WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 11, Issue 15, 892-898. Research Article ISSN 2277– 7105

PHYTOCHEMICAL SCREENING AND EVALUATION OF ANTI-BACTERIAL ACTIVITY OF *CLEOME BRACHYCARPA* EXTRACT

N. Bhojak* Amita and Seema Vyas

GCRC, P.G. Department of Chemistry, Govt Dungar College (NAAC 'A' Grade), MGS University, Bikaner 334001, India.

Article Received on
08 Sept. 2022,

Revised on 29 Sept. 2022,
Accepted on 20 October 2022

DOI: 10.20959/wjpr202215-26033

***Corresponding Author**
Dr. N. Bhojak
GCRC, P.G. Department of Chemistry, Govt Dungar College (NAAC 'A' Grade), MGS University, Bikaner 334001, India.

ABSTRACT

The present investigations have been designed with a motive to develop green method to extract different potential phytochemicals found in aerial part of *Cleome brachycarpa* and to evaluate their biological activity. The extracts of *Cleome brachycarpa* were prepared by using Soxhlet extraction protocol and by a developed green method. Different solvents i.e. water, alcohol, petroleum ether and micellar medium were used successively to extract different photochemicals. Preliminary phytochemical screening of extract showed the presence of flavonoids, glycosides, triterpenoids, phenolic compounds. The antibacterial activities of extracts were evaluated by disc diffusion method. For Biological evolution screening of extracts have been carried out against *Escherichia coli*, *Bascillus subtilis* and *Staphylococcus aureus*.

KEYWORDS: Phytochemical screening, antibacterial activity, *Cleome brachycarpa*, extract.

INTRODUCTION

Cleome brachycarpa belongs to Cleomaceae family widely distributed in Africa, Asia, especially in North Africa, Egypt, Saudi Arabia, Afghanistan, Pakistan, India, and Hormozgan province of Iran.[1] The flowers shapes are special so this species are called as spider flowers. *Cleome brachycarpa* is perennial herbs having 50 cm height.[2] Some phytochemicals were isolated from *Cleome brachycarpa* i.e. Cabralealactone, Ursolic, trinortriterpenoid, dilactone deacetoxybrachycarpone, flavonoids, alkaloids.[3] *Cleome brachycarpa* possess anti-inflammatory, antidermatosis (scabies and leucoderma), carminative and anti-emetic, anti-bacterial and antifungl activity, anxiolytic properties.[4]

Cleome brachycarpa also used in positive effect of memory.[5] *Cleome brachycarpa* Vahl. leaves are used for the treatment of rheumatism and effective in leucoderma and scabies. *Cleome brachycarpa* shows hypolipidemic and hepatoprotective effects.[6] Coordination chemistry of bioactive ligands and their biological activities are also one of the most significant area of research in recent past.[7-8] Further these investigations have become more fruitful when synthesis and or extraction carried out by Green methodology.[9-10]

MATERIAL AND METHOD

Sample collection

The aerial parts of *Cleome brachycarpa* were collected from Govt. Dungar College; Bikaner (Rajasthan). The aerial parts were washed with water and dried under shade for 20 days. The dried material was powered and store for further use.

Preparation of extract

The extracts of *Cleome brachycarpa* were prepared by using Soxhlet extraction protocol and by a developed green method. Different solvents i.e. water, alcohol, petroleum ether and micellar medium were used successively to extract different photochemicals.

Phyto-chemical screening

The preliminary phytochemical studies were performed for testing the different chemical groups present in water, alcohol, petroleum ether and micellar media extracts of *Cleome brachycarpa*. Different tests were performed to identify various phytochemicals present in the extracts (11-14).

Test for Alkaloids

Mayer's test: the plant extract was treated with Mayer's reagent and cream colour was observed, indicates the presence of alkaloids.

Test for Flavonoids

NaOH test: 2-3 ml. of extract and few drop of NaOH were taken in test tube. Yellow colour was appeared that became colourless after adding dilute HCl, indicates the presence of flavonoids.

Test for Tannins

Ferric chloride test: In a test-tube 5 ml of extract of 5% ferric chloride were taken. The solution change in green to blue colour, indicates the presence of tannins.

Test for Glycosides

Keller-Killani Test: In a test tube 2 ml extract, glacial acetic acid, one drop of 5% $FeCl_3$ and conc. H_2SO_4 were taken. Reddish brown colour appeared at the junction of two liquid layers and upper layer turn into bluish green, shows the presence of glycosides.

Test for Saponins

Foam test**:** 5 ml of dilute extract was taken in test tube and stirred vigorously. After 3 minutes honeycomb like froth was formed, indicated the presence of saponins.

Test for Anthocyanins

2 ml of plant extract and 2 ml of 2N of HCl were taken in a test tube and then diluted it with ammonia. Pink red colour was appeared. It indicates presence of anthocyanin.

Test for Proteins

Biuret test: Addition of dilute copper sulphate in an alkaline extract and appearing of violet colour solution indicates protein.

Test for Phenol

Ferric chloride test: In a test tube 2 ml extract and 0.5 ml of $FeCl_3$ solution were taken. Solution became intense colour, indicates the presence of phenol.

Test for terpenoids

In a test tube 1ml extract, 1ml chloroform and 1ml acetic anhydrides were taken. After adding 2ml of sulphuric acid reddish colour was appeared, indicates the presence of terpenoids.

Antimicrobial activity

Disc diffusion method was carried out for the investigation of antibacterial activity of various extract against the gram positive and negative bacteria i.e. *E.coli*, *Bacillus subtilis* and *Staphylococcus aureus.*, all solutions (saturated nutrient agar solution, agar media, broth) and apparatus were autoclaved for sterilization for the duration of 45minutes. After cooling the medium was poured in petridishes in laminar airflow. After the solidification bacteria loan was applied on nutrient agar. Whatman paper disk dipped in sample and placed into bacteria coated petridishes. Finally prepared petridishes were incubated at 37 ^{o}C for 24 hour. After 24

hours antibacterial activities were measured by measuring the diameter of the zones of inhibition.[15-17]

RESULT AND DISCUSSION

Phytochemicals screening

The preliminary phytochemical screening of ethanolic extract of *Cleome brachycarpa* shows presence of alkaloids, flavonoids, glycosides, triterpenoids, phenolic compounds, fat. The results obtained by qualitative phytochemical screening for primary and secondary metabolites in aerial parts extracts have been summarized below in table 1.

Antibacterial activity

The diameters of zone of inhibition are shown figure 1-2. The result obtained by antibacterial activity shows that Micellar alcoholic extract had greatest antibacterial activity against *Staphylococcus aureus*.

Table 1: Qualitative analysis of aerial parts of *Cleome brachycarpa* alcoholic extract.

S.no.	Chemical test	Results
1.	Alkaloids	+ve
2.	Flavonoids	+ve
3.	Tannins	-ve
4.	Glycosides	+ve
5.	Steroids	-ve
6.	Terpenoids	+ve
7.	Protiens	-ve
8.	Saponins	-ve
9.	Anthocyanin	-ve
10.	Phenols	+ve

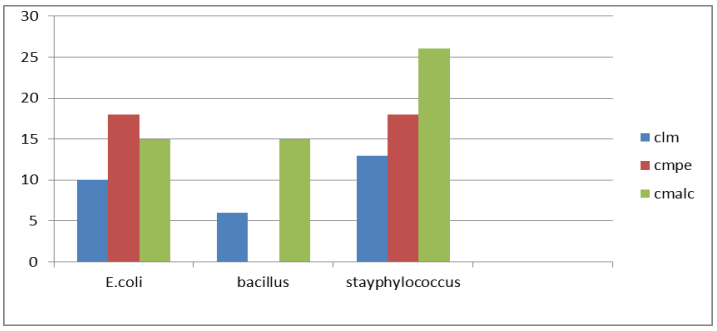

Figure 1: Antibacterial activity of *Cleome brachycarpa* extract with micellar media-alcohol-petroleum ether.

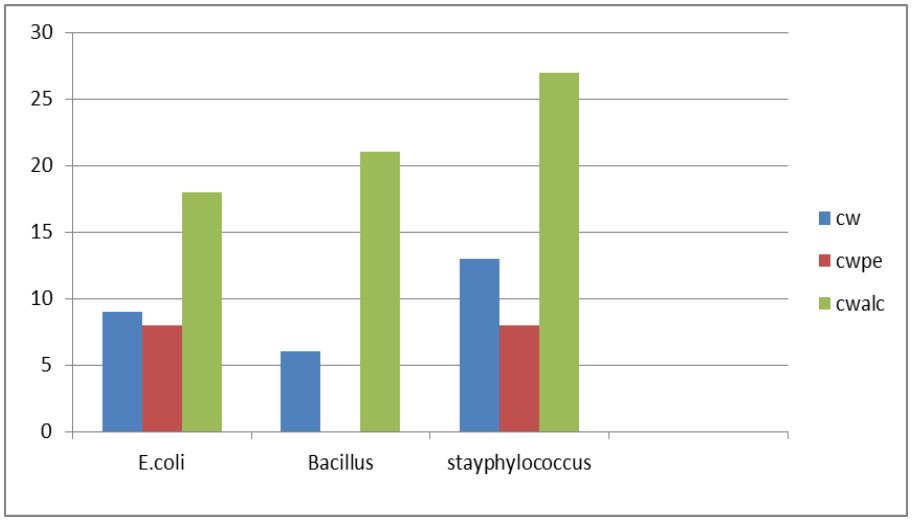

Figure 2: Antibacterial activity of *Cleome brachycarpa* extract with Water-alcohol-petroleum ether.

CONCLUSION

The presents study reveals that *Cleome brachycarpa* have secondary metabolites and primary metabolites such as flavonoids, glycosides, tannins, phenolic compounds, alkaloids and essential oil (fats) etc. the presence of these phytochemicals shows their therapeutic effects. The screening of antibacterial activity showed that all extract are sensitive for bacterial strain but Micellar-alcoholic extract had greatest antibacterial activity against *Staphylococcus aureus*.

ACKNOWLEGMENT

Authors are thankful to UGC for financial assistance.

REFERENCES

1. Jorshabani S, Bagheri F, Asgarpanaz J, Bidgoli SA. (Antioxidants and hepato protective potentials of Oral *Cleome Brachycarpa* Hydroalcoholic Extract: An Organ Toxicity Assessment in Mice)**.** ARC Journal of Pharmaceutical Sciences (AJPS), 2017; 3(2): 22-34**.**
2. Alil HK, Cheruth AJ, Salem MA, Maqsood S. (Evaluation of antioxidant activity of *Cleome brachycarpa* Vahl ex DC, an under-exploited desert plant of United Arab Emirates). Pharmacologyline, 2012; 3: 167-173.
3. Rassouli E, Dadras OG, Bin E, Asgarpanah J. (The essential oil composition of *Cleome brachycarpa* Vahl ex DC). Journal of Essential oil Bearing plant, 2014; 17(1): 158-163.

4. Afifi MS, (Phytochemical and biological investigation of *cleome brachycarpa* vahl. growing in Egypt). International journal of Pharmaceutical sciences and research, 2014; 5(9): 4008-4014.
5. Sarfaraz S, Najam R, Azhar I. (Memory boosting effects of *cleome brachycarpa*: alternative approach to treat dementia). World Journal of Pharmacy and Pharmaceutical Sciences, 2014; 3(7): 1750-1757**.**
6. Sarfaraz S, Najam R, Azhar I, Ahmed S, Sarwar G. (Evaluation of Hypolipidemic and Hepatoprotective Effects of Ethanolic Extract of *Cleome Brachycarpa* on Albino Rabbits). Journal of Analytical & Pharmaceutical Research, 2017; 5(6): 1-4.
7. Yadav N and Bhojak N. Microwave assisted synthesis, spectral and antibacterial investigation on Co (II) complexes with amide ligands. *The Int J Eng Sci*., 2013; 2(2): 166-168.
8. Jain VK, Mandalia HC, Bhojak N. Azocalix [4] pyrrole dyes: application in dyeing of fibers and their antimicrobial activity. *Fibers and Polymers*, 2010; 11(3): 363-371.
9. Verma KK, Gupta PS, Solanki K, Bhojak N. Microwave assisted synthesis, characterisation and antimicrobial activities of few Cobalt (II) thiosemicarbazones complexes. *World J Pharm Pharm Sci.*, 2015; 4: 1673-1683.
10. Prajapat G, Gupta R, Bhojak N. Thermal, Spectroscopic and Antimicrobial Properties of Novel Nickel (II) Complexes with Sulfanilamide and Sulfamerazine Drugs. *Chemical Science International Journal*, 2018; 24(2): 1-13.
11. Naeem H, Perveen R, Zaidi SSM, Zia Z, Fatima K, Akram Z, Hussain M, Ishaque F. (*Cleome brachycarpa*: A Review on ethnobotany, phytochemistry and pharmacology). RADS J. Pharm. Pharm. Sci., 2019; 7(2): 107-111.
12. Ahouansinkpo E, Atanasso J, Dansi A, Adjatin A, Azize O, Sanni A. (Ethnobotany, phytochemical screening and toxicity risk of *Cleome gynandra* and *Cleome viscosa*, two traditional leafy vegetables consumed in Benin). Int. J. Curr. Microbiol. App. Sci., 2016; 5(2): 813-829.
13. Gayathri DS, Sangeetha S, Shoba MD. (Comparative evaluation of phytochemicals and antioxidant Potential of *Cleome viscose* and *Trichodesma indicum*). Int. J. Pharm. Sci. Rev. Res., 2013; 23(1): 253-258.
14. Srinivas R, Chaitanya PJ, Chandrashekar R, Bhavani NL. (Analysis of preliminary phytochemicals of leaf extracts of *Cleome gynandra* L.). World Journal of Pharmaceutical Sciences, 2014; 2(9): 1043-1045.

15. Amita, S. Vyas and N. Bhojak, Secondary metabolites in few desert plants: A Review, *International Journal of Green and Herbal Chemistry, 2019;* 8(2): 157-165.
16. N. Gakkhar, A. Bhatia and N. Bhojak, Comparative Study on Physiochemical Properties of Various Milk Samples, *International Journal of Recent Scientific Research, 2015;* 6(6): 4436-4439.
17. N. Bhojak, D.D. Gudesaria, N. Gakkhar and R. Jain, Microwave Assisted Synthesis Spectral and Antibacterial Investigations on Complexes of Mn (II) with Amide containing ligands, *Journal of Chemistry, 2007;* 4(2): 232-236.