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Phytochemical Screening of Five Medicinal Plants

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Abstract

For drug discovery and development detection of the bioactive principles present is medicinal plants is a valuable step. The present study deals with phytochemical screening of five medicinal plants for alkaloids, carbohydrates, flavonoids, glycosides, proteins, phenols, saponin, steroid, tannin and terpenoids. All the five plants were found to contain glycosides and terpenoids. Alkaloids were present only in black pepper and garlic. Phenols were present in all except black pepper and garlic. Proteins were present only in garlic. Tannins were present in all except cinnamon and clove. Highest number of bioactive compounds were present in garlic followed by guava and lowest in clove.

Keywords: Alkaloids, Glycosides, Medicinal Plants, Terpenoids.

Introduction

In developing countries major part of the total population uses traditional folk medicine obtained from plants. Plants are valuable source of natural products for maintaining human health, as studies on natural therapies have intensified. More than 150,000 plant species have been studied and several of them contain therapeutic substances and the use of plant compounds for medicine has gradually increased.

Review of Literature

World Health Organization says that medicinal plants are probably the best source of a variety of drugs. About 80 % of population in developed countries use traditional medicine containing compounds derived from medicinal plants (Castello et al., 2002). India is rich in biodiversity and it offers a unique opportunity for drug discovery research. A number of traditional natural products have been increased and much work has been done on selected ethno medicinal plants for antibacterial activity against pathogenic strains of both Gram negative and Gram positive bacteria (Jachas, 2007; Singh, 2002). The bioactive constituents from plant origin show antimicrobial activity against some microorganisms like bacteria, fungi and protozoa. Antimicrobial drugs either microbicidal (kill microbes) or microbiostatic (prevent the growth of microbes). Thus, the drugs derived from plants have shown great promise in the treatment of various diseases including viral infections caused by microorganisms due to their antimicrobial activity (Kaur et el., 2017, Yadav et al., 2018 and Yadav, 2018). The present study deals with phytochemical screening of five medicinal plants for alkaloids, carbohydrates, flavonoids, glycosides, proteins, phenols, saponin, steroid, tannin and terpenoids.

Objective of The Study

The present investigation was performed for phytochemical analysis of five medicinal plants.

Methodology

Collection of Plant Material

Plant materials were collected from local market of Shahjahanpur and identified by Department of Botany, Gandhi Faiz-e-Aam College, Shahajahanpur and were stored in laboratory for future use.

Preparation of Extract

10g of powdered material was used for solvent extraction via Soxhlet apparatus following standard protocol (Nag et al., 2012). After the complete process, the collected extracts were subjected for evaporation at room temperature. The dried extracts were stored at 4˚C for future analysis.

Phytochemical Screening

Phytochemical screening was carried out to determine the presence of saponins, tannins, flavonoids, glycosides, terpenoids, phytosterols and cardiac glycosides, proteins, carbohydrates and phenols.

Test for Saponins (Foam test)

About 200 mg of powdered sample was mixed with 5 ml of distilled water and shaken vigorously for a stable persistent broth. Formation of foam indicated the presence of saponins.

Test for Tannins (Ferric chloride test)

About 200 mg of plant extract was treated with few drops of 0.1% ferric chloride and observed for blue or black colouration. Formation of blue black colour confirmed the presence of tannins.

Test for Alkaloids (Wagner's test)

About 0.5ml of extract solution was treated with 2-3 drops of Wagner's reagent (solution of Iodine in potassium iodide) and the formation of reddish brown precipitate indicate the presence of alkaloids.

Test for Flavonoids (Alkaline reagent test)

To the extract solution, few drops of sodium hydroxide was added, formation of an intense yellow colour, which turns to colourless on addition of few drops of dilute acetic acid indicate the presence of flavanoids.

Test for Sterols and Triterpenoids (Salkolwski's test)

The extract was treated with chloroform, few drops of concentrated H_2SO_4 was added, the test tube will be shaken well and allowed to stand for some time. The appearance of red colour in upper layer indicate the presence of sterol and formation of yellow colour at the lower layer indicated the presence of triterpenoids.

Test for Cardiac Glycosides (Keller Killani test)

The extract was treated with chloroform and allowed to dryness. Then, 0.4 ml of glacial acetic acid containing a trace amount of ferric chloride solution was added. The mixture will be transferred to small test tube. 0.5 ml of concentrated H_2SO_4 will be added along the sides of the test tube, the appearance of blue colour in acetic acid layer indicate the presence of cardiac glycosides.

Screening of Phenol

To 1ml of the extract 3ml 10% lead acetate solution was added. A bulky white precipitate indicates the presence of phenolic compounds.

Screening for Proteins

5ml of extract was mixed with 10% NaOH solution and added few drops of copper sulphate to it. The formation of reddish violet colour indicates the presence of proteins.

Screening for Carbohydrate test

To 1ml of extract, 1ml of Benedict's reagent was added. The mixture is heated on a boiling water bath for 2 minutes solution appeared green showing the presence of reducing sugar.

Table 1: Phytochemical analysis of Plant extract (in Chloroform)

S.No.	Phytochemicals	Guava	Black Pepper	Cinnamon	Clove	Garlic
1	Alkaloids	–	+	–	–	+
2	Carbohydrates	+	+	–	–	–
3	Falavonoids	+	–	–	–	+
4	Glycosides	+	+	+	+	+
5	Proteins	–	–	–	–	+
6	Phenols	+	–	+	+	–
7	Saponin	–	–	+	–	+
8	Steroid	–	–	–	–	+
9	Tannins	+	+	–	–	+
10	Terpenoids	+	+	+	+	+

Discussion and Results

All the five plants were found to contain glycosides and terpenoids. The glycosides are useful in lowering blood pressure. (Nyarko et al.,1990). Terpanoids are used in the treatment of cough, asthma and hay fever. They are also used in the treatment of congestive heart failure. Alkaloids were present only in black pepper and garlic. Phenols were present in all except black pepper and garlic. Alkaloid has important biological property like cytotoxicity and are used in allophatic systems (Trease and Evans, 2005). Proteins were present only in garlic. Tannins were present in all except cinnamon and clove. Tannins are present only in saffron extracts. Phenols and tannins acts as antioxidants (Han et al., 2005).Highest number of bioactive compounds were present in garlic followed by guava and lowest in clove. The plant extract and their phytoconstituents have been reported for anti-inflammatory, antidiarrheal, antimicrobial, antioxidant and insecticidal activities (Chouhan and Singh, 2011). Saponins are present in cinnamon and garlic. Traditionally saponins have been extensively used as detergents and pesticides. Saponins protect against hypercholesterolemia and antibiotics properties (Amin et al., 2013). Steroids and Sterols are great importance in pharmacy as they possess compounds like sex hormones and can be used for drug production (Okwu, 2001). All the selected five plants in this study consist of many useful phytochemicals having important biological properties. These findings would lead to find out some compounds which are very useful for the new medicines.

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