International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Unlocking the Antimicrobial Potential: Ethno-Medicinally Important Weeds in Bilaspur, Chhattisgarh

Priya Banerjee[1], D. K. Shrivastava[2]

Department of Microbiology and Botany, Govt. E. Raghavendra Rao Postgraduate Science College, Bilaspur (Chhattisgarh), India
Email: *priya_majumdar [at]rediffmail.com*

Abstract: ***This study's goal was to look at the various applications and cognitive significance of ethno-medicinally important obnoxious weeds growing in Bilaspur region of Chhattisgarh state. A weed is a collaborative name given to plants that spread and compete with the cultivated crops and are found to be hesitant to most of the bacterial and fungal diseases. Weeds are adapted well to grow in both adverse and favourable environments and cause outcome and quality loss, battling with crops for resources. These resistant conducts against microbial diseases assist us to find the antimicrobial potential of weeds grown in the Bilaspur region, Chhattisgarh state. Although all plants on this planet develop specific secondary metabolites to protect them from environmental stresses, these metabolites or phytochemicals also have the power to fight off microorganisms and stop their growth. This tactic is employed to take advantage of their inherent anti-microbial qualities for the benefit of mankind. Total 12 invasive weeds belonging to different families i.e. Asteraceae, Poaceae, Euphorbiaceae and Fabaceae etc. were documented in Bilaspur, Chhattisgarh.***

Keywords: Antimicrobial, Weeds, Chhattisgarh, extracts

1. Introduction

Plants have been used to heal a variety of diseases since ancient times. According to analysis, early humans treated illnesses with plants. They also observed that animals consume some plants while eliminating others, and they imitated their behaviour when it came to dealing with poisonous plants. The natural compounds and secondary metabolites of wild plants have been proven to have therapeutic uses as inhibitors of numerous illnesses and infections as well as antibacterial qualities. (Khalil *et al.,* 2020). Weeds are undesirable and obnoxious plant species which grow where they are not required. Weeds have become a serious warning to agricultural lands as they act as immortal pest to crop plants, reduce their productivity and cause a huge financial loss to the farmers. They are usually allergic and cause threats to humans and animals. Weeds can combat in almost all environmental conditions and seasons favouring their robust growth in natural habitats. Apart from the negative features, weeds are also used for some beneficial purposes (Rautela *et al*., 2021).

Since past exhaustive research has been conducted on novel sources of antimicrobial agents and their influence on the growth of pathogens. The major sources explored were medicinal plants, fungi, bacteria etc. The well acknowledged antimicrobial agents which are established in the market and manufactured industrially. Such acknowledge medicinal molecules are now facing issues of Resistance development and decline in their control efficiencies against the pathogen. The repeated exposure of these biocontrol molecules has induced resistance in the pathogens. The resistance development is one of the major setbacks which catered the search of novel sources including weeds. This paper is dedicated to thoroughly investigate the weeds of Chhattisgarh region, select and screen weeds which can have applicability as a potential source of antimicrobial molecular species.

2. Materials and Method

2.1 Study Area

Chhattisgarh has been the 26th state in the Indian union since its formation on November 1, 2000. It only occupies 4.14% of the nation's total area and it is home to 2.11 % of the population as per the 2011 census. The present study has been undertaken to investigate the obnoxious weeds of Bilaspur region.

2.2 Collection snd Identification

During sample collection in the sampling site initially we take natural photographs of weed plants then whole plants digging out from field. Whole plant sample washed with tap water for removing soil from roots, dust and insects from aerial parts, and damaged/diseased/parts of plant samples were also removed. Fresh plant samples were kept in clean/sterilized polythene zip bags and labelled and kept in refrigeration for further investigation.

India

Figure i

Chhattisgarh

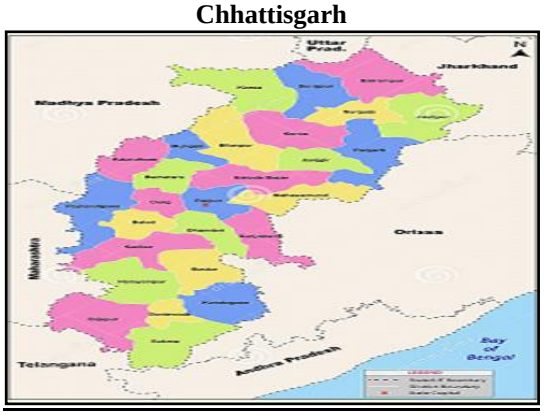

Figure ii

Figure iii

(Showing Map of India, Chhattisgarh State and Bilaspur region and its adjacent districts of Chhattisgarh State)

Table 1: List of weed plants collected from sampling sites of Bilaspur region of Chhattisgarh State and identified

Fig. No.	Botanical Name	Local Name / English Name	Family	Part used	References
1	*Blumealacera (Burm. f.)*	Jangli Muli/ Blumea	Asteraceae	Leaves, stem, roots	Singh *et al*., (2019) - Work done on Haridwar.
2	*Euphorbia hirta L.*	Dudhi/Asthma Weed	Euphorbiaceae	Leaves, seeds, roots	Nyeem *et al*., (2017) - Work done on Tropical Asia.
3	*Lantana camara L.*	Raimuniya/Wild sage	Verbenaceae	Leaves, stem, roots	Noguchi *et al*., (2021) - Work done on Japan.
4	*Sennatora (L.) Roxb.*	Charotabhaji / sickle senna	Fabaceae	Leaves, stem, roots	Telrandhe *et al*., (2022) - Work done on Maharashtra.
5	*Tridax procumbens L.*	Coat buttons	Asteraceae	Leaves, stem, roots	Ingole *et al*., (2022) - Work done on Chennai.
6	*Parthenium hysterophorus*	Gajarghas	Asteraceae	Stem, roots	Matzrafi1 *et al*., (2021) - Work done on Israel.
7	*Heliotropium indicum*	Hatisundha	Boraginaceae	Leaves, roots	Sarkar *et al*., (2021) - Work done on Tropical Asia.
8	*Phyllanthus urinaria*	Shatterstone	Phyllanthaceae	Leaves, roots	Nguyen *et al*., (2020) - Work done on Vietnam.
9	*Dactyloctenium aegyptium*	Crowfoot grass	Poaceae	Leaves, roots	Kumar *et al*., (2015) - Work done on Hyderabad.
10	*Tecoma stans*	Yellow trumpet bush	Bignoniaceae	Leaves, roots	Khatak *et al*., (2019) - Work done on Haryana.
11	*Physalis angulata L.*	Wild tomato	Solanaceae	Leaves, Stem, roots	Pillai *et al*., (2022) - Work done on Kerala.
12	*Pistia stratiotes*	*Water lettuce*	Araceae	Leaves, roots	Li *et al*., (2022) - Work done on China.
13		Silk Leaf	Asteraceae	Leaves, roots	Yadava *et al*., (2019) - Work done on Sagar.
14	*Taxacum officinal*	Dandelion	Asteraceae	Leaves, roots	Dobrowolska *et al*., (2022)- Work done on Poland.
15	*Cleome viscosa*	Tickweed	Cleomaceae	Leaves, roots	Swaminathan *et al*., (2017) - Work done on Shevaroy hills, South India.
16	*Crotalaria verrucosa*	Blue rattlepod	Fabaceae	Leaves, roots	Sana *et al*., (2020) - Work done on Tirupathi.

3. Result and Discussion

In the present investigation a few species were found to be dominant over the others while many were found in very few numbers. On the contrary, 12 families have been recorded from the Bilaspur region and the district represents a diverse weed flora. The leaves stem and root extracts were evaluated for their antimicrobial activity. The methanolic leaf extract of *Tecoma stans* shows high ZOI against S. aureus. The ethanolic extract of Dactyloctenium aegyptium inhibits fungal growth and found to be more effective. The roots of Cleome viscosa shows good result in methanolic and ethanolic extract.

4. Conclusion

Out of which Asteraceae, Poaceae and Fabaceae have much diversity and frequency. The objective of this study was to embark on a comprehensive exploration and identification of the diverse weed species inhabiting the Bilaspur. The data gathered from this study will facilitate the accurate identification of these weeds and explore its antimicrobial potential. Moreover, they can adversely impact the quality of crops and result in significant losses to farmers. Thus, the findings of this study have the potential to utilise the useful side of the obnoxious weed irrespective of their harmful effect.

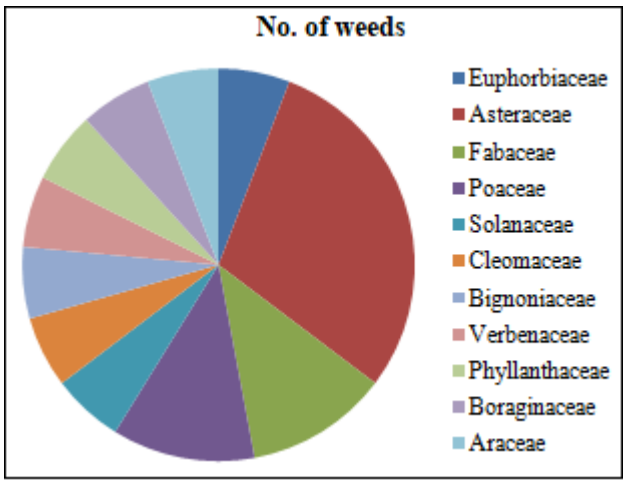

Figure 1: Chart showing number of weeds and their family.

References

[1] **Dobrowolska, M. K. andBaraniak, J. (2022).** Dandelion (*Taraxacumofficinale* L.) as a Source of Biologically Active Compounds Supporting the Therapy of Co-Existing Diseases in Metabolic Syndrome*Foods*. Vol-11, 2858.

[2] **Ingole, V. V., Mhaske, P. C. and Katade, S. R. (2022).** Phytochemistry and pharmacological aspects of *Tridaxprocumbens* (L.): A systematic and comprehensive review. Phytomedicine Plus. Vol-2, 100199.

[3] **Khan, M. S. A. (2020).** A Review on *Senna*: An Excellent Prophetic Herbal Medicine. *World Journal of Pharmaceutical and Medical Research*. Vol-6 (7), Pp-113-118.

[4] **Khalil, N., Bishr, M., Desouky, S. and Salama, O. (2020).** AmmiVisnaga L., a potential Medicinal Plant: A Review. Molecules. Vol.25 (2), 301.

[5] **Khatak, S., Malik, D. K. and Dahiya, R. (2019).** *Tecoma stans*: A noxious weed put to beneficial use. IJCS. Vol-7 (3), Pp-296-299.

[6] **Kumar, V., Banu, R. F., Begum, S., Kumar, M. S. and Mangilal, T. (2015).** Evaluation of antimicrobial activity of ethanolic extract of *Dactyloctenium aegyptium*. *International Journal of Pharmacological Research*. Vol-5 (12), Pp-338-343.

[7] **Li, Y., Xin, J. and Tian, R. (2022).** Physiological defense and metabolic strategy of *Pistia stratiotes* in response to zinc cadmium co-pollution. *Plant Physiology and Biochemistry*. Vol-178, Pp-1-11.

[8] **Matzrafi1, M., Raz, H., Rubin, B., Yaacoby, T. andEizenberg, H. (2021).** Distribution and Biology of the Invasive Weed *Parthenium hysterophorus*L. in Israel. *Frontiers in Agronomy*. Vol-3.

[9] **Nguyen, D. H., Lee, J. S., Park, K. D., Ching, Y. C., Nguyen, X. T., Phan, V. H. G. andThi, T. T. H. (2020).** Green Silver Nanoparticles Formed by *Phyllanthus urinaria*, *Pouzolziazeylanica*, and *Scopariadulcis* Leaf Extracts and the Antifungal Activity. Nanomaterials. Vol-10, Pp-542.

[10] **Noguchi, H. K. and Kurniadie, D. (2021).** Allelopathyof *Lantanacamara* as an Invasive Plant. *Plants*. Vol-10 (5), 1028.

[11] **Nyeem, M. A. B., Haque, M. S., Akramuzzaman, M., Siddika, R., Sultana, S. and Islam, B. M. R. (2017).** *Euphorbia hirta*Linn. A wonderful miracle plant of mediterranean region: A review. JMPS. Vol-5 (3), Pp-170-175.

[12] **Pillai, J. R., Wali, A. F., Menezes, G. A., Rehman, M. U., Wani, T. A., Arafah, A., Zargar, S. and Mir, T. M. (2022).** Chemical Composition Analysis, Cytotoxic, Antimicrobial and Antioxidant Activities of *Physalisangulata* L. : A Comparative Study of Leaves and Fruit. Molecules. Vol-27 (5), 1480.

[13] **Rautela, B. and Tiwari, P. (2021).** Folk uses of weeds from District Rudraprayag, Uttarakhand, India. *Plant Archives*. Vol. 21, Pp. 1537-1542.

[14] **Sana, S. S., Kumbhakar, D. V., Pasha, A., Pawar, S. C., Grace, A. N., Singh, R. P., Nguyen, V. H., Van Le, Q. and Peng, W. (2020).** *Crotalaria-verrucosa* Leaf Extract Mediated Synthesis of Zinc Oxide Nanoparticles: Assessment of Antimicrobial and Anticancer Activity. *Molecules*. Vol-25, Pp-4896.

[15] **Sarkar, C., Mondal., M., Khanom, B., Hossain, M. M. Hossain, M. S., Sureda, A., Islam, M. T., Martorell, M., Kumar, M., Rad, J. S., Al-Harrasi, A. and Al-Rawahi, A. (2021).** *Heliotropium indicum* L: From Farm to a Source of Bioactive Compounds with Therapeutic Activity. Hindawi. 9965481.

[16] **Singh, L. R. (2019).** *Blumealacera* (Burm. f.) DC. (Kukraundha) a Wild Herbaceous Plant and its Rational Applications: A Review. *IJRAR*. Vol-6 (2), Pp. 435-439.

[17] **Swaminathan, C. (2017).** Evaluation of Antibacterial and Antioxidant properties of *cleome viscosa L. Indo American Journal of Pharmaceutical Research*. Vol-7 (4), Pp-8473-8478.

[18] **Telrandhe, U. B. and Gunde, M. C. (2022).** Phytochemistry, pharmacology and multifarious activity of *Cassia tora*L. : A comprehensive review. *Annals of Phytomedicine*. Vol-11 (2), Pp-231-239.

[19] **Yadava, R. N. and Surywanshi, V. (2019).** Antioxidant activity of new allelochemical isolated from *Lagascea mollis Cav*. *Indian Journal of Chemistry*. Vol-58, Pp-609-613.