

(RESEARCH ARTICLE)



Phytochemical screening of some selected Sudanese medicinal plants

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Comprehensive Research and Reviews in Biology and Pharmacy, 2022, 01(01), 001–004

Publication history: Received on 16 July 2022; revised on 22 August 2022; accepted on 26 August 2022

Article DOI: <https://doi.org/10.57219/crrbp.2022.1.1.0031>

Abstract

In this study, aims to assess the phytochemicals screening for chloroform, acetone and water extracts of *Mentha spicata*, *Solenostemma argel*, *Ocimum basilicum*, *Linum usitatissimum*, and *Ziziphus spina-christi*, from the Sudan. The results showed the phytochemical screening the presence of tannins, saponins, flavonoids, *terpenoids* and/or *stroids* and alkaloids. The chloroform extract of *Ocimum basilicum* and *Linum usitatissimum* present in all testes, whereas chloroform acetone and water extracts of *Ziziphus spina-christi* shown in all testes. The results obtained showed the *Mentha spicata*, *Solenostemma argel*, *Ocimum basilicum*, *Linum usitatissimum*, and *Ziziphus spina-christi*, were a good source of food and therapeutic agents which could be use pharmaceutical industries and could then be useful in the classification of this plants.

Keywords: Phytochemical screening; *Mentha spicata*; *Solenostemma argel*; *Ocimum basilicum*; *Linum usitatissimum*

1 Introduction

Medicinal plants continue to play animated role as therapeutic agents in primary and secondary health care in developing countries [1]. Sudan is located in tropical Africa and has high plant diversity and a multinational population. In Sudan and other developing countries traditional medicine plays a major role particularly in rural regions due to both economic and cultural reasons [2]. Comprehensive ethnobotanical investigations on Sudanese medicine was reported previously [3-6]. The *Mentha spicata*., a perennial herb with erect square stems and green opposite short stalked and toothed margins leaves. Flowers are borne in whorls in dense terminal spike with a tubular calyx and pale violet bell-shaped (conical) corolla. Length of the plant is between 15 to 50 cm tall and can reach [7].

Solenostemma argel, which belong to the family *sclerpiadaceae*. Extract from the leaves of *S. argel* was used for treatment of diabetes mellitus and renal inflammation [8]. *Ocimum basilicum*., commonly called “king of herbs” belongs to the family *Lamiaceae* [9]. It is an annual plant usually producing white-purple flowers [10]. It is a culinary herb consumed in high quantity due to the characteristic flavors it imparts. The plant is found in many parts of the world especially in the tropical regions of Asia, Africa and central South America [9,11]. *Linum usitatissimum*., is an annual herb of about 0.7m high with blue flowers and a globular capsule. The seed are ovate, flattened and obliquely pointed at one end, about 4-6 mm long and 2-2.5mm broad. The taste is brown, glossy and finely pitted odorless, taste mucilaginous and oily. Seeds are sown at the end of March and flower in June. [12].

Ziziphus spina-christi (*Rhamnaceae*) species are used in folk medicine to treat blisters, bruises, chest pains, dandruff, fractures, headache, and mouth problems. The leaves are traditionally used to treat ulcers, wounds, eye diseases, bronchitis, and skin diseases as an anti-inflammatory agent [13]. The study to investigation the preliminary

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phytochemical screening of the *Mentha spicata*, *Solenostemma argel*, *Ocimum basilicum*, *Linum usitatissimum*, *Ziziphus spina-christi*, from Sudan.

2 Material and methods

2.1 Plant Material

The plants *Mentha spicata*, *Solenostemma argel*, *Ocimum basilicum*, *Linum usitatissimum*, *Ziziphus spina christi*, The plants species was taxonomically identified by Mr.Mubarak Siddig, Department of Botany, Faculty of science, Sudan University of Science and Technology. The plant was washed thoroughly under running water to remove contamination and was shade dried with active ventilation at ambient temperature for 5 days; the dried leaves and flowers were to fine powder using pistil and mortar.

2.2 Preparation of extract

50g from plants samples (*Mentha spicata*, *Solenostemma argel*, *Ocimum basilicum*, *Linum usitatissimum*, *Ziziphus spina christi*.) were placed in 500ml conical flask and then 300ml chloroform, acetone and water were added. The conical flask was placed in the water bath and was allowed to stand for 1 hour. The time was measured after boiling start (after appearance of the first bubble). The mixture was filtered using filter paper while it is hot by using another 500 ml conical flask.

2.3 Qualitative Phytochemical Analysis

Phytochemical screening for the identification of major groups of chemical constituents using standard procedures [14,15]. The phytochemical components analyzed were, tannins, saponins, flavonoids, terpenoids and/or Steroids and alkaloids.

Phytochemical analyses to test for the presence or absence of various phytoconstituents by the following tests:

2.3.1 Test for Tannins (Ferric chloride)

0.5ml of the extract was boiled with 10ml of distilled water in a test tube and then, few drops of 0.1 % ferric Chloride Solution were added and the reaction mixture was observed for blue greenish black Colour change.

2.3.2 Test for Saponins (Frothing Test)

0.5ml the Extract was added to 5ml of distilled water in test Tube. The Solution was shaken vigorously and observed for The Stable persistent forth. Frothing was mixed with 3 drops of olive oil and shaken vigorously after which it was observed for the formation of an emulsion.

2.3.3 Test for Flavonoid

To The 0.5ml of the extract 5ml of distilled water was added and then apiece of magnesium ribbon and 2ml of Concentrated HCL was added. The reaction mixture was observed for the pink or red colour solution.

2.3.4 Test for terpenoids and/or steroids:

To 0.5ml each of the extract 2ml of chloroform was added and then 3ml of the concentration H₂SO₄ Was Carefully added to from a layer. A reddish brawn coloration of the interface indicated the presence of tepenoid and steroids.

2.3.5 Test for Alkaloid

Three different test were used Identification of alkaloids:

Mayer Test

To 0.5ml of the extract 2ml of Mayer's reagent (K₂HgI₄) was added and the reaction mixture was observed for formation of creamy white precipitate.

Wagner test

To 0.5ml of the extract 2ml of wagner's reagent (dilute iodine solution) was added and the reaction mixture is observed for the formation of reddish brown precipitate.

Dragendorffs

To 0.5ml of the extract 2ml of dragendorff's reagent was added, the reaction mixture observed the orange or orange red precipitate indicates the presence of alkaloids.

3 Results and discussion

3.1 Phytochemical screening

Phytochemical screening of chloroform, acetone and water extracts of studied plants was performed for constituents: tannins, saponins, flavonoids, terpenoids and/or steroids and alkaloid (Table1). Many phytochemicals found in plants are either the product of plant metabolism or synthesized for defence purposes. The phytochemicals are either useful or toxic to human body.[16]. The *Mentha spicata.*, the chloroform extract not shows in tannine and alkaloids, Acetone extract found in tannine and terpenoids and/or steroids, water extract shows in flavonoids, terpenoids/or steroids and Alkaloids. Tannins and saponins were also detected in Irish potato tubers. Tannins are known to “tan” the outermost layer of the mucosa and render it less permeable and more resistant to chemical and mechanical injury or irritation [15]. *Solenostemma argel*, chloroform extract shows in all testes expect tannins testes, acetone extract not shows in tannine, saponins and Alkaloids, but water extract not found in saponine and alkaloids. Saponins are steroidal glycosides with foaming characteristics and bitter taste that have beneficial effect on the blood cholesterol levels, fight cancer and help in health and the stimulation of immune system. They are also used for the treatment of viral diseases [16].

Ocimum basilicum, chloroform extract shows in all testes, acetone extract not found in tannins and alkaloids, water extract not found in saponins and flavonoids. *Linum usitatissimum*, chloroform extract shows in all testes, acetone extract not in alkaloids, water extract not found flavonoid and alkaloids. *Ziziphus spina-christi* chloroform, acetone and water extracts shows in all testes. The phytochemicals are either useful or toxic to human body [17].

Table 1 Phytochemical screening of chloroform, Acetone and water extracts under study

plant	Extract	Tannins	Saponins	Flavonoids	Terpenoids and Stroids	Alkaloids
<i>Mentha spicata</i>	Chloroform	-	++	+	+++	-
	Acetone	+	-	-	+	-
	Water	-	-	+	++	++
<i>Solenostemma argel</i>	Chloroform	-	++	+	+	+++
	Acetone	-	-	+	++	-
	Water	++	-	+	+	-
<i>Ocimum basilicum</i>	Chloroform	+	+++	+	+++	+
	Acetone	-	+	+	+	-
	Water	++	-	-	++	+
<i>Linum usitatissimum</i>	Chloroform	+	+	+	++	+++
	Acetone	+	+	+	+++	-
	Water	+	+	-	+++	-
<i>Ziziphus spina-christi</i>	Chloroform	+	+++	+	++	++
	Acetone	++	+	+	+	++
	Water	++	+++	+	+	+

Key: + = present; - = absent

4 Conclusion

The results obtained showed was a good source of therapeutic. Which require further phytochemical studies to assess its active constituents responsible for those biological actions.

Compliance with ethical standards

Acknowledgments

We are grateful to Department of Botany, Faculty of Science, Khartoum University, Khartoum, Sudan and Department of Botany and Microbiology, Faculty of Science, Gezira University.

Disclosure of conflict of interest

No conflict of interest.

References

- [1] Champ M, Langkilde AM, Brouns F, Kettlitz B, Yle CB (2003). Advances in dietary fibre characterisation. Definition of dietary fibre, physiological relevance, health benefits and analytical aspects. *Nutr Res Rev* 16(1): 71-82.
- [2] Bantle JP, Wylie Rosett J, Albright AL, Apovian CM, Clark NG. (2008). Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. *Diabetes Care* 31(Suppl 1): S61-S78.
- [3] Mangoni F, Poli A (2008). The glycemic index of bread and biscuits is markedly reduced by the addition of a proprietary fiber mixture to the ingredients. *Nutr Metab Cardiovasc Dis* 18(9): 602-605.
- [4] Wannamethee SG, Whincup PH, Thomas MC, Sattar N (2009). Associations between DF and inflammation, hepatic function, and risk type 2 diabetes in older men: potential mechanisms for the benefits of fiber on diabetes risk. *Diabetes Care* 32(10): 1823-1825.
- [5] Higgins JA (2004). Resistant starch: metabolic effects and potential health benefits. *J AOAC Int* 87(3): 761-768.
- [6] Theuwissen E, Mensink RP (2008). Water-soluble dietary fibers and cardiovascular disease. *Physiol Behav* 94(2): 285-292.
- [7] Adel Nadjib Chaker, Habiba Boukhebt, Farida Sahi, Rima Haichour and Rachid Sahraoui (2011). Morphological and Anatomical study of two Medicinal plants from genus *Mentha*, *Advances in Environmental biology* 5(2) p:220.
- [8] H MY Hamadnalla, Mohamed M El J. Phytochemical Screening and Antibacterial Activity of *Solenostemma Argel*: A Medicinal Plant. *Open Acc J Envi Soi Sci* 2(4)-2019. OAJESS.MS.ID.000141.
- [9] Yelwa AS, Ogbiko C, Yakubu Y, Usman H and Lawal SI. (2018). Phytochemical screening, in vitro antibacterial and partial TLC purification of different solvents extracts of *Ocimum basilicum* L. *GSC Biological and Pharmaceutical Sciences*, 5(2), 132-138.
- [10] Mohammad A, Moghaddam D and Shayegh J. (2011). Antimicrobial activity of essential oil extract of *Ocimum basilicum* L. leaves on a variety of pathogenic bacteria. *Journal of Medicinal Plants Research*, 5(1), 3453-3456.
- [11] Daneshian A, Gurbuz B, Cosge B and Ipek A. (2009). Chemical components of essential oils from basil (*Ocimum basilicum* L.) grown at different nitrogen levels. *International Journal of Natural and Engineering Sciences*, 3(3), 9-13.
- [12] Ahmed Ali Mustafa (2019). Major, Minor and Trace Elements *Linum Usitatissimum* in Libya. *Am J Biomed Sci & Res.* 2019 - 6(3).
- [13] Mosab Nouraldein Mohammed Hamad. "Phytochemical Screening, Antimicrobial and Antioxidant Activity of *Ziziphus Spina-Christi* (L.) (Rhamnaceae) Leaves and Bark extracts" *MAR Microbiology* 2.2 (2021).
- [14] Sofowora, A (2008). Medicinal plants and traditional Medicine in Africa 3th Edition spectrum Books Ltd Ibadan, Nigeria pp.23-25.
- [15] Mustafa, A.A, El-kamali, H.H (2020). Proximate and phytochemical constituents of *Ocimum sanctum* in Sudan. *Advance Pharmaceutical Journal* 5(6):201-205.
- [16] Mustafa AA, El-kamali H.H.(2019). Chemical Composition of *Ocimum americanum* In Sudan *Res Pharm Health Sci.* ;5(3):172-178.
- [17] Ahmed Ali Mustafa, Reham Mohamed Basher, Nouf Faisal Ibrahim, Afaf R Taher and Haifa Abbas Awad (2020). Preliminary phytochemical screening of some selected medicinal plants in Sudan. *International Journal of Pharmacognosy and Life Science.* 1(2): 47-49