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Phytochemical Analysis of Some Selected Spices

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ABSTRACT: Spices have been defined as plant substances from indigenous or exotic origin, aromatic or with strong taste, used to enhance the taste of foods. Herbs and spices have been used during the middle Ages for flavoring, food preservation, and/or medicinal purposes. The present study was carried out on the five spices i.e., *Capparis spinosa* (Caper), *Cinnamomum verum* (Cinnamon), *Illicium verum* (Star anise), garlic cloves (*Allium sativum*), and dried turmeric powder (*Curcuma longa*), to determine their phytochemical constituents and were proved to have the potential to act as a source of useful drugs and also to improve the health status of the consumers as a result of the presence of various compounds that are vital for good health

Keywords: Spices, Phytochemicals, *Capparis spinosa*, *Cinnamomum verum* (Cinnamon), *Illicium verum* (Star anise), Garlic cloves (*Allium sativum*), *Curcuma longa*. (turmeric powder).

I. INTRODUCTION

Plants have been used to treat or prevent illness since before recorded history. The sacred Vedas dating back between 3500 B.C and 800 B.C give many references of medicinal plants. One of the remotest works in traditional herbal medicine is “*Virikshayurveda*”, compiled even before the beginning of Christian era. “*Rig Veda*”, one of the oldest available literatures written around 2000 B.C. mentions the use of Cinnamon (*Cinnamomum verum*), Ginger (*Zingiber officinale*), Sandalwood (*Santalum album*) etc. not only in religious ceremonies but also in medical preparation^[1]. Medicinal plants are of great importance to the health of individuals and communities in general. The medicinal value of plants lies in some chemical substances that produce a definite physiological action on the human body^[2]. Plants and plant-based medicaments are the basis of many of the modern pharmaceuticals we use today for our various ailments. The discovery of medicinal plants has usually depended on the experience of the populace

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based on long and dangerous self experiment. Progress over the centuries towards a better understanding of a plant derived medicine has depended on two factors that have gone hand in hand. One has been the development of increasingly strict criteria of proof that a medicine really does what it is claimed to do and the other has been the identification by chemical analysis of the active compound in the plant (Holiman, 1989).

According to world health organization (WHO), more than 80% of the world's population relies on traditional medicines for their primary health care needs^[3]. The medicinal value of Spices, which include leaves (coriander, mint), buds (clove), bulbs (garlic, onion), fruits (red chili, black pepper), stem (cinnamon), rhizomes (ginger), star anise, cinnamon(bark) and other plant parts, have been defined as plant substances from indigenous or exotic origin, aromatic or with strong taste, used to enhance the taste of foods. Herbs and spices have been used during the middle Ages for flavoring, food preservation, and/or medicinal purposes. Only a small percentage of plants species have been investigated phytochemically and the fraction submitted to biological screening is even smaller^[4]. Several studies have attributed the antimicrobial, antioxidant and pharmaceutical properties of spices and herbs to their phenolic compounds^[2].

II. MATERIALS AND METHODS

Spices

Five samples of spices *Capparis spinosa* (Caper), *Cinnamomum verum* (Cinnamon), *Illicium verum* (Star anise, garlic cloves (*Allium sativum*), and dried turmeric powder (*Curcuma longa*), were used in this study

Preparation of ethanolic extracts

Samples of spices were pulverized and extracted twice in ethanol (1:10 w/v) at room temperature for 48 hrs and filtered. The filtrates were concentrated to dryness under reduced conditions at room temperature. Dried extracts were then suspended in dimethyl sulfoxide (DMSO) for further use.

PHYTOCHEMICAL SCREENING

A. Test for carbohydrates:

Equal volumes of Benedict's reagent and test solution were mixed in test tube. The mixture was heated in boiling water bath for 5 minutes. Solution appeared green showing the presence of reducing sugar.

B. Tests for Proteins: Xanthoproteic test:

To 1ml of extract, 1ml of conc. H_2SO_4 was added. This resulted in the formation of white precipitate which on boiling turned yellow. On addition of NH_4OH , yellow ppt. turned orange.

C. Test for glycosides: Borntrager's Test:

To the 3ml of aqueous extract, dil. H_2SO_4 was added. The solution was then boiled and filtered. The filtrate was cooled and to it equal volume of benzene was added. This solution was shaken well and the organic layer was separated. Equal volume of dilute ammonia solution was added to the organic layer. The ammonia layer turned pink showing the presence of glycosides.

D. Test for Steroids: Salkowski Test:

To 2ml of aqueous extract, 2ml of chloroform and 2ml of conc. H_2SO_4 was added. The solution was shaken well. As a result chloroform layer turned red and acid layer showed greenish yellow fluorescence.

E. Tests for alkaloids: The aqueous extract was evaporated in a test tube. To the residue dilute HCl was added, shaken well and filtered. With the filtrate following tests were performed.

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Hager's Test- To the 2-3ml of filtrate hager's reagent was added. Yellow ppt was formed showing the presence of alkaloids.

Mayer's Test- To the 2-3 ml of filtrate Mayer's reagent was added. Formation of yellow precipitate showed the presence of alkaloids.

With tannic acid- To 1ml of extract add 2-3 drops of the tannic acid solution reagent, appearance of amorphous or crystalline precipitate represents the presence of alkaloid.

F. Tests for flavanoids- With Lead acetate- To small quantity of aqueous extract 10% of lead acetate solution was added. Formation of yellow precipitate showed the presence of alkaloids.

With Sodium Hydroxide- On addition of an increasing amount of sodium hydroxide, the aqueous extract showed yellow coloration, this decolorized after addition of acid.

G. Test for saponins- Drug extract was shaken vigorously with water. No persistent foam was formed.

H. Test for anthraquinones- 0.5 gm of the extract was boiled with 10ml of sulphuric acid and filtered while hot. The filtrate was shaken with 5ml of chloroform. The chloroform layer was pipette into another test tube and 1ml of dilute ammonia was added. The resulting solution was observed for color changes.

I. Test for Tannins- For 2ml of extract add few drops of 1% lead acetate. A yellowish precipitate showed the presence of tannins.

J. Test for Terpenoids- 2ml of aqueous extract was added to 2ml of acetic anhydride and concentration of H₂SO₄. Formation of blue, green rings indicated the presence of terpenoids.

K. Test for Anthocyanins- 2ml of aqueous extract is added to 2ml of 2N HCl and ammonia. The appearance of pink red turns blue violet indicates the presence of anthocyanins.

L. Test for leucoanthocyanins- 5ml of aqueous extract was added to 5ml of isoamyl alcohol. Upper layer appears red in color indicates the presence of leucoanthocyanins.

M. Test for coumarins- 3ml of 10% NaOH was added to 2ml of aqueous extract formation of yellow color indicates the presence of coumarins.

N. Test for Emodins - 2ml of NH₄OH and 3ml of Benzene was added to the extract. Appearance of red color indicates the presence of emodins.

III. RESULTS AND DISCUSSION

The present study carried out on the five spices i.e., *Capparis spinosa* (Caper), *Cinnamomum verum* (Cinnamon), *Illicium verum* (Star anise), *Allium sativum* (garlic cloves), and *Curcuma longa* (turmeric powder), were used in this study and revealed the presence of medicinal active constituents. The phytochemical active compounds of these spices were qualitatively analyzed separately and the results are presented in Table 1. In these screening process alkaloids, tannins, saponins, flavonoids and terpenoids, glycosides, phenols shows different types of results in different solvents. The medicinal value of plants lies in some chemical substances that have a definite physiological action on the human body. Different phytochemicals have been found to possess a wide range of activities, which may help in protection against chronic diseases. For example, alkaloids protect against chronic diseases. Saponins protect against hypercholesterolemia and antibiotic properties^[5]. Steroids and triterpenoids show the analgesic for central nervous system activities. Phytochemical screening of the various extracts of *Capparis spinosa* (Caper), *Cinnamomum verum* (Cinnamon), *Illicium verum* (Star anise), *Allium sativum* (garlic cloves), and *Curcuma longa* (turmeric powder) were used to study the presence of contained alkaloids, flavonoids, steroids, saponins, tannins and triterpenoid and also have various medicinal values such as anti-inflammatory, anti-diabetic and analgesic activities and for central nervous system activity. The importance of alkaloids, saponins and tannins in various antibiotics used in treating common pathogenic strains has recently been reported by (Kubmarawa, 2007; Mensah, 2008)^{[6], [7]}.

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**Table 1
Phytochemical screening**

	<i>Capparis spinosa</i>	<i>Cinnamomum verum</i>	<i>Illicium verum</i>	<i>Garlic cloves</i>	<i>Curcuma longa</i>
carbohydrates	+	+	+	+	+
Proteins	+	+	++	+	+
glycosides	+	+	-	++	-
steroids	+	++	-	-	++
Alkaloids	++	++	-	++	-
Flavanoids	++	++	+	+	-
Saponins	-	+	-	-	+
anthraquinones	-	++	+	-	-
Tannins	++	++	-	-	-
Terpenoids	+	+	+	++	-
Anthocyanins	-	-	-	-	+
leucoanthocyanins	-	-	-	-	+
coumarins	-	+	-	-	-
Emodins	-	-	+	-	-

+ Shows the presence of phytochemicals, ++ Shows the presence of abundant phytochemicals,
-Shows the absence of phytochemicals

IV. CONCLUSION

The spices have been screened for phytochemical constituents seemed to have the potential to act as a source of useful drugs and also to improve the health status of the consumers as a result of the presence of various compounds that are vital for good health.

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