



Qualitative phytochemical analysis of ten different leafy wild vegetables

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Abstract

The present research paper focuses on the phytochemical analysis of 10 different species of non-cultivated, wild, and traditional vegetables available in the adjoining area of Nipani City (Karnataka) during the rainy season. These wild plants are used as medicine as well as vegetables. They are used to treat different diseases like diabetes, rheumatism, dysentery, dyspepsia, gastritis, constipation, urinary disorders, etc., and are easily available in natural habitats, a cheap and excellent source of nutrients like proteins, carbohydrates, iron, essential minerals, and other secondary metabolites. Phytochemical analyzed 10 leafy vegetable extracts shows the presence of phytochemicals such as phenols, tannins, saponins, alkaloids, and flavonoids. The photochemical 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.

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

Introduction

Nipani City is located on Puna- Bangalore Highway (NH-4) and placed northwest side in the Belgaum district of Karnataka. Geographically Nipani City is at 15° 51' N latitude and 74° 31' E longitude at an altitude of nearly 710 meters above mean salinity level on the northern slope of Bellary nallah. Nipani is closer to the branches of the western ghats, with a good rainy season temperature ranging from 16° c to 40°C.

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 preliminary phytochemical compounds were studied using aqueous and ethanol, extracts of 10 different leafy wild vegetables collected from adjoining areas of Nipani City (Karnataka) during the rainy season.

The phytochemical compounds such as phenol, tannins, saponin, alkaloid, and flavonoids were screened in 10 leafy wild vegetables using standard methods.

In the present investigation, the following leafy wild vegetables were used to screen for photochemical analysis. 1) *Portulaca oleracea* (Portulacaceae) Purslane, 2) *Celosia argentea* (Amaranthaceae) kuradu 3) *Oxalis corniculata* (Oxalidaceae) Indian Sorrel 4) *Rumex vesicarius* (Polygonaceae) Bladder Doc Sorrel 5) *Launaea procumbens* (Asteraceae); Pathari 6) *Commelina benghalensis* (Commelinaceae): Kena 7) *Portula quadrifolia* (Portulacaceae): Chicken weed 8) *Amaranthus roxburghianus* (amaranthaceae): Non Spiny Amaranth, Tandali 9) *Amranthus cruentus* (amaranthaceae): Red Amaranth 10) *Hibiscus cannabinus* (Malvaceae): Deccan hemp: Ambadi .

Materials and Method

Collection of Specimen

All These above-mentioned plants in Table 1 were collated from local fields in the adjoining area of Nipani City

(Karnataka) during the rainy season between August 2021 to October 2021.

Sample preparation

The fresh plants were washed thoroughly under tap water then the leaves of these plants were separated and dried at 55°C in a hot air oven. After that, they were powdered separately using a grinder. The Powdered material was extracted both in distilled water and in ethanol 1:10 (W/V), shivered, and then stored for 72 hours then filtered using whatman No. 1 filter paper, then the filtrate was evaporated to dry, and the dry extract which was kept in an airtight container at 4°C in the refrigerator for analysis.

Phytochemical analysis

The phytochemical tests were conducted (Khandelwal, 2001) as follows:

1. Phenol: The extract (0.5 g) was dissolved in 5 ml of distilled water. To this, add a few drops of neutral (5%) ferric chloride solution. A dark green color indicated the presence of phenolic compounds.
2. Tannin: One gram of fruit extract added with 100 ml of distilled water, boiled them, makes them to cool, and filtered it. Add 1% ferric chloride drop by drop to the filtrate. Green-black precipitate shows the presence of tannin.

3. Saponins: About 2 ml of sodium bicarbonate (1%) was added to 1 ml of extract and shaken it well. Lather-like formation remains constant for some time indicative of the presence of saponin.

4. Alkaloids: Crushed and filtered 1 ml of fruit extract was taken in a test tube. Then, add 2 ml of aqueous hydrochloric acid (1%). Heat it for a few minutes. Furthermore, add 2-3 drops of dragendroff reagent in the solution. The reddish-brown precipitate color appeared with turbidity depicting shows alkaloid presence.

5. Flavonoids: To the 5 ml of extract that was taken, add 1 ml of sodium hydroxide solution (10%). Add two drops of concentrated hydrochloric acid to the side of the beaker. The yellow color changes to colorless showing the presence of flavonoids.

Results and Discussion

Phytochemical analyzed 10 leafy 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 10 leafy vegetable extracts shown in Table 1.

Table 1. Phytochemical analysis of secondary metabolites

Sr. No	Name of the Species	Phenol		Tannin		Saponins		Alkaloid		Flavonoids	
		A	E	A	E	A	E	A	E	A	E
1	<i>Portulaca oleracea</i>	+	+	+	+	+	+	+	+	+	+
2	<i>Celosia argentea</i>	+	+	+	+	+	+	+	+	+	+
3	<i>Oxalis corniculata</i>	+	+	-	+	+	+	+	+	+	+
4	<i>Rumex vesicarius</i>	-	+	+	+	+	+	+	+	+	+
5	<i>Launaea procumbens</i>	+	+	+	+	-	+	+	+	+	+
6	<i>Commelina benghalensis</i>	-	+	+	+	+	+	+	+	+	+
7	<i>Portula quadrifolia</i>	+	+	-	+	+	+	+	+	+	+
8	<i>Amaranthus roxburghianus</i>	+	+	+	+	+	+	+	+	+	+
9	<i>Amranthus cruentus</i>	+	+	+	+	+	+	+	+	+	+
10	<i>Hibiscus cannabinus</i>	+	+	+	+	-	+	+	+	+	+

A: Aqueous, E: Ethanol, +: Positive, -: Negative

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 except the *R. vesicarius* and *C. benghalensis*. 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 involve in protein synthesis. It is a large polyphenolic group of secondary compounds. 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). *P. oleracea* *C. argentea* *O. corniculata* *R. vesicarius* *C. benghalensis* *P. quadrifolia* *A. roxburghianus* *A. cruentus* 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 (Eband 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 property 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 the 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 10 leafy vegetable extracts has the major bioactive constituents. These bioactive compounds are having a valuable reservoir for therapeutic merit. Therefore, the selected leafy vegetable extracts could be a good source of useful drugs.

Conflict of Interest

The author hereby declares no conflict of interest.

Consent for publication

The author declares that the work has consent for publication.

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