

Study of Flavonoid and Phenol contents and phytochemical screening of weed plants

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Abstract:

Plant-derived foods play an essential function in human nutrition and major source of substances with biological activity, including vitamins, dietary fiber, antioxidants, and chemicals that decrease cholesterol. The nutritional value of plants remains unclear despite a wealth of data on the subject. Historical perspective on the importance of various plant nutrients and health-promoting substances. *Eragrostis ciliaris* (All.) Vignolo ex Janch., *Senna occidentalis* (L.) Link, *Dactyloctenium aegyptium* (L.) Willd were the test plants of the current study's phytochemical screening. These weeds responded favourable to the presence of secondary metabolites such as flavonoids, phenol, proteins, carbohydrates, etc., according to quantitative study of flavonoid and phenol techniques. These metabolites are important for the plant, but they also define the nutritional quality of the plant. This suggests that they are suitable for usage as herbal ingredients. The secondary plant metabolites and the techniques used to analyse them are the focus of this piece of content.

Keywords: Phytochemical, Plant metabolites, Quantitative, Analysis, Total Flavonoid.

Introduction:

Phytochemicals, derived from the Greek term "phyto," which signifies "plant," are biologically active, naturally occurring chemical entities present in flora that confer health advantages to humans beyond those ascribed to macronutrients and micronutrients (Hasler and Blumberg et al., 1999). These compounds serve as protective agents for plants against disease and injury while also contributing to the plant's coloration, fragrance, and taste. In a broader context, the chemical constituents that safeguard plant cells from environmental threats, including pollution, stress, drought, ultraviolet radiation, and pathogenic invasions, are collectively referred to as phytochemicals (Mathai et al., 2000). Recent research has elucidated their significant role in the preservation of human health, particularly when their dietary consumption is substantial. The exploration of plant-derived compounds has garnered considerable attention due to their diverse applications. Medicinal plants represent a rich biorepository of agents utilized in traditional medicinal systems, contemporary pharmaceuticals, nutraceuticals, dietary supplements, traditional remedies, pharmaceutical intermediates, and chemical precursors for synthetic drugs. Over 4,000 distinct

phytochemicals have been identified and are categorized based on their protective functions, physical properties, and chemical attributes (Meagher and Thomson et al., 1999).

Medicinal flora is gaining significant prominence in the primary healthcare systems of individuals and communities within numerous developing nations. This has led to a heightened demand in international commerce due to their remarkable efficacy, affordability, purported lack of adverse effects, and their utilization as alternatives to conventional allopathic treatments. Medicinal plants are considered to possess a higher degree of safety and have been recognized as effective remedies in addressing various health conditions (Ashis et al., 2003).

Plants hold fundamental nutritional significance due to their composition of proteins, carbohydrates, fats and oils, minerals, vitamins, and water, which are essential for the growth and development of both humans and animals. The term phytochemical refers to the bioactive compounds derived from plants. The prefix “phyto” originates from the Greek language, signifying plant. Phytochemicals are categorized into primary or secondary constituents, contingent upon their functional role in plant metabolism. Primary metabolism encompasses essential processes necessary for the growth and development of plants, including common sugars, amino acids, proteins, purines and pyrimidines found in nucleic acids, and chlorophyll, among others. Conversely, secondary metabolism is crucial for the plant's adaptation and survival within its ecological niche. Examples of the functions of secondary metabolites include the attraction of pollinators and the establishment of natural defence mechanisms against herbivores and pathogens (Velavan et al., 2007).

The secondary metabolites generated serve as a significant characteristic of our agricultural crops (including attributes such as flavour, pigmentation, aroma, etc.) and decorative flora. Furthermore, a plethora of plant-derived secondary metabolites, including flavonoids, alkaloids, tannins, saponins, steroids, anthocyanins, terpenoids, and rotenoids, among others, have been harnessed for commercial utilization in pharmaceuticals, dyes, flavoring, fragrances, and insecticides. These specialized chemicals are meticulously extracted and refined from botanical sources. While plants synthesize these compounds primarily for self-protection, contemporary research indicates that numerous phytochemicals possess the capability to confer protection to humans against various ailments, encompassing cancer, cardiovascular diseases, arthritis, diabetes, and aging (Velavan et al., 2011).

Material and Method:

Study area: The fresh leaves, stem, seed, flower of some plants were collected from various regions of, Visnagar city which includes both rural and urban areas of Visnagar, is situated in the northern part of Gujarat State, geographically located between 23.7 N 72.55 E.

Flavonoid: The Flavonoid Content was determined by aluminium chloride method where the extracts were treated with AlCl_3 and Potassium acetate. Quercetin was used as a standard for this assay. The values obtained for were expressed as mg of quercetin equivalent (QE)/g dry weight of the plants. Absorbance was taken at 510 nm using spectrophotometer (Kumar et al., 2008).

Phenol: Determination of total phenols by folin-reagent method. The phenol content of plants was evaluated quantitatively by Folin-Ciocalteu method (Mohammed et al., 2013, Esha rami et al., 2014 and Tekeshwarkumar et al., 2015). Total phenol Content was expressed as mg of Gallic acid equivalent based on the calibration curve (Kumar et al., 2008).

The phenol content was determined by Folin-Ciocalteu method where the extracts were treated with folin reagent and Na₂CO₃. Gallic acid was used as the standard for this assay absorbance was taken at 765 nm using spectrophotometer. The present study reveals the phenol contents of the leaves, seed, stem and flower of all plants in terms of mg gallic acid equivalent/g of dry sample.

Plant Extraction: After collecting the plants were cleaned by using tap water followed by double distilled water to remove all the dust. 1 g of finely chopped dry plant parts were taken in a mortar pestle and to it approximately acetone (80 ml) + distilled water (20 ml) of freshly prepared was added and keep it pasting until a clear plant solution was observed. Then the solutions were centrifuged at 1000 rpm for 15 min and the final supernatants were collected in respective tubes.

Result and Discussion:

The phenol and flavonoid processing the material used for quantitative analysis which was *Eragrostis cilianensis*(All.)Vignolo ex Janch., *Senna occidentalis*(L.) Link., *Dactyloctenium aegyptium*(L.) Willd. respective three plant. The plant samples identified some secondary metabolites, currently they produced an unfavorable outcome. only a small number of metabolites. They are important secondary Plant-based metabolites that are in charge for a variety of the plants' medicinal properties. The chemical substances found in plants are what gives them their biological activity.

The results of the current investigation were presented in terms of total phenolic content, which was calculated by changing the currently used technique. Gallic acid equivalent per 1.5 mg of dried sample. Given samples from the 3 weeds that were analyzed phenol content was greater in this *Eragrostis cilianensis*(All.) Vignolo ex Janch., *Senna occidentalis* (L.) Link, *Dactyloctenium aegyptium*(L.) Willd.

Table.1: Selected Plant by Flavonoid Estimation

Sr. no.	Plant Name	Flavonoid		Phenol	
		O.D. at 510 (nm)	Concentration (mg/ml)	O.D. at 765 nm	Concentration (mg/ml)
1	<i>Eragrostiscilianensis</i> (All.) Vignolo ex Janch.	0.104	0.445	1.97	11.3
2	<i>Senna occidentalis</i> (L.) Link	0.192	0.961	1.28	6.97
3	<i>Dactylocteniumaegyptium</i> (L.) Willd	0.048	0.117	1.43	7.94

The total flavonoid concentration was found to be highest in, *Sennaoccidentalis* (L.) Link (0.961), and lowest in *Dactylocteniumaegyptium*(L.) Willd.(0.117).The total phenol concentration was found to be highest in *Eragrostiscilianensis*(All.) Vignolo ex Janch.(11.3), and lowest in *Sennaoccidentalis* (L.) Link (6.97).

The total phenolic optical density was found to be highest in *Eragrostiscilianensis*(All.) Vignolo ex Janch.(1.97) and lowest in *Sennaoccidentalis* (L.) Link (1.28). The total flavonoid optical density was found to be highest in *Sennaoccidentalis* (L.) Link (0.192) and lowest in *Dactylocteniumaegyptium*(L.) Willd.(0.048).

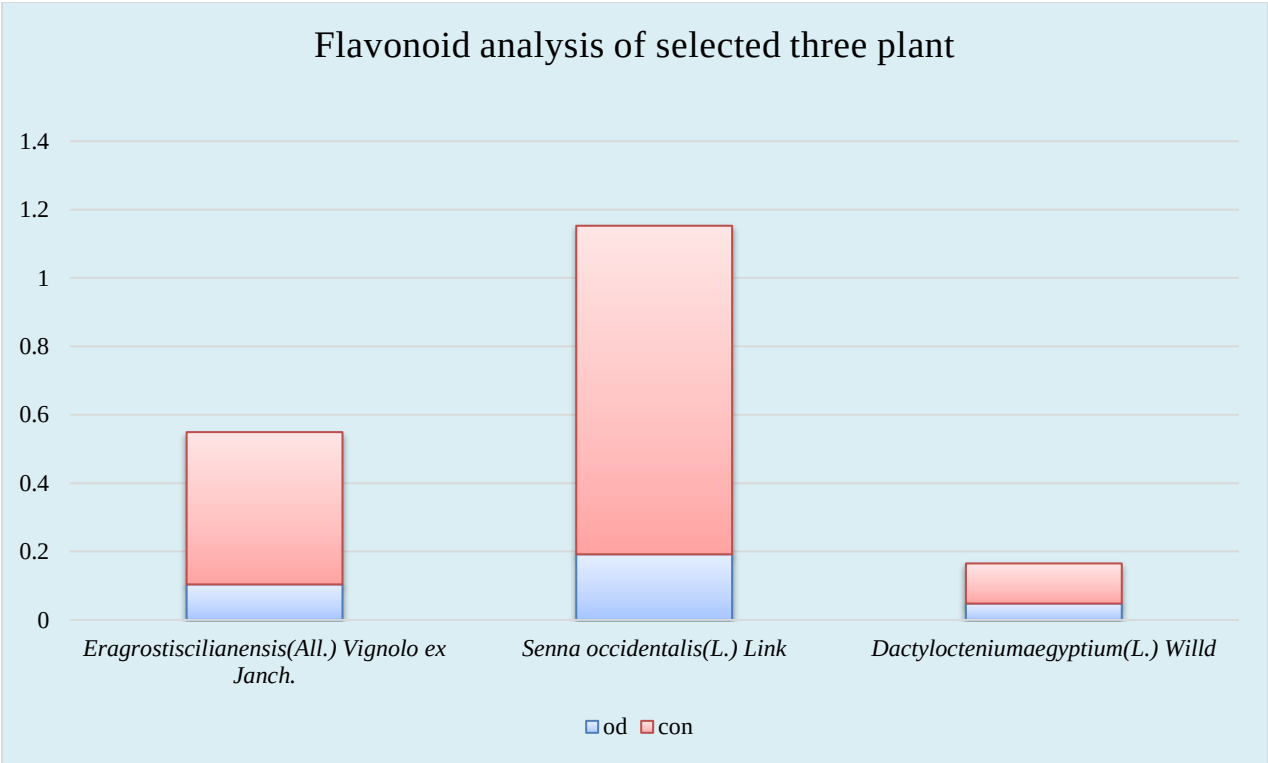


Figure 1:Total Flavonoid Concentration (mg/ml) and O.D (µg/ml) among the plant

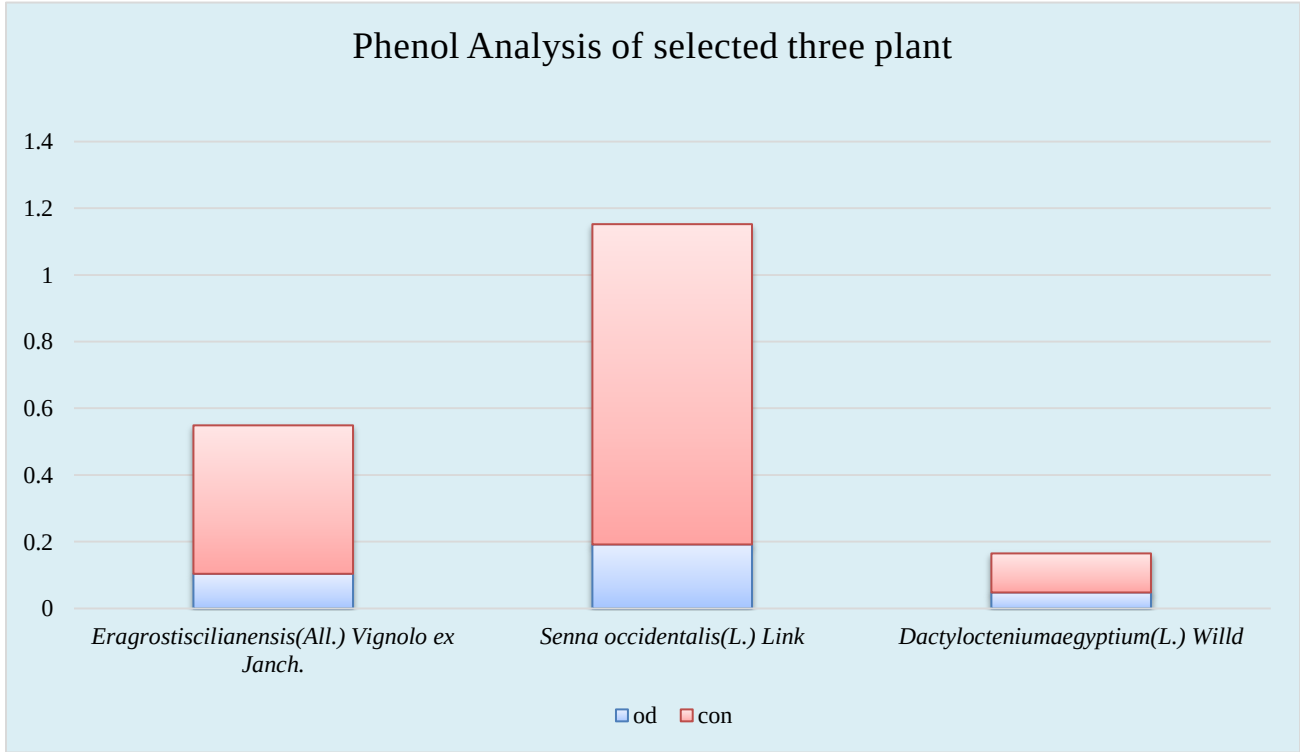


Figure 2: Total Phenol Concentration (mg/ml) and O.D (µg/ml) among the plant

These substances were physiologically responsive crucial to many plant characteristics including antibacterial and antioxidant anti-cancer, etc. The acetone all plants extracts *Eragrostis cilianensis* (All.) Vignolo ex Janch., *Senna occidentalis* (L.) Link, *Dactyloctenium aegyptium* (L.) Willd was studied to determine for the presence of different phytochemicals. The extracts from both plants revealed the presence of many chemical substances. such as glycosides, phenols, flavonoids, tannins, and carbohydrates. Being surrounded with secondary metabolites 3 plants, suggesting that they are useful as parts of seed, leaf, flower, and stem. In both extracts, there was a favorability for flavonoids and phenols. Phenols a class of substances that was connected to the antibacterial characteristics of the plants. Another was flavonoids a large class of substances that were effective without antioxidants and radical scavengers (Doss, A. et al., 2009).

Conclusion:

A total of 3 plant species were meticulously selected from the precincts of M.N. College, and the analysis conclusively indicated that the highest concentration of the comprehensive investigations conducted on these 3 selected plant species, *Eragrostiscilianensis*(All.) Vignolo ex Janch.(11.3) , *Senna occidentalis* (L.) Link (6.97), *Dactylocteniumaegyptium*(L.) Willd.(7.94), have incontrovertibly demonstrated the presence of significant phenol content. and *Eragrostiscilianensis*(All.) Vignolo ex Janch.(0.445) , *Senna occidentalis* (L.) Link (0.961), *Dactylocteniumaegyptium*(L.) Willd.(0.117), presence of flavonoide content. Analysis of selected plants extract for the phytochemicals and active ingredients could provide leads in pharmaceuticals. The high phenol of the selected plants material coupled with a fairly high concentration of the amino acids make it suitable for fortification of foods. In these investigation plants possess a reasonable number of flavonoid and phenol these leaves, seed, stem, flower, can be used as a phenol-enriched food material for nutritional purposes.

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