in this work a comparative phytochemical study was carried on both the leaf extracts.

Materials:Leaf extracts of both the plants was prepared by using soxhlet extraction method using ethanol and evaporated .The crude extract obtained was subjected to various phytochemical using several reagents.

Results:Phytochemical screening of both the extracts shows the presence of various active constituents like alkaloids,glycosides,flavonoids,saponins,carbohydrates ,proteins,steroids and tannins.

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Conclusion:This studies shows both these plants shows a number of active constituents responsible for treatment of various kinds of ailments.

Keywords:Chemicalconstituents,phytochemistry,active constituents

Introduction

Our country has a vast knowledge base of Ayurveda whose potential is only being realized in the recent years. However, the drug delivery system used for administering the herbal medicine to the patient is traditional and out-of-date, resulting in reduced efficacy of the drug.. Herbs are staging a comeback, herbal 'renaissance' is happening all over the globe and more and more people are taking note of herbal therapies to treat various kinds of ailments in place of mainstream medicine. There are three main reasons for the popularity of herbal medicines:

- There is a growing concern over the reliance and safety of drugs and surgery.
- Modern medicine is failing to effectively treat many of the most common health conditions.
- Many natural measures are being shown to produce better results than drugs or surgery without the side effects[2,3].

Also there is increasing evidence that many current drug therapies simply suppress symptoms and ignore the underlying disease processes. In contrast, many natural products appear to address the cause of many diseases and yield superior clinical results. Unfortunately, most physicians and patients are not aware that these natural alternatives exist. Some drugs have an optimum concentration range within which maximum benefit is derived, and concentrations above or below this range can be toxic or produce no therapeutic benefit at all[4].

Additionally, after the approbation made by WHO on diabetes mellitus, exploration on hyperglycemic agents from medicinal plants has become more significant. India being diabetic capital of the world is in a need to develop some new and reliable herbal potent dosage forms, because of the health complications and side effects of the synthetic diabetic compounds.

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Medicinal herbs have been of use for thousands of years in one form or another under the indigenous systems of medicine like Ayurveda, Siddha and Unani. Since independence in 1947, Most of the biologically active constituents of plants are polar or water soluble molecules[9-11].

In this we are studying a comparative phytochemical studies of two plant drug having antidiabetic activity namely Swertiachirata and Zizyphusmauritiana.

Plant Profile

Sweritachirata:

- Hindi Name:Chirayata
- Family:Gentinacece
- Unani Name:Chirata
- AyurvedicName:Kiratatikta

Swertiachirata(Gentianaceae), a popular medicinal herb indigenous to the temperateHimalayas is used in traditional medicine to treat numerous ailments such asliver disorders, malaria, and diabetes and are reported to have a wide spectrumof pharmacological properties. Its medicinal usage is well-documented in Indianpharmaceutical codex, the British, and the American pharmacopeias and in differenttraditional medicine such as the Ayurveda, Unani, Siddha, and other conventionalmedical systems[18]

Zizyphusmauritiana:

- *Family:Rhamnaceae*
- Hindi Name:Ber

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- Sanskrit Name:Badri

Ziziphusmauritiana(Rhamnaceae)used as a folk remedy for a long time for several ailments and diseases.The leaves of the plant have shown a hypoglycemic effect

Comparative Phytochemical studies of Swertiachirata and Zizyphusmauritiana

❖ **Phytochemical screening of plant extract.**

The crude extract obtained by solvent extraction was subjected to various qualitative tests to detect the presence of common chemical constituents as: alkaloid, glycoside, carbohydrate, phytosterol, saponin, tannin, flavonoid and protein etc.

Tests for Alkaloids

Dragendorff's test

In the pipette 1 ml of extract and 1 ml of Dragendorff's reagent (potassium bismuth iodide solution) was added. An orange-red precipitate were appeared which indicated the presence of alkaloids.

Mayer's test

In the pipette 1 ml of extract and 1 ml of Mayer's reagent (Potassium mercuric iodide solution) were added. Whitish yellow or cream colored precipitate indicated the presence of alkaloids.

Wagner's test

In the pipette 1 ml of extract and 1 ml of wagner's reagent (Iodine potassium iodide solution) were added. Reddish brown precipitate indicated the presence of alkaloids.

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Tests for Glycosides

Killer-killani test

Dissolved 2 ml of extract in Glacial acetic acid and then added one drop of 5% $FeCl_3$ and conc. H_2SO_4. Reddish brown color appeared at the junction of the two liquid layers and upper appeared bluish green indicated the presence of glycosides.

Baljet's test

To 1ml of the test extract, 1ml of sodium picrate solution was added and the yellow to orange color revealed the presence of glycoside.

Foam test

0.5gm extract vigorously shaken with water than formation of a layer of foam. It's indicated the presence of glycosides

Tests for Carbohydrate

Benedict's test

To 5ml of Benedict's reagent, 1ml of extract solution was added and boiled for 2 minutes and cooled. Formation of red precipitate indicated the presence of sugars.

Molisch's test

A small fraction of extract was taken in ethanol separately and a few drops of 20% w/v solution of α-napthol in ethanol (90%) were added to it. After shaking well, about 1 ml of concentrated sulphuric acid was allowed to flow carefully by the side of the test tube. A reddish violet ring at the junction of the two layers indicated the presence of carbohydrates.

Fehling's test

Extract heated with dil. HCL than neutralized with NaOH than added fehling's solution A & B. Brick red precipitate was formed. It's indicated the presence of carbohydrates.

Tests for Steroids

Salkowski test

The extract was dissolved in chloroform and equal volume of conc. H_2SO_4 was added. Formation of bluish red to cherry color in chloroform layer and green fluorescence in the acid layer represents the steroidal components in the tested extract.

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Liebermann-Burchard test

A small portion from extract was taken with about 1 ml of acetic anhydride and dissolved by warming. The contents were cooled and a few drops of concentrated sulphuric acid were added in each case by the sides of the test tube. Appearance of blue colour indicated the presence of sterols.

Test for Proteins

Biuret test

Add 1ml of 40% sodium hydroxide solution and 2 drops of 1% CuSO4 solution till a blue color is produced, and then add to the 1ml of the extract. Formation of pinkish or purple violet color indicates the presence of proteins.

Tests for Saponins

Froth test

A little fraction of extract was boiled with about 1 ml of distilled water and shaken. Appearance of a characteristic foam formation indicated the presence of Saponins. Aqueous and alcoholic extract were tested directly.

Foam test

A little fraction of extract was taken with about 2 ml of distilled water. A small quantity of sodium carbonate was added to each and shaken. The characteristic foam formation indicated the presence of Saponins. Aqueous and alcoholic extract were tested directly.

Test for Phenolic Compounds and Tannins

i) Take the little quantity of test extract and mixed with basic lead acetate solution. Formation of white precipitates indicates the presence of tannins.

ii) To 1 ml of the extract, add ferric chloride solution, formation of a dark blue or greenish black colour product shows the presence of tannins.

iii) The little quantity of test extract is treated with potassium ferric cyanide and ammonia solution. A deep red colour indicates the presence of tannins.

iv) To the test extract, add strong Potassium dichromate solution, a yellow colour precipitate indicates the presence of tannins and phenolics.

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Tests for Flavonoids

Shinoda test

To the test solution add few magnesium turnings and concentrated hydrochloric acid drop wise, pink scarlet, crimson red or occasionally green to blue colour appears after few minutes.

Alkaline reagent test

To the test solution add few drops of sodium hydroxide solution, intense yellow color is formed which turns to colorless on addition of few drops of dilute acid indicate presence of Flavonoids.

Lead acetate Test

Extract was treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates the presence of flavonoids.

Results and Conclusion

❖ Phytochemical analysis of Swertiachirata

S.NO.	Identification Test	Test name	Present	Absent
1	Alkaloids	Mayer's test	+	
		Dragendorff's test	+	
		Wagner's test	+	
2	Glycosides	Killer-killani test		-
		Baljet test		
		Foam test	+	
3	Carbohydrates	Molisch's test		
		Fehling test	+	
		Benedict test		
4	Tannins	Vanillin-HCL test		
		Lead acetate test	+	

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		Ferric chloride test		
5	Flavonoids	Lead acetated test		-
		Shinoda test		
		Alkaline reagent test		-
6	Steroids	Libermamm-Burchard test		
		Salkowski test		-
7	Protein and amino acid	Biuret test		
9	Saponins	Froth test	+	
		Foam test	+	

❖ Phytochemical analysis of Zizipusmauritiana

S.NO.	Identification Test	Test name	Present	Absent
1	Alkaloids	Mayer's test	+	
		Dragendorff's test	+	
		Wagner's test		
2	Glycosides	Killer-killani test	+	
		Baljet test		
		Foam test	+	
3	Carbohydrates	Molisch's test		
		Fehling test		-
		Benedict test		-
4	Tannins	Vanillin-HCL test		
		Gelatin test		
		Ferric chloride test	+	
5	Flavonoids	Lead acetated test		
		Shinoda test		
		Alkaline reagent test	+	

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6	Steroids	Libermamm-Burchard test		
		Salkowski test		
7	Protein and amino acid	Biuret test		-
		Precipitation test		
		Xanthoproteic test		
8	Resins	Colour detection with ferric chloride		
		Turbidity test		
9	Saponins	Froth test	+	
		Foam test	+	

References:

1. Kumari P, Singh N, Cheriyan P, Neelam. Phytosomes: A novel approach for phytomedicine. Int J Inst Pharm Life Sci. 2011;1:89-100.

2. Saha S, Sharma A, Saikia P, Chakrabarty T. Phytosomes: A brief overview. SchAcad J Pharm. 2013;2:12-20.

3. Srikanth V, Laxmaiah CH, Gopi SB, Naveen P, Chiranjeeb B. Phytosome: A novel drug delivery system for improving bioavailability of herbal medicine. Int J Pharm Res Dev. 2011;3(6):175-84.

4. Saraf S, Kaur CD. Phytoconstituents as photoprotective novel cosmetic formulations. Pharmaco Rev. 2010;4:1-11.

5. Amin T, Bhat S. A review on phytosomes technology as a novel approaches to improve the bioavailability of nutraceuticals. Int J Adv Res and Tech. 2012;1:1-15.

6. Patel A, Tanwar Y, Rakesh S, Patel P. Phytosome: Phytolipid drug delivery system for improving bioavailability of herbal drugs. J Pharm Sci and Bio Sci Res. 2013;3:51-57.

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 04, 2021

7. Manach C, Scalbert A, Morand C Polyphenols: food sources and bioavailability. Am J ClinNutr 2004; 79: 727- 747.

8. Bhattacharya S, Ghosh A. Phytosomes: the Emerging Technology for Enhancement of Bioavailability of Botanicals and Nutraceuticals. The Internet Journal of Aesthetic and Antiaging Medici 2009; 2(1): 141- 153.

9. Ansari SH, Islam F, Sameem M. Influence of nanotechnology on herbal drugs: A review. J Adv Pharm Technol Res. 2012; 3(3): 142–6.

10. Chaturvedi M, Kumar M, Sinhal A, Saifi A. Recent development in novel drug delivery systems of herbal drugs. Int J Green Pharm. 2011; 5(2):87–94.

11. Devi VK, Jain N, Valli KS. Importance of novel drug delivery systems in herbal medicines. Pharmacogn Rev. 2010; 4(7): 27–31.

12. Naik S, Pilgaonkar V, Panda V. Evaluation of antioxidant activity of *Ginkgo biloba*phytosomes in rat brain. Phytother Res. 2006;20:1013-6.

13. Semalty A, Semalty M, Rawat MS, Franceschi F. Supramolecular phospholipids-polyphenolics interactions: The phytosome strategy to improve the bioavailability of phytochemicals. Fitoterapia 2010; 81(5):306-14.

14. Gandhi A, Dutta A, Pal A, Bakshi P. Recent trend of phytosomes for delivering herbal extract with improved bioavailability. J PharmacognPhytochem 2012;1(4):6.

15. Bhattacharya S. & Ghosh A: Phytosomes-The Emerging Technology for Enhancement of Bioavailability of Botanicals and Nutraceuticals.The Internet Journal of Aesthetic and Antiaging Medicine 2009.

16. Pandey Shivanand, Patel Kinjal: Phytosomes- Technical Revolution in Phytomedicine. International Journal of PharmTech Research 2010; 1: 627- 631.

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 04, 2021

17. Rathee, S., &Kamboj, A. (2018). Optimization and development of antidiabetic phytosomes by the Box-Behnken design. J Liposome Res, 28(2), 161-172.

18. Ittadwar, P.A., &Puranik, P.K. (2017). Novel UmbelliferonePhytosomes: development and optimization using experimental design approach and evaluation of photo-protective and antioxidant activity. Int J Pharm PharmSci, 9(1), 218-228.

19. Sharma, S., &Sahu, A.N. (2016). Development, characterization, and evaluation of hepatoprotective effect of Abutilon indicum and Piper longumphytosomes. Pharmacogn Res, 8, 29.

20. Saoji, S.D., Raut, N.A., Dhore, P.W., Borkar, C.D., Popielarczyk, M., & Dave, V.S. Preparation and Evaluation of Phospholipid-Based Complex of Standardized Centella Extract (SCE) for the Enhanced Delivery of Phytoconstituents. The AAPS. 2016;1, 102-113.

21. Vora, A., Londhe, V., &Pandita, N. Herbosomes enhance the in vivo antioxidant activity and bioavailability of punicalagins from standardized pomegranate extract. J Funct Foods. 2015;12, 540-8.

22. Bhosale, A.P., Patil, A., &Swami, M. Herbosomes as a novel drug delivery system for absorption enhancement. World Journal of Pharmacy and Pharmaceutical Sciences. 2015;5, 345-355.

23. Zahra, H., Saeed, G., &Hamed, H. Preparation and Characterization of Rutin-loaded Nanophytosomes. Pharmaceutical Sciences. 2015; 21, 145-151.

24. Dhase, A.S., &Saboo, S.S. Preparation and Evaluation of Phytosomes Containing Methanolic Extract of Leaves of *AegleMarmelos* (Bael). International Journal of PharmTechResearch.2015; 8(6), 231-240.

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 04, 2021

25. Abubakar, N.A., Oise, A.E., &Saidu, A.N. Phytochemical Constituents and Hypoglycemic Effect of Aqueous and Ethanolic Extracts of *MurrayaKoenigii* in Alloxan-Induced Diabetic Rats. IOSR Journal of Dental and Medical Sciences. 2014;13(9), 08-12.

26. Gauttam, V.K.,&Kalia, A.N. Development of polyherbal antidiabetic formulation encapsulated in the phospholipids vesicle system. JAdv Pharm Technol Res. 2013; 4(2), 108-17.

27. Khan, J., Alexander, A., Saraf, S., &Saraf, S. Recent advances and future prospects of phyto-phospholipid complexation technique for improving pharmacokinetic profile of plant actives. Journal of Controlled Release. 2013; 168, 50-60.

28. Raihan, O., Brishti, A., Khalequeuzzaman, M., &Ahmed, M. Antihyperglycemic Activity Evaluation of Antidiabetic Herbal Formulations on Alloxan Induced Rats Md. Global Journal of Pharmacology. 2012; 6(3), 226-230.

29. Naik, S.R., &Panda, V.S. Hepatoprotective effect of Ginkgoselect Phytosome in rifampicin induced liver injury in rats: Evidence of antioxidant activity. Fitoterapia. 2008;79(6), 439-445.

30. Kumar V, Van Staden J. A Review of Swertiachirayita (Gentianaceae) as a Traditional Medicinal Plant. Front. Pharmacol. 2016; 6: 308.

31. Bhatia A, Mishra T. Hypoglycemic activity of Ziziphusmauritiana aqueous ethanol seed extract in alloxan-induced diabetic mice. Pharmaceutical Biology. 2010; 48:6, 604-610.