

Phytochemical analysis of *Phyllanthus niruri* L. and *Chloris barbata* (SW.)

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Abstract

Plant investigations has increased worldwide, and more data has emerged revealing the enormous potential of therapeutic plants utilized in many traditional ways. The qualitative phytochemical analysis of two weeds *Phyllanthus niruri* L. and *Chloris barbata* (SW.) were tested in different solvents system (Water, Methanol and Chloroform) carried out in order to assess the presence of primary metabolites and Secondary metabolites. A preliminary phytochemical test showed the positive result of presence of alkaloids, flavonoid, tannins, phlorotannins, steroids, terpenoids, phenol, protein, carbohydrates, amino acids, saponins, anthraquinones and cardiac glycosides have been found of tested weeds. *Phyllanthus niruri* L. weed showed the maximum compounds present in methanolic extract then water and chloroform. *Phyllanthus niruri* L. weed was maximum phytochemical present compare to *Chloris barbata* Sw. mentioned weeds contain compounds in their whole plant which may cause allelopathic effects, also utilized pharmaceutical industries.

Keywords: *Chloris barbata* Sw., *Phyllanthus niruri* L., Phytochemical analysis, Weed

Introduction

Recently, plant-based investigation has raised in globally and a higher amount of evidence has accumulated to show huge potential of medicinal plants used in different traditional methods. Over 13,000 plants have been the studied in the past 15 years (Pande *et al.*, 2007). Indian flora has always provided mankind with therapeutic medicines (Verma and Sing, 2008). Chemical compounds embedded in medicinal plants, like carbohydrates, flavonoids, alkaloids, glycosides, and lignans, have been identified to contain beneficial properties in the reduction of liver diseases and tumors (Venugopal and Liu, 2012). *Phyllanthus*, a vast genus of shrubs, trees, and rare plants from the Euphorbiaceae family, was studied for its phytochemical and pharmacological characteristics. The genus is widespread throughout the world's warmer regions (Burkill, 1996). *Phyllanthus niruri* is a tiny erect annual plant that grows up to 30-40cm in height and is native to the Amazon rainforest and other tropical regions, including South East Asia, Southern India, and China (Girach *et al.*, 1994). Its leaves are 7-12 cm long and alternating, sessile oblong. It produces little off-white-greenish flowers that are solitary, auxiliary, pedicellate, apetalous, and monoecious. *Phyllanthus amarus* and *Phyllanthus sellowianus* are similarly related to *P. niruri* in appearance, phytochemical composition, and history, but they are found in dry regions of India and Brazil, as well as in Florida and Texas. (Lee *et al.*, 2006). *Phyllanthus niruri* is known in Spanish as Chanca Piedra, means "stone breaker," since it has been used to treat gallstones, kidney stones, and other disorders of the kidneys. In a preclinical investigation, *P. niruri* aqueous extract had an effective non-concentration-dependent inhibitory impact on calcium oxalate crystal formation (Campos and Schor, 1999). It is known as Quebra Pedra in Brazilian herbal medicine and is considered as an effective treatment for bladder infections, hydrosies, and infections of the urinary system. It is also used to treat diabetes, hepatitis, and kidney disease (Santos *et al.*, 1995; Wang *et al.*, 1995; Wang 2000). Asthma, bronchitis, coughing, dehydration, anemia, jaundice, and TB considered usual home remedies in India, and this remedy is known as Pitirishi or Budhatri (Dhar and Dhar, 1968). Ottow isolated phyllanthin in 1891 and was the first to work on *Phyllanthus niruri*. (Row *et al.*, 1964). It contains a wide range of phytochemicals belong only to *Phyllanthus niruri*. The leaves, stem, and roots of *Phyllanthus niruri* contain lignans, tannins, coumarins, terpenes, flavonoids, alkaloids, saponins, and phenylpropanoids, and additional compounds that have been related to the plant's biological activity. The plant also contains common lipids, sterols, and flavanols. (Dhar and Dhar, 1968). The chosen plant, *Chloris barbata*, plays a significant role in Indian traditional medicine and culture. Throughout India, this plant is commonly used in the Ayurvedic medicine tradition. The plant

has several kinds of pharmacological properties, including antibacterial, anti-inflammatory, anti-pyretic, anti-diabetic and analgesic properties. (Kumar *et al.*, 2012 and Bhargavi *et al.*, 2013). *Chloris barbata* leaves are used in the treatment of cancer, antibacterial, antiurolithiac, hepatoprotective, and antidiabetic activity (Selvan *et al.*, 2014). Plants release low molecular weight substances called allelochemicals as part of secondary metabolism (Rice, 1984). They are found in every part of the plant, including the stem, roots, rhizomes, leaves, flowers, fruits, seeds, and even pollen grains that are released from the plant by decomposition, volatilization, leaching, and exudation from plant tissue (Molisch, 1937). Earlier studies had examined the allelopathic potential of a few chosen species (Sharma and Devkota, 2014). Plants produce secondary metabolites called allelochemicals. Different kinds of allelochemicals occur. (Bachheti *et al.*, 2020)

The present investigations more significant the phytochemicals present in the plants for isolation and further phytochemical analysis use for local community.

MATERIALS AND METHODS:

Preparation of extract

The collected *Phyllanthus niruri* L. and *Chloris barbata* Sw. plants then washed whole plants and shed drying all the samples were grinded in mechanical grinder and powdered material was kept in airtight container for further use. Here extraction was prepared by shake extraction method. 1 gm of each sample was soaked in conical flask containing 10 mL water, methanol, and chloroform as a solvent and put on shaker for 24 hours. The extracts were filtered through Whatman filter paper Obtain cured extract for stored in refrigerator for further use of phytochemical screening.

The qualitative phytochemical screening of Primary metabolites and Secondary metabolites as a Protein, Amino acid, Carbohydrate, Phenol, Flavonoid, Alkaloids, Tannin, Cardiac glycoside, Phlorotannin, Terpenoids, Anthraquinone, Steroid was test in three different solvent water, methanol, and chloroform. Qualitative phytochemical analysis was done using the Harborne, (1998), Trease and Evans, (1989), Kokate *et al.*, (2001), Khristi *et al.*, (2017), Savithrammma *et al.*, (2011), Peach and Tracoy, (1955), Treare and Evans, (1985) Rizk, (1982), Tiwari *et al.*, (2011), Prabha *et al.*, (2017) procedure.

RESULT AND DISCUSSION:

The qualitative phytochemical analysis of different chemical compounds was test in different extract (Water, Methanol and Chloroform) of cured powder of *Phyllanthus niruri* L. and *Chloris barbata* (SW.) analysis was carried out in order to assess the presence of Secondary metabolites. The results were illustrated in **Table 1**. Showing the presence of alkaloids, flavonoid, tannins, phlorotannins, steroids, terpenoids, phenol, protein, carbohydrates, amino acids, saponins, anthraquinones and cardiac glycosides. In methanolic extract showed the presence of compounds in weeds. *Phyllanthus niruri* L. weed showed the maximum compounds present in methanolic extract then water and chloroform. *Phyllanthus niruri* L. weed was maximum phytochemical present compare to *Chloris barbata* Sw. weed.

According to Adebisi *et al.*, 2021, Leaves of *Phyllanthus niruri* L. plant contain alkaloids, tannins, anthraquinones, glycosides, saponins, flavonoids, steroids. The phytochemicals found in leaf samples were noticeably lacking of purine-type alkaloids and phlobatannins. The phytochemical screening of the methanolic extract of *Chloris barbata* leaves revealed the presence of alkaloids, carbohydrates, flavonoids, triterpinoids, glycosides, and saponins. Ramayyappa *et al.*, (2020). The preliminary phytochemical analysis of the methanol extract of *Chloris barbata* (SW.) leaves revealed the presence of flavonoids, tannins, saponins, and proteins. Kumar *et al.* (2020). The results showed that phenolics, saponins, and flavonoids are present in *Chloris barbata* Sw. Furthermore, these species have good inhibitory action against human pathogenic microorganisms. It is also possible to prospect

for *Chloris barbata* (SW.) plant species and determine their allelopathic impacts on other organisms and ecotypes. Saranya *et al.*, 2013.

Table 2: Preliminary analysis of *Phyllanthus niruri* L. and *Chloris barbata* Sw. in different solvents

Phytochemical constituent	Test name	<i>Phyllanthus niruri</i> L.			<i>Chloris barbata</i> Sw.		
		Methanol	Water	Chloroform	Methanol	Water	Chloroform
Carbohydrates	Molisch's test	+	+	++	+	+	+
	Fehling's test	+	++	++	+	+	-
Protein	Biuret test	++	+	+	+	+	+
Amino acid	Ninhydrin test	+	+	++	+	+	+
Phenol	Folin's test	+++	+++	+	+	+	+
	1% Ferric chloride test	+++	++	+	++	++	++
Flavonoid	NaOH test	+++	+	+	+	++	+
Alkaloids	Hanger's test	+	+++	+++	++	+	++
	Wanger's Test	++	+	++	+++	++	+++
	Mayer's test	++	+	+	++	++	+
	Dragendroff's Test	+	+	++	+++	+	+
Tannin	10% Ferric chloride test	+++	++	+	++	++	+
	Gelatin Test	++	++	+	+	++	+
Cardiac Glycosidic	Keller-kiliani's Test	++	+++	+	+	+++	-
Phlorotannin		++	+	-	++	+	++
Terpenoids		+++	+++	+++	+	++	++
Anthraquinone		+++	++	+++	+	++	+++
Steroids	Liebermann Burchard's test	+++	++	+	++	+++	+
	Salkowski's test	++	++	++	+	++	+++

Note:- Low concentration +, medium concentration ++ and higher concentration +++

CONCLUSION:

Based on the phytochemical screening of *Phyllanthus niruri* L. and *Chloris barbata* (Sw.) it can conclude that whole plant extract was positive result showed in different solvent system alkaloids, flavonoid, tannins, phlorotannins, steroids, terpenoids, phenol, protein, carbohydrates, amino acids, saponins, anthraquinones and cardiac glycosides were present. Both weeds chemical compounds further used as an allelopathy, pharmaceutical and agriculture for mankind.

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