Evaluation of Phytochemicals and Antioxidant Potential of Cinnamomum zeylanicum

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ABSTRACT

The aim of the present study was to evaluate the phytochemical and antioxidant properties of *Cinnamon Zylenicum* aqueous extract. Qualitative phytochemical screening of *Cinnamon Zylenicum* extracts was assessed by standard methods. The phytochemical constituents present in aqueous extract of were, Saponins, steroids, flavonoids and Tannins. DPPH assay, reducing power assay were used to study antioxidant potentials of extracts. The results from our studies support the fact that *Cinnamon Zylenicum* is good source of photochemical and has strong has strong antibacterial properties, antiulcer, antioxidant.

Key words: phytochemicals, antioxidant, tannins, flavanoids

INTRODUCTION

Day by day there is exponential growth in the use of plants as potential herbal drugs to cure many infection and diseases. As per WHO, more than 80% of world's population depends on herbal medicine for primary healthcare. (Pizzorno and Murray 2012). Phytochemicals are often referred to non-nutritive compounds thought to be produced by plants as means of protection against such dangers as harmful ultraviolet radiation, pathogens and herbivorous predators. Phenolic compounds, including flavonoids, anthocyanins and tannins, are the main group of antioxidant phytochemicals with interesting properties and have deep value due to their biological and free radical scavenging activities (Elfalleh *et al.*, 2011). Cinnamon is a native of Southern Asia and South America. Now it is cultivated in many tropical countries such as India, China and the Caribbean. Cinnamon (*Cinnamomum cassia*) of the family Laura cease is a favourite spice around the world because of its health benefits, flavors and preserves food [NM Chaudhry; P Triq, 2006]. The most favorite chemical constituents of cinnamon are volatile oil (cinnamaldehyde, eugenol, cinnamic acid, and weitherhin), mucilage, diterpenes and proanthocyanidins [GK Jayaprakasha ,KK Sakariah,2002]. Although traditionally known, some recent scientific studies have shown antimicrobial activity of essential oils of

Cinnamomum cassia presl., *C. osmophloeum* kaneh. and *C. zeylanicum blume* [R Tiwari ,ST Chang 2001]. Quattara reported the inhibitory effect of *C. zeylanicum* essential oil on meat deteriorating organisms [RE Simard;RA Holly.,1997]. Antifungal activity was reported for respiratory tract infecting fungi such as *Aspergillus niger* Tieghem, *A. fumigatus* Fres., *A. nidulans* (Eiidam) Winter and *A. flavus* [HB Singh AB Singh.,1995]. Treating high moisture barley or wheat (*Triticum aestivum* L.) grains with essential oil of C. zeylanicum protected them from deteriorating fungi and ochratoxin formation [C Idler;1996]. Similar findings were reported for protection of stored maize (*Zea mays* L.) against *A. flavus* [BR Monte;M Carvajal.,1998].

Although the activity of Cinnamomum cassia bark extracts against various yeast species has been demonstrated previously, their mode of action is not clearly understood. This work constitutes the attempt to assess the anticandidal role of Cinnamomum cassia bark extract against some recently obtained Candida isolates. The ability of this extract to kill Candida cells was tested and identified by the minimum inhibitory concentration, filter disc assay, growth studies and scanning electron microscopy. Our approach involved the collection, extraction, phytochemical and anticandidal evaluation of bark of this medicinal plant.

The bark of various cinnamon species is one of the most important and popular spices used worldwide not only for cooking but also in traditional and modern medicines.. Tannins and flavonoids are phenolic compounds and plant phenolic is a major group of compounds that act as basic antioxidants or free radical scavengers. Saponins have hypotensive and cardio depressant properties. Considering all these facts, the present study was designed to reveal the presence of phytochemicals and to quantify the total phenols and flavonoids beside the antioxidant activity of *Cinnamomum zeylanicum* .

Materials and methods

1. Collection of plant material

The fresh sample of plant material (Bark) was collected from local shop Bhiwandi.

2. Preparation of plant extract

Plant material of *Cinnamomum zeylanicum* was extracted using soxhlet extractor using ethanol as solvent for extraction. 17 grams of sample was weighed and subjected to soxhlet extractor for extraction of plant material using 500mL of ethanol (industrial grade solvent). The temperature was set at 50ºC so as to obtain 3 cycles/hour. The filtrate was collected after 25 cycles and was purified using a rotavapor. The extract was collected in a petri plate and left overnight for complete evaporation of the solvent. The extract was thus obtained and purified After extraction process was completed, the solvent was removed or recovered by means of rotary evaporator.

Preliminary phytochemicals screening

Qualitative analysis of Tannins (Braemer's test)

Extract was added (500 µl) in test tube and in control tube. The sample was sonicated using a sonicator for 5 minutes so that all samples should get mixed properly. Then 10% alcoholic FeCl3 was added in test tube and color change was observed.

Qualitative analysis of Saponins (Foam test):

The stock solution was prepared in D/W and it was continuously mixed for 15 min. After mixing it properly, formation of stable foam was taken as an indication of the presence of saponins.. (Horbone 1973).

Qualitative analysis of steroids (Salkowski,s test)

The plant extracts (1 mg) was taken in a test tube and dissolved with chloroform (10 mL), then added equal volume of concentrated sulphuric acid to the test tube by sides. The upper layer in the test tube was turns into red and sulphuric acid layer showed yellow with green fluorescence. It showed the presence of steroids.

Qualitative analysis of flavanoids

To 1ml of extract, 1ml of 10%leads acetate solution was added. The formation of yellow precipitate was taken as a positive test for the presence of flavonoids.

Phytochemical constituents	**Test**	**Result**
Tannins	Breamers test	Present
Saponins	Foam Test	Present
Steroids	Salkowski's test	Present
Flavanoids	Ferric chloride test	Present

Table 1: Preliminary Phytochemical analysis of *Cinnamomum zeylanicum*

Determination of total phenol by Folin-reagent method

It is a colorimetric total phenolic assay that utilizes Folin–Ciocalteau (F–C) reagent. The F–C assay relies on the transfer of electrons in alkaline medium from phenolic compounds to phosphomolybdic/phosphotungstic acid complexes, which are determined spectroscopically at 765 nm. Although the electron transfer reaction is not specific for phenolic compounds, the extraction procedure eliminates approximately 85% of ascorbic acid and other potentially interfering compounds.

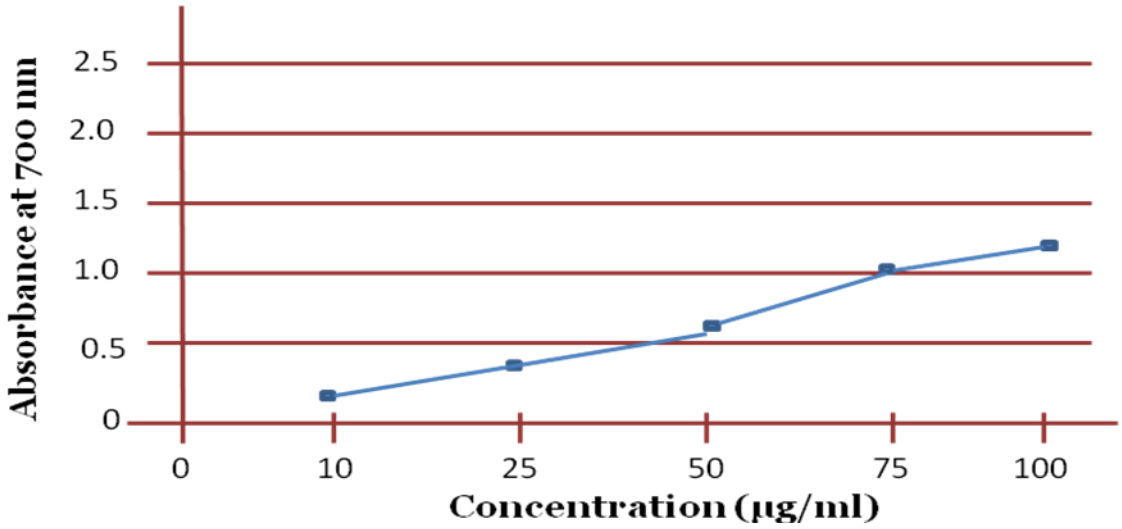
Materials & Method

All the chemicals used were of analytical grade. Chemicals used for phenolic content estimation were 10% Folin Ciocalteau reagent (prepared) and 2% Na_2CO_3.

*Ferric Chloride Test: (*Kumar *et al* 2013*)* method was used for estimation of phenols with slight modification. Method include test sample which was added such that its concentration was according to per ml. Diluent used was D/W.400 µl of 2% Na2CO3 solution was added(for alkaline condition).after this, 500 µl of 10% Folin Ciocalteau reagent was added. The tubes after adding all the reagents & stock solution was kept at 45ºC for 15 minutes in water bath. Absorbance was measured at 765 nm spectrophotometrically

Concentration (µg/ml) Standard Gallic acid	Absorbance at 700 nm	Concentration (µg/ml)	Absorbance at 700 nm
10	0.31	10	0.32
25	0.41	25	0.36
50	1.22	50	0.61
75	1.58	75	1.00
100	2.00	100	1.20

Table 2: Alcoholic extract of *Cinnamomum zeylanicum* for phenol content estimation



Graph 1: Graph of phenolic content of *Cinnamomum zeylanicums*

Result and Discussion

The result for phytochemical screening of ethanolic extract of *Cinnamomum zeylanicum* showed the presence of tannins, saponins steroids and flavonoids, but alkaloids, , and triterpenoids not present in the extract (Table 1). The sample used for estimating phenols showed colour change from lowest concentration to highest concentration i.e. from 10-100 µg/ml The change in colour (from colorless to grey) with an increase in graph **(Graph 1)** indicates the presence of phenols in the sample. Also result was compared with standard (Gallic acid) The secondary metabolites present in the plants are known to be biologically active ingredients. The curative properties of *Cinnamomum zeylanicum* are due to the presence of various secondary metabolites such as tannins, saponins steroids flavonoids and phenols. The ethanolic extract showed the presence of various phytochemical components. The presence of flavonoids in the extract indicates naturally occurring phenolic compounds have beneficial effect in human diet.

Conclusion

The present study was carried out for phytochemical screening of *Cinnamomum zeylanicum*. The phytochemical analysis of the plant is very important for the discovery of drugs for treatment of various diseases. The present finding revealed that, ethanolic extract of *Cinnamomum zeylanicum* was a good source of phytochemical which include flavonoids, phenols, tannins, saponins. This may be due to the presence of antioxidants such as flavonoids and other phenolic compounds and can be used as easily accessible source of natural antioxidants and as a possible food supplement in pharmaceutical industry. *In vitro* study indicates that these plant extracts is a significant source of natural antioxidant,

which might be helpful in preventing the progress of various oxidative stresses. Therefore, further investigations need to be carried out to isolate and identify the antioxidant compounds present in the plant extract.

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