Asian Journal of Basic Science & Research
Volume 2, Issue 2, Pages 09-14, April-June 2020

Phytochemical Screening and Antibacterial Activity of *Pulicaria Crispa* Aerial Parts Extract

Research Article *Country: Sudan*

Received: 09 January 2020 *Accepted: 13 May 2020* *Published: 02 June 2020*

Dr. Mahdi Abd elmageed Mohammed Ali

Department of Biology & Technology, College of Applied Science & Industrial, University of Bahri, Sudan.

Corresponding Author
Author Email:
m73mageed@gmail.com

DOI: 10.38177/AJBSR.2020.2202

Abstract: *This present survey was carried out to examine the phytochemical and antibacterial activity of Pulicaria crispa (Forssk). The plant is an annual herb or a perennial, producing yellow flowers. The plant materials were collected from Khartoum state –western Omdurman area – Sudan. Four solvent (ethanol, methanol, ethyl acetate and water) were used in the extraction. The secondary metabolize compounds were investigated. The antibacterial activity of extracts were evaluated against four standard bacteria (Gram positive; Bacillus subtilis, Staphylococcus aureus) and (Gram negative; Escherichia coli, Pseudomonas aeruginosa). The results provided that, P. crispa is contain very high amount of alkaloids; phenyl and flavonoids in ethanol and ethyl acetate extracts and high amount in methanol extracts and moderate amount in water extract) ; low amount of amino acid in all extracts, high amount of protein in ethanol and low in all extracts, moderate amount of carbohydrate and Saponins in all extracts, high amount of tannins, sterol in ethanol and methanol and low amount in water and ethyl acetate extract. The result of antibacterial tests indicated that the methanol, ethanol and ethyl acetate extract were recorded high activity (21,20,19,18) against all bacteria at concentration (100), and low activity against all bacteria in water extract and most extracts showed same degree of antibacterial activity.*

Keywords: *Folk medicine, antimicrobial, phytochemical screening, Pulicaria Crispa.*

Introduction

Pulicaria crispa (Forssk.) belong to *Asteraceae* family it is an annual herb or perennial producing small yellow flowers (l). The family is distributed in all over the world, *P. crispa* is used in traditional medicine for the treatment of various ailments [2]and has been used for the cure of heart diseases and as gastroprotective, due to its anti-oxidative nature [3] [1-2]. *P. crispa* is an aromatic herb used in folk medicine for the treatment of colds, coughs, colic, excessive sweating and as carminative [4], in Sudan, India , Egypt and Saudi Arabia used for the treatment of inflammation. It is also repellent to insects [3] and it used as an herbal tea [5]. The traditional medicinal plants are increase in both developing and industrialized countries [6][7] reported that both literate and illiterate people still use local plants as drugs in many conditions.

Hydnora abyssinica is a widespread species and was believed to range diagonally across parts of sub-Saharan Africa from northern Namibia to Ethiopia, Somalia and the Arabian peninsula (Musselman and Visser, 1989). ydnora abyssinica is a widespread species and was believed to range diagonally across parts of sub-Saharan Africa from northern Namibia to Ethiopia, Somalia and the Arabian peninsula (Musselman and Visser, 1989). The aims of this study is to determine the phytochemical screening, and antibacterial activities of *Pulicaria Crispa*.

2-Material and Methods

Plant materials

The *P. crispa*, aerial parts were collected from Khartoum state– Omdurman- **Sudan** and identified in herbarium of natural research Centre and compared with herbarium of Faculty of Science University of Khartoum.

2-1-Preparation of Crude Extracts

100g of dried plant was weighted, after washed, the sample was successively extracted using checker methods and analytical grade such as chloroform, distilled water, ethanol, methanol, petroleum ether, acetic anhydride, sulphuric acid, gelatine salt, ferric chloride, reagents (Wagner, Hager, and Dragendorffs), aluminium chloride and potassium hydroxide. The crude extracts were then kept at -20 ºC in sterile universal bottles.

2-2-Phytochemical screening test of different extracts of the plant

General phytochemical screening was carried out for extract using the methods carried by [8][9]. And for extract using the methods described by[10][11][12]..

2-3-Preparation of media and Antibacterial activity test

28g of powdered nutrient agar was weighted, dispersed in 1 liter of distilled water and allowed to soak for 10 minutes, swirl to mix then sterilized by autoclaving for 15 minutes at 121c, cooled to 47c, mixed well then poured into petri dishes.

2-4-Teste of Bacterial Organisms

All the bacteria (two gram negative and two gram positive) bellow were tested

Bacillus subtitles (NCTC 8236 Gram positive bacteria).

Staphylococcus aureus (ATCC 25923 Gram positive bacteria).

Escherichia coli (ATCC 25922 Gram negative bacteria).

Pseudomonas arginosa (ATCC 27853 Gram negative bacteria).

3-Results

Table (1): Result of phytochemical screening *Pulicaria Crispa*

Secondary metabolites	**Extract test**	**Successive method of extraction**			
		Water	Methanol	Ethyl acetate	**Ethanol**

Alkaloids	dragendroffs	+	+++	++++	++++
	Winger	+	+	+++	+++
	Hager	+	+	+	++
Flavonoids	KOH	-	++	++	+++
	NH4OH	-	++	+++	++++
	ALCL3	-	++	+++	+++
	Mg	-	++	+++	+++
Saponins	Foam test	++	++	+++	+++
Phenol	Ferric chloride	++	++++	+++	++++
Sterols & Triterpenes	Liebermann's	+	++	++	+++
	Salkowski	+	++	++	+++
Tannins	Ferric chloride test	++	++++	++	++++
	Gelatin test	++	+++	++	++++
Quinine		+	+	++	+
Terpenoide	-	+	+	++	++
Carbohydrate	Molisch,s .H2SO4	+++	+++	+	++++
Protein	Biuret reagent	-	-	++	++++
Amino acid	ninhydrin	-	-	++	++

Key: Very high=(++++), High=(+++), Moderate=(++), Trace amount=(+) And absent= (-).

Table (2) antibacterial activities of *Pulicaria Crispa* whole plant at concentration 100mg/ml

Extract	**Zone of inhibition in diameters (mm)**				
	Concentration in100 mg/ml	E.c	P.a	S.a	**B.s**
Methanol	100	21	20	18	**19**
	50	18	19	17	**18**
	25	16	17	16	**17**
	12.5	15	14	15	**15**
Ethanol	100	19	19	18	**19**
	50	17	17	17	**18**
	25	16	15	16	**17**
	12.5	13	14	14	**15**
Ethyl acetate	100	19	19	20	**21**
	50	18	17	19	**19**
	25	17	16	18	**18**
	12.5	16	15	17	**16**
Water	100	15	17	16	**17**
	50	14	16	15	**16**
	25	13	14	14	**16**
	12.5	12	13	13	**14**

Key: *B.s, Bacillus subtilis; S.a, staphyllococcus aureus; E.c, Escherichia coli; P.a pseudomonas aeruginosa;* Concentration of extracts (100, 50, 25, 12.5mg/ml). Zone of inhibition in (mm).

4-Discussion

Phytochemical screening was carried out and lead to presence of some secondary metabolites the plant was showed to contain alkaloids, flavonoids, tannins, saponnins, sterol, triterpenes, and cardiac glycosides. The crude extracts was subjected to antibacterial assays using cup plate diffusion method and the inhibition zone were measured in mm. The methanol , ethanol, and ethyl acetate extracts at concentration (100) gave good result against four tested bacteria (E.c, S.a, B.s, and P s) and the low activity (12, 13, 14, 15) was recorded in water extracts at concentration (12.5, 25) against all bacteria.

Acknowledgement

The authors are very grateful to people and laboratories for sharing their knowledge on traditional herbal medicine.

Reference

[1]- Principe, P.E. (1991). Valuing the biodiversity of medicinal plants. In: Akerele,O., Heywood,V., Synge H. (Eds). Conservation of medicinal Plants. Proceedings of an International Consultation. 21-27 March (1988). Chiang Mai, Thailand, Cambridge University Press, Cambridge, pp 79-124.

[2]- Hansel, R. (1972). Medicinal Plants and empirical drug reseach. In : Swain,T. (Eds). Plants in the Development of Modern Medicine. Harvard University Press. Boston pp. 161-174.

[3]- Balandrin M.F., Kinghorn A.D., Farnsworth N.R. (1993). Plant-Derived Natural Products in Drug Discovery and Development. In: Kinghorn, A.D., Balandrin M.F. (Eds). Human medicinal Agents from Plants, ACS Symposium Series 534 American Chemical Society DC, pp 2-12.

[4]-. Elmann A, Telerman A, Mordechay S, Erlank H, Ofir R. (2012). Antioxidant and Astroprotective Effects of a *Pulicaria incisa* Infusion. Oxid Med Cell Longev : 1-10.

[5].- Ali NAA, Sharopov FS, Alhaj M, Hill GM, Porzel A, Arnold N, Setzer WN, Schmidt J, Wessjohann L. (2012).Chemical composition and biological activity of essential oil from Pulicaria undulata from Yemen. Nat Prod Commun ; 7: 257–260.

[6]-WHO (1998). Regulatory Situation of Herbal Medicines, A worldwide Review. World Health Organization, Geneva, Switzerland. http://whqlibdoc.who.int/hq/1998/WHO -TRM-98.1.pdf..

[7]-Koko Waro, J. O. (1976). Medicinal plants of East Africa. East Africa literature. Bureau. Kampala, Nairobi, Dar Es Salam.

[8]- 3-Harborne JB. Phytochemical methods, JB Harborne (ed.), second edition, Champman & Hall, London, New York, 1984, 157.

[9]- Shelley, B. C. (2009). "Ethanobotany & the process of drug discovery: a laboratory exercise." The American Biology Teacher 71(9): 541-547.

[10]- Martinez A, Valencia G: Marcha fitoquimica. In Manual de prácticas de Farmacognosia y Fitoquímica: (1999)1st edition. Medellin: Universidad de Antioquia; 2003:59-65.

[11]- Elgazali B. E. G., Eltohami S. M., El Egami B. A. A. Text book of Medicinal plants of the Sudan, (Medicinal plant of the White Nile province), (1994); 3: 54 - 86. 7. Kavanagh F. Analytical Microbiology. Academic Press, New York and London, 1972 (II): 11

[12]- Gibbons, S. (2008). "Phytochemicals for bacterial resistance-strengths, weaknesses and opportunities." Planta medica 74(06): 594-602.