CHAPTER-17

QUALITATIVE PHYTOCHEMICAL ANALYSIS OF SOME WILD EDIBLE VEGETABLES FROM BULDHANA DISTRICT (MS) INDIA

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Summary

Wild edible vegetables have played an important role since ancient times in providing nourishment to people. In many regions, tribal communities depend on wild edible vegetables for both sustenance and income. These wild edible vegetables possess various nutraceutical and medicinal properties like antiallergic, antibacterial. In Ayurveda, many of these plants are used to cure diseases. The present research focuses on the phytochemical analysis of some species of noncultivated, wild, and traditional vegetables available in the area surrounding Takarkhed Mu. Village, Tq. Chikhli, Dist. Buldhana (Maharashtra) during the rainy season. These wild plants are used both as medicine and vegetables. They are utilized to treat various diseases such as diabetes, dysentery, dyspepsia, gastritis, constipation, urinary disorders, and mouth sores, to improve hair growth. They are easily available in natural habitats and are a cheap and excellent source of nutrients such as proteins, carbohydrates, iron, essential minerals, and other secondary metabolites. Phytochemical analysis of wild vegetable extract reveals the presence of phytochemicals such as phenols, tannins, saponins, alkaloids, and flavonoids. The phytochemical analysis of these plants is crucial commercially and holds significant interest for pharmaceutical companies in the production of new drugs to treat various diseases. These are easily available in natural habitats, a cheap and excellent source of nutrients like proteins, carbohydrates, iron, essential minerals, and other secondary metabolites. Phytochemical analysis of wild vegetable extracts show the presence of phytochemicals such as phenols, tannins, saponins, alkaloids, and flavonoids. The phytochemical analysis of these plants is very important commercially and has a great interest in pharmaceutical companies for the production of new drugs for curing various diseases.

This study will investigate the qualitative characteristics of several edible wild herbaceous species, including those most commonly consumed: *Capparis zeylanica* L. (Waghati) - Capparidaceae, *Celosia argentea* L. (Kurdu) - Amaranthaceae, *Citrullus colocynthis* L. (Sherni) - Cucurbitaceae, *Momordica dioica* Roxb ex Willd (Kantule) - Cucurbitaceae, *Telosma pallida* L. (Zatuli) - Asclepiadaceae

Keyword: Phytochemical, Phenols, Tannins, Saponins, Alkaloids, Flavonoids.

Introduction

Plants that grow without any cultivation or care are known as wild plants. These plants mainly grow in forests, wilderness, edges of farmlands, and barren fields. In the early days of the monsoon season, these vegetables are available for consumption. Along with being vegetables, a majority of them are also medicinal plants. Wild vegetables are commonly used in the traditional diets of indigenous people in many parts of the world, including India. Wild vegetables play an important role in the livelihood of people residing in rural areas. Even today in most remote areas, people depend on plants that are available in their natural surroundings for food, medicine, shelter, etc. The majority of wild edible vegetables have medicinal properties and can be used to treat common ailments due to the presence of phytochemical constituents. The wild edible plant plays a dual significant role i.e. they provide supplements for food and have medicinal uses. The medicinal plants contain some phytocompounds like alkaloids, tannins, phenols, saponins, flavonoids and other micronutrients which are used for herbal drugs or medicines. The preliminary phytochemical compounds were studied using aqueous and methanol, extracts of 5 different wild vegetables collected from adjoining areas of Takarkhed Mu., Buldhana District (Maharashtra) during the rainy season. The phytochemical compounds such as phenol, tannins, saponin, alkaloid, and flavonoids were screened in 5 wild vegetables using standard methods.

Alkaloids have a wide range of Pharmacological activities including antimalaria, antiasthma, anticancer, anti-diabetic. Many have found use in traditional or modern medicine or as starting points of drug discovery.

Natural phenolic compounds play an important role in cancer prevention and treatment. Phenolic compounds from medicinal herbs and dietary plants include phenolic acids, flavonoids, tannins and others.

Flavonoids can protect against various disease damage. On the other hand flavonoids can chelate transition metals which are able to promote hydroxyl radical formation.

Plants containing tannins have astringent hemostatic, antiseptic properties. Herbal preparation containing tannins are used to stop local small hemorrhage, sore mouth, bronchitis, burns, scars of skin, wounds and many others. Pharmacological activities associated with saponins include cytotoxicity, antitumor, antimutagenic, anti-inflammatory, antiviral and cardiac activities (Lacaille-Dubois et.al., 1996).

In the present investigation, the following wild vegetables were used to screen for phytochemical analysis.

Sr.	Scientific name	Family	Local name		
No.					
1.	Capparis zeylanica L.	Capparidaceae	Waghati		
2.	Celosia argentea L.	Amaranthaceae	Kurdu		
3.	Citrullus colocynthis L.	Cucurbitaceae	Sherni		
4.	Momordica dioica Roxb.	Cucurbitaceae	Kantule		
5.	Telosma pallida L.	Asclepiadaceae	Zatuli		

Table 1. List of Wild edible vegetables



Figure 1: Photographs of Collected plant materials

Materials and Method

Collection of Specimens

All these above-mentioned plant material ((leaves, fruits and flowers) in Table 1 were collected from local fields in the adjoining area of Takarkhed Mu. Village,

Tq. Chikhli, Dist. Buldhana (Maharashtra) during the rainy season between July 2024 to October 2024.



Fig. 2. Site of Plant Collection

Sample preparation

The collected samples were washed, shade dried and coarsely powdered and preserved in airtight containers. The powder was used for qualitative analysis of secondary metabolites e.g., Alkaloids, Phenols, Tannins, Flavonoids, Saponins.

Preparation of extracts

Aqueous and Methanol extract of leaves, fruits and flowers of wild edible vegetable species were prepared by Soxhlet extractor assembly. The extracts were used for the investigation of preliminary phytochemical analysis. Extraction was carried out in different organic solvents such as distilled water, methanol for 8-10 hours at room temperature by using Soxhlet extractor assembly.

Preliminary Phytochemical screening

Detection of Alkaloids

Mayer's test - Few drops of Mayer's reagent were added to 2 ml extract and observed for white or cream colour ppt which indicates the presence of alkaloids (Siddiq and Ali, 1997).

Detection of Phenol

Gelatin test - 1% gelatin solution containing 10% sodium chloride was added to 2 ml extract, ppt formation indicates phenol (Sadashivam and Manickam, 1992).

Detection of Tannins:

Lead acetate - The extract (50mg) is dissolved in distilled water and to this 3 ml of 10% lead acetate solution is added. A bulky white precipitation indicates the presence of tannins.

Iodine test - 2 ml of extract were treated with dilute iodine solution. Appearance of transient red colour indicated the presence of tannin compound (Iyengar, 1995)

Detection of Saponins- The extract (50mg) us diluted with distilled water and made up to 20 ml. The suspension is shaken in a graduated cylinder for 15 mins. A two cm layer of foam indicates the presence of saponins.

Detection of Flavonoids:

Lead acetate test - 2 ml of extract treated with few drops of 5% solution of Lead acetate, milky colour ppt formation indicated the presence of flavonoids (Sadashivam and Manickam, 1992).

Results and Discussion

Qualitative phytochemical analysis of 5 wild edible vegetable extracts show the presence of a bioactive compound which is known to reveal medicinal properties as well as physiological activities (Sofowra, 1993). Screening of the plant extracts is to find out the presence of phytochemicals such as phenols, tannins, saponins, alkaloids, and flavonoids. 5 phytochemical tests showed positive and negative in all extract of the 5 wild edible vegetable extracts shown in Table 2.

Sr. No.	Name of the species	Phenols		Tannins		Saponins		Alkaloids		Flavoinds	
		AQ	М	AQ	М	AQ	М	AQ	М	AQ	М
1	Capparis zeylanica	+	-	+	+	+	+	-	-	-	-
2	Celosia argentae	+	+	-	+	+	+	+	+	+	+
3	Citrullus colocynthis L.	+	+	+	+	+	+	+	+	+	+
4	Momordica dioica	-	+	+	+	+	+	+	+	-	+
5	Telosma pallida L.	+	+	+	+	+	-	+	+	+	+

Table 2. Phytochemical analysis of secondary metabolites

Phenol is one of the omnipresent groups of plant metabolites (Singh et al., 2007). In this analysis, most of the selected leafy vegetable extracts have the presence of phenolic compounds. The presence of phenol had pharmacological

properties such as anti-apoptosis, anticarcinogen, anti-inflammation, anti-aging, anti atherosclerosis, inhibition of angiogenesis, cell proliferation activities, and cardiovascular protection (Han et al., 2007). All the selected leafy vegetable extracts show the presence of tannins. Tannins involved in protein synthesis. It is a large polyphenolic group of secondary compound It contains sufficient hydroxyl groups and other suitable groups to form a strong complex with other macromolecules. The presence of tannin used as an astringent against diarrhea (Yoshida et al., 1991), as a diuretic (Hatano et al., 1991; Okuda et al., 1983), duodenal tumors (Saijo et al., 1989), anti-inflammatory, antiseptic, and hemostatic pharmaceuticals (Haslam, 1996). All these shows the presence of saponin in both solvent extracts. The presence of saponin is used to stop hemorrhage and for healing wounds and ulcers, also it helps in red blood cell coagulation (Okwu and Josiah, 2006). Saponins help as an anti-inflammatory, precipitating and coagulating red blood cells, cholesterol binding properties, hemolytic activity, and bitterness (Okwu, 2004; Sodipo et al., 2000), and antibacterial properties (Epand et al., 2007). All the selected leafy vegetable extracts show the presence of alkaloid compounds. The alkaloids group shows the chemical compounds which contain basic nitrogen atoms. It is produced by a large variety of organisms including bacteria, fungi, plants, and animals (Luch, 2009). It has important medicinal properties as cytotoxicity (Nobori et al., 1994), analgesic (Antherden, 1969), antispasmodic (Stray, 1998), and antibacterial (Stray, 1998). The Flavonoids group helps plant metabolites to provide cell signaling pathways and antioxidant activity. All the selected leafy vegetable extracts show the presence of flavonoid compounds. Flavonoids are an important antibiotics group. These antibiotic principles are effective in the defensive mechanism of the plants against different microbes (Hafiza, 2000). The presence of flavonoids is used for pharmacological activity such as antimicrobial activity (Cowan, 1996), antioxidant (Salah et al., 1995), and anticancer activities (Del-Rio et al., 1997; Okwu, 2004). The results obtained in the present study suggest that the identified phytochemical compounds are perhaps bioactive constituents and these plants prove an increasingly valuable bioactive compound for significant medicinal worth.

Conclusion

It has been concluded that the presence of various phytochemical compounds in the selected 5 leafy vegetable extracts has the major bioactive constituents. These bioactive compounds have a valuable reservoir for therapeutic merit. Therefore, the selected leafy vegetable extracts could be a good source of useful drugs.

References

 Abdul Kader, Mohiuddin (2019). Medicinal and Therapeutic values of Sesbania grandiflora. Advanced Research Journal of Pharmacy and Pharmacology 4(2): 087-093.

- [2] Ahmed Algabri, and Pandhure, Narayan (2019). in vitro micropropagation studies in Spilanthes acmella murr. 8 (2): 1-2.
- [3] Ali Esmail Al-Snafi, (2016). Chemical constituents and pharmacological effects of Citrulus colosynthis: A Review. *IOSR Journal of Pharmacy* 6(3): 57-67.
- [4] Atram Seema, (2015). Medicinal properties of wild leafy vegetables avail in Maharashtra state in Rainy season. *International Journal of Recent Scientific Research*, 6: 5875-5879
- [5] Augustine, A. C. and D'souza (1997). Conservation of Curculigo orchiodes- An endangered anticarcinogenic herb. In: Biotechnological applications of tissue and cell culture, Oxford and IBH Publication co. Ltd., New Delhi, India, pp-116-118
- [6] Bawara, B., Dixit, Mukesh, Chauhan, N. S., Dixit, V. K. and Saraf, D. K. (2010). Phytopharmacology of Momordica dioica Roxb ex. Willd: A Review. *International Journal of Phytomedicine*, 2: 01-09
- [7] Bhogaonkar, P. Y., Marathe, V. R. and Kshirsagar, P. (2010). Documentation of Wild Edible Plants of Melghat Forest, Dit Amaravati, Maharashtra State, India. *Ethnobotanical leaflets* 14: 751-758.
- [8] Borah, A. R., Yadav, N. S. and Unni, B. G. (2021). Evaluation of Antioxidant Activity of different solvent extracts of Oxalis corniculata L. *Journal of Pharmacy Research*, 5(1): 91-93.
- [9] Bvenura, C. and Sivakumar, D. (2017). The role of Wild Fruits and Vegetables in delivering a balanced and healthy diet. *Food Research International*, 99:15-30.
- [10] Chaithanya, V. V., Sugjya, N. And Aneesh K. S. (2015). Wild Edible Plants Traditionally used by Kadar Tribe of Vazhachal Forest division, Thrissur, Kerala. *Journal of Global Bioscience*, 4: 3344-3349
- [11] Chandana, B. C., Kumari Nagveni, H. C., Heena, M. S., Shashikala, S. Kolakar, and Lakshmana, D. (2018). Role of plant tissue culture in micropropagation, secondary metabolites production and conservation of some endangered medicinal crops. *Journal of Pharmacognosy and Phytochemistry*, SP3: 246-251.
- [12] Deshpande, S., Joshi R. and Kulkarni D. K., (2015). Nutritious Wild Food resources of Rajgond tribe Vidharbha, Maharashtra state, India. Indian Journal of Fundamental and Applied Science, 5(1): 15-25
- [13] Devarkar, V. D., Marathe, V. R. and Chavhan, D. P. (2010). Dietary and Medicinal significance of Wild Vegetables from Osmanabad region, Maharashtra, (India). *Life Sciences Leaflets* 11:317-332.
- [14] Fayaz, M., Bhat, M. H., Kumar A. and Jain, A. K. (2019). Phytochemical Screening and Nutritional Analysis of some parts of *Celosia argentea* L. *Chemical Science Transactions*, 8(1): 12-19.

- [15] Gaikwad, A. V., Singh, S. K. and Gilhotra, R. (2017). Plant Tissue Culture, A Review. SGVU Journal of Pharmaceutical Research and Education 2(2): 217-220.
- [16] Geedhu Daniel and Krishnakumari, S. (2014). Quantitative analysis of primary and secondary metabolites in aqueous hot extract of Eugenia uniflora (L.) Leaves. *Asian J. Pharmaceutical and Clinical Research*, 8(1): 334-338.
- [17] Harborne, A. J. (1998). phytochemical methods a guide to modern techniques of plant analysis. 3rd (Edn).
- [18] Kamble, Vaishali S. and Jadhav, Varsha D. (2013). Traditional Leafy Vegetables: A Future Herbal Medicine. *International Journal of Agriculture and Food Science* 3(2): 56-58.
- [19] Keshav, A., Sharma, A., and Mazumdar, B. (2019). Phytochemical Analysis and Antioxidant Activity of Colocasia esculenta L. Leaves. International Journal of Chemical and Molecular Engineering, 13(1):20-23.
- [20] Khude Varsha (2023). Qualitative phytochemical analysis of some wild edible vegetables. *Science Archive* . 4 (2): 99-101.
- [21] Kulkarni, D. K. and Kumbhojkar, M. S. (2002). Ethnobotanical studies on Western Ghats in : Biodiversity of the Western Ghats of Maharashtra- Current knowledge, edited by Ajit P. Jagtap and Singh NP, Bishen Singh, Mahendra Pal Sing, Dehradun 58-63.
- [22] Malik, S. K., Chaudhary, R., Kalia, R. J. (2005) Rapid in vitro multiplication and conservation of *Garcinia indica*: a tropical medicinal tree species. Sci Hortic, 106:539-553.
- [23] Murty, P., Narasimha Rao P. G. M. and Srinivasa Rao, D. (2015). Nutritional and Medicinal values of some Wild Edible Fruits of Andhra Pradesh, India. *Journal of Science* 5:385-390.
- [24] Neelu Singh, (2011). Wild edible plants: A potential source of nutraceuticals. *IJPSR* 2(12): 216-225.
- [25] Okereke, C. N., Iroka, F. C., Chukuma, M. O. (2015). Phytochemical Analysis and Medicinal uses of Hibiscus sabdariffa. *International Journal of Herbal Medicine* 2(6): 16-19.
- [26] Pawar, H. A., Choudhary, P. D. and Kamat, S. R. (2018). An Overview of Traditionally used, *Colocasia esculenta* as a Phytomedicine. Medicinal and Aromatic plants. 7(02):
- [27] Roy, B., Halder, A. C. and Pal, D. C. (1998). Plants for human consumption in India, Botanical Survey of India, Flora of India, Series-4,188
- [28] Saijo, R., Nonaka, G. I., and Nishioka, I. (1989). Tannins and related compounds. Lxxxiv.: Isolation and characterization of five new hydrolyzable tannins from the bark of mallotus japonicus. *Chemical and pharmaceutical bulletin*, 37(8): 2063-2070.

- [29] Satpute, S. V. (2015). Documentation of Wild Vegetables: A Study Based on Warud Tehsil- Maharashtra. International Journal of Informative and Futuristic Research, 2 (20):2662-2670
- [30] Uma, C. and Sekar, I. K. G. (2014). Phytochemical analysis of a folklore Medicinal plant *Citrulus colosynthis* L. (bitter apple). *Journal of Pharmacognosy and Phytochemistry*, 2(6): 195-202.
- [31] Valvi, S. R., Gadekar, S. S. and Jadhav, V. D. (2014). Phytochemical assessment of five wild edible fruits. *International J. of Life Sciences*, 2(2): 168-172

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