Journal of Medicinal Plants Studies
www.PlantsJournal.com

ISSN (E): 2320-3862
ISSN (P): 2394-0530
NAAS Rating: 3.53
JMPS 2020; 8(1): 62-65

Received: 13-11-2019
Accepted: 19-12-2019

Priyanka
Plant Pathology and Microbiology Laboratory, Dept. of Botany, Patna University, Patna, Bihar, India

Corresponding Author:
Priyanka
Plant Pathology and Microbiology Laboratory, Dept. of Botany, Patna University, Patna, Bihar, India

Qualitative phytochemical constituents of some medicinal plants

Priyanka

Abstract
The Qualitative analysis is very important to identify the phytochemical constituents present in medicinal plants. The medicinal properties of plants is due to the presence of particular bioactive costituents. In present study qualitative analysis of ten medicinal plants namely *Syzygium aromaticum* (Clove), *Oxalis corniculata* (Wood sorel), *Solanum nigrum* (Black nightshade), *Azadirachta indica* (Neem), *Bauhinia variegata* (Kachnar), *Coriandrum sativum* (Dhania), *Anesomeles indica* (Indian catmint), *Terminalia bellirica* (Bahera), *Ocimum sanctum* (Tulsi) and *Citrus sinensis* (Orange) were done and reveals the presence of alkaloids, flavonoids, phenols, tannins, Saponins, terpenoids and Steroids.
Except saponins were absent in *Coriandrum sativum*, Terpenoid in *Anesomeles indica* and *Terminalia bellirica.* Steroids and Sterols were not present in *Bauhinia variegata*, *Coriandrum sativum and Anesomeles indica.*

Keywords: Phytochemical, constituents, medicinal properties

1. Introduction
Plants have been appreciated for their antimicrobial or medicinal properties for centuries. Due to a particular taste or smell, Plants have which they are used in the perfume and fragnance industry. Herbs and spices have been used since ancient times not only as “tastemakers”, but also as preservatives or antioxidants (Beuchat, 1994; Nakatani, 1994) [2, 3]. There are literatures which describes the favorable properties and identifying the active components of plants. Nature has long been a great source of antimicrobial compounds and play important role in natural defense and thus this is logical to search natural alternatives to chemical one. Compounds that are present in plants have antimicrobial activity and called as green chemicals. Spices and herbs inhibit molds, bacteria and yeasts and are used in food preservation as well as for medicinal purposes. The use of numerous plant extracts, various spices and their constituents provide an alternative way to prevent fungal growth and mycotoxins formation. (Vagi *et al*., 2005; kumar *et al*., 2007, Lee *et al*., 2007) [4, 5, 6] These plant extracts considered as natural sources of antimicrobial agents regarded as nutritionally safe and easily degradable (Cowan, 1999; Duffy and Power 2001; Berahou *et al*., 2007, Chika *et al*., 2007) [7-10].
In this era of antimicrobial drug resistance, some plants have antimicrobial potential and is considered as alternatives to conventional antimicrobial agents (Nwaopara *et al*., 2009) [11]. Plants can synthesize aromatic secondary metabolites, like phenols, quinones, flavones, phenolic acids, flavonoids, flavonols, coumarins and tannins (Cowans, 1999) [7]. Thus various studies have been conducted on pathogenic microorganisms growth inhibition. Many researchers used either natural antimicrobial agents such as essential oils and phenolic compounds (Bluma and Et Cheverry, 2008; Al-Bayati, 2008) [12, 1]. Phenolic compounds exhibit a wide range of properties, such as anti inflammatory, anti-allergenic, anti-microbial, antioxidant, anti thrombotic and cardio protective effects (Balasundram *et al*., 2006) [36].
Different plant parts such as roots, leaves, seeds and flowers possess inhibitory properties against bacteria, fungi and insects (Davicino *et al*., 2007) [14]. At present there is little evidence on the antimicrobial properties of the medicinal plants under investigation against food spoilage moulds and yeasts.
The plant compounds which are secondary metabolites, mainly of terpenoid or phenolic biosynthetic origin, hydrolytic enzymes (Glucanases, chitinases) and proteins acting specifically on membranes of invading microorganisms with antimicrobial activity (Bowles, 1990; Vigers *et al*., 1991) [15, 16]. No sharp chemical division can be made in general between

constitutive and induced antimicrobials (Grayer and Harborne, 1994). Today, scientific research reveals that not only chemicals from plants have an effect against a particular disease. But also the antioxidant property from plant extracts gives a beneficial effect to human health (Puangpronpitag and Sittiwet, 2009) [17]. Different plants extracts may be successfully applied to elimination of food borne bacteria which were used for treatment of some gastrointestinal disorders, (Tayel and El Tras, 2010) [18]. On the other hand, it is regarded that there is a lower incidence of adverse reactions to plant preparations compared to synthetic pharmaceuticals and reduced cost of plant preparations (Cock, 2008) [19], Considerable research on antimicrobial plant extracts has been reported (Sharma and Hashinaga, 2004) [20].

2. Materials and Methods:

- Ten different medicinal plants listed in Table-1 were collected in their natural habitat from local areas of Patna. The plant was authenticated by taxonomists from Botany Department, P.U., Patna.
- The samples were cut into small pieces and then surface sterilized with 5% Sodium hypochlorite solution. The plant parts were dried in shade for 48 hours approximately at ambient temperature under laboratory condition and then crushed to fine powder in electric grinder. These were sealed in polyethylene bags and stored away from light and moisture until used for extraction (Yaye *et al*., 2012)

Protocol for qualitative Phytochemical Screening:
Phytochemical screening of ten medicinal plants was carried out; as they depicted better antifungal activity. Preliminary qualitative chemical tests using ethanol extracts for Alkaloid, Tannin, Saponin, Flavonoids and Phenols and terpenoid by following procedure. Qualitative phytochemical analyses were done using the procedure of Kokate *et al*., (1995) [22].

2.1. Test for alkaloids
50 mg of powdered plant parts was mixed in 100 ml of ethanol and distilled water and stirred by adding few ml of dilute hydrochloric acid and filtered. The filtrate was tested carefully with various alkaloidal reagents as follows:
Mayer's Test This test was performed by adding two drops of Mayer's reagent (Potassium mercuric chloride) to 1 ml of extract. Formation of a whitish-yellow coloured precipitate indicated the presence of alkaloids.

2.2. Test for Tannins and phenols
To 1 ml of extract solution 2 ml of water and 2-3 drops of of ferric chloride solution was added. Appearance of blue colour indicated the presence of gallic tannins, and green black colour for catecholic tannins (Iyengar,1995) [23].

2.3. Test for Saponins
Froth test: Extracts were diluted with distilled water to 20 ml and this was shaken in a graduated cylinder for 15 minutes. Formation of 1cm to 2cm layer of foam indicated the presence of saponins.

2.4. Test for Flavonoids: 4 ml of extract solution was treated with 1.5 ml of 50% methanol solution. The solution was warmed and metal magnesium was added. To this solution, 6 drops of concentrated hydrochloric acid was added. The appearance of red color indicated the presence of flavonoids, and orange color indicated flavones (Siddiqui and Ali, 1997) [24].

2.5. Test for Steroid and Terpenoid: Liebermann Burchard test: Crude extract was mixed with few drops of acetic anhydride, boiled and cooled. Concentrated sulphuric acid was then added from the sides of the test tube. Formation of a brown ring at the junction of two layers indicated the presence of terpenoids. Green coloration of the upper layer and the formation of deep red color in the lower layer would indicated a positive test for steroids and triterpenoids respectively.

3. Results and Discussion:
The ten plants *viz*. Clove, creeping wood sorel, Black nightshade, Neem, Kachnar, Coriander, Indian catmint, Bahera, Tulsi and orange were further investigated for their phytochemical content response. The phytochemicals in the ethanolic extract of ten medicinal plants were evaluated qualitatively for seven parameters like Alkaloids, Flavonoids, Phenols, Tannin, Saponins, Terpenoid, Steroids and sterols. The results indicated that medicinal plants showed the presence of alkaloids, flavonoids, phenols, tannins, saponins, terpenoids and steroids (Table 1). The degree of phytochemicals, however, varied among different plants. Phenolic compound was high in Clove (3^+) and all the phytochemicals like flavonoid, alkaloid, tannin, saponin, terpenoid and steroids were present in it. The phenols was moderate in Orange, Tulsi and Creeping woodsorel (2^+). Saponins was high in Indian catmint (3^+). Bahera contained moderate level of flavonoids, tannins and steroids (2^+). The degree of phenols in ethanolic extract of Bahera was lesser (1^+). Similarly terpenoids were absent in extract of Indian catmint and Bahera. The steroids were not detected in the ethanolic extract of Kachnar, Coriander and Indian catmint (Table 1.).

Table 1: Qualitative estimation of phytochemical compounds responsible for antimicrobial activity.

+ = Present; - = Absent.

Sl. No.	Extracts	Alkaloids	Flavonoids	Phenol	Tannin	Saponins	Terpenoid	Steroids & Sterols
1	*Syzygium aromaticum* (Clove)	+	+	+ + +	+	+	+	+
2	*Oxalis corniculata* (Creeping wood sorel)	+	+	+ +	+	+	+	+
3	*Solanum nigrum* (Black Nightshade)	+	+	+	+	+	+	+
4	*Azadirachta indica* (Neem)	+	+	+	+	+	+	+
5	(*Bauhinia variegata*) Kachnar	+	+	+	+	+	+	-
6	*Coriandrum sativum* (Coriander)	+	+	+	+	-	+	-
7	*Anesomeles indica* (Indian catmint)	+	+	+	+	+ + +	-	-
8	*Terminalia bellirica* (Bahera)	+	+ +	+	+ +	+	-	+ +
9	*Ocimum sanctum* (Tulsi)	+	+	+ +	+	+	+	+
10	*Citrus sinensis* (Orange)	+	+	+ +	+	+	+	+

Phytochemicals of medicinal plants and their medicinal values have been studied by many workers. Emmanuel *et al*., (2015) [25] have studied the phytochemicals of *Syzygium aromaticum* flower and found more or less similar results. A more or less similar phytochemical constituent from clove has also been investigated by Rashi *et al*., (2011) [26] and Umesh Kumar *et al*., (2010) [27]. Nirmala Paul *et al*., (2013) [28], Nimish *et al*., (2011) [29], Arun thangavel *et al*., (2015) [30], Sasi Kumar *et al*., (2014) [31] have investigated the similar phytochemicals in *Coriandrum sativum*. The phytochemicals of *Anisomeles indica* of more or less similar pattern have been studied by Ulhe and Narkhede (2013) [32] and Kavitha *et al*., (2012) [33]. The phytochemicals of Terminalia bellerica have been thoroughly studied by Disha *et al*., (2014) [34] and Nithya *et al*., (2014) [37]. Devendran and Balasubramanian (2011) [35] have screened the phytochemicals from *Ocimum sanctum*. Similar phytochemicals in aqueous ethanolic extract of *Ocimum sanctum* have also been studied by Bishnu *et al*., (2011) [38]. Phytochemicals of *Azadirachta indica* and their antimicrobial activities have been studied by Susmitha *et al*., (2013) [40] and Imran Khan *et al*., (2010) [39]. Zemali *et al*., (2013) [41] have studied the phytochemicals of *Solanum nigrum* and also confirmed the presence of alkaloids, saponins, tannins, glycosides, coumarins, terpenoids, flavonoids and volatile oils. The phytochemicals and their antimicrobial activities of Citrus sinensis of similar characters have also been studied by Ehigbai *et al*., (2016) [42] and Ashok Kumar *et al*., (2011) [43].

4. Conclusion

The results of qualitative biochemical analysis suggested that, the studied medicinal plants extracts possessed some of natural phytochemicals having antifungal property. The nature of these active components is not very clear. Hence these compounds need further thorough investigation simultaneously and more studies are essential to purify and identify these compounds.

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