"ANTIMICROBIAL, ANTIOXIDANT AND GLUCOSE ADSORPTION ACTIVITY OF COSTUS IGNEUS EXTRACT"

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Abstract

The aqueous as well as methanolic extracts of parts such as rhizome and leaves of *Costus igneus* were prepared and used to study the phytochemical characteristics, antioxidant, antibacterial and antidiabetic activity. The phytochemical analysis revealed that the plant contains flavonoids, alkaloids, steroids, quinones, carbohydrates, tannins, and glycosides. The antioxidant activity was evaluated using assays such as TPC, TFC, H_2O_2 and DPPH. The flavonoid content was recorded, as CILM extract (1.18 mg/ml) had the highest and the CIRM extract (0.385mg/ml) had the lowest content. The highest phenolic content was recorded in the CILM extract (38 mg/ml), while the lowest was in the CILA extract (2.86mg/ml). . The extracts of *Costus igneus* (Rhizome and leaves) were tested for antioxidant activity using DPPH radical scavenging method, the maximum percentage inhibition observed in rhizome extracts was, 85.506±0.008% and minimum percent inhibition is 68±0.094% respectively. The H_2O_2 activity of the extract showed the maximun percentage inhibition in methanolic leaves of *costus igneus* was 79%, and minimum percent inhibition was 27% respectively.

Discussion

In the present study the tested organism *E. fecalis, E.coli* and *Bacillus* species was found to be sensitive to methanolic and aqueous extract of *Costus igneus*. The maximum zone of inhibition was found to be 26mm, 22mm and 24mm at 1000µg/ml Conc. against *E.faecalis* in rhizome methanolic extract and methanolic extract of leaves of *costus igneus* showed maximum zone of inhibition of 22mm, 22mm and 18mm at 1000µg/ml Conc. against *B.subtilis, E.coli* and *E. faecalis.* The aqueous extract of rhizome maximum zone of inhibition was found to be 20mm, 24mm, and 22mm against *B.subtilis, E.coli* and *E. faecalis* at 1000µg/ml Conc. Where as aqueous extract of rhizome maximum zone of inhibition was found to be 22mm, 26mm, and 24mm against *B.subtilis, E.coli* and *E. faecalis* at 1000µg/ml Conc. Zone of inhibition was not observed in organisms such as *Proteus species, Pseudomonous aeruginosa* and *Staphylococcus aureus.* In the given study *Ciprofloxacin* used as antibiotic which showed 20mm zone of inhibition against tested organisms. The highest flavonoid content was recorded in the methanolic extract(1.18 mg/ml), while the lowest was in the aqueous extract (0.61 mg/mL).

The DPPH scavenging activity of the extracts can be correlated to the presence of flavonoids. It was found that the methanolic extract of rhizome has a higher scavenging activity than the methanolic extract of leaves with the increase on concentration. The percentage inhibition (% inhibition) at various concentrations (100-1000 µg/ml) as well as standard ascorbic acid were calculated. The maximum percentage inhibition observed in rhizome extracts was 85.506±0.008 respectively .

Introduction

The genus *Costus igneus*_consists of more than 100 species, which makes it as the largest genus in the family Costaceae. Different parts of the *Costus igneus* are used in treating various diseases. The rhizomes are bitter and used mainly for treating diabetes. They show anthelmintic, astringent, expectorant properties. The extract of rhizome is used for treating burning sensation, constipation, leprosy, asthma, bronchitis , anaemia and other skin ailments (Bown Deni, 2008). Rhizomes of *Costus* are used as herbal remedy for fever and its paste is used for treating boils. It is also used to make sexual hormones and contraceptives (Warrier *et al.* 1994; Rastogi and Mehrotra, 1991). Leaves are used for scabies and stomach ailments. Leaves are ground into paste and applied to the forehead to bring down high fever. Besides rhizomes, stems are also used for treating blisters and burns. Roots are used against snake bite (Gruenwald *et al.* 2000; Rathore and Khanna, 1978). The rhizomes of the genus *Costus igneus* are the major source of a compound, diosgenin (Sarin *et al*. 1974). Dasgupta and Pandey (1970) reported diosgenin as the major constituent isolated from rhizomes of *Costus* species. Diosgenin was also reported from other parts of *Costus* such as leaves, stems and flowers (Srivastava *et al.* 2011). *Costus igneus* is traditionally used as a medicinal herb mainly for its tonic, stimulant, carminative, diuretic, digestive and antiseptic properties. The rhizome is used internally in the treatment of abdominal pain, chest pains, liver problems, jaundice, gall bladder pain etc (Sivarajan and Balachandran, 1994).

Materials and methods

Collection of Plant Material

⬇

Preparation of Leaves and Rhizomes Extract

⬇

PHYTOCHEMICAL ANALYSIS

⬇

ANTIOXIDANT ACTIVITY
(Determination of Antioxidant Activity)

⬇

(Estimation of Total Phenol Content)

⬇

(Estimation of Total Flavonoid Content)

⬇

(Hydrogen Peroxide Scavenging Assay)

(Diphenyl- 2-picryl-hydrazyl (DPPH) Free Radical Scavenging Assay)

⬇

Antimicrobial Activity

⬇

Inoculum Preparation
(Solid culture media)

⬇

Antidiabetic Activity

⬇

Glucose adsorption assay

Results

Sr.No	Phytochemical Test	Observation			
		Rhizomes		Leaves	
		Methanol	Aqueous	Methanol	Aqueous
1	Alkaloids				
	Hager's Test	+	+	+	-
	Wagner's Test	+	+	+	+
2	Flavonoids				
	Lead acetate Test	+	+	+	+
	Sodium Hydroxide Test	+	+	+	-
3	Saponins				
	Frothing Test	-	-	-	-
4	Steroids				
	Chloroform + H_2SO_4 Test	+	+	+	+
5	Tannins				
	Ferric Chloride Test	+	+	-	+
6	Carbohydrates				
	Molisch's Test	+	+	+	+
	Fehling's Test	+	+	+	-
7	Quinones	+	+	+	-
8	Glycosides				
	Keller-kiliani Test	+	+	-	-

The phytochemical analysis was classified as positive (+) as present and negative (-) as absent.

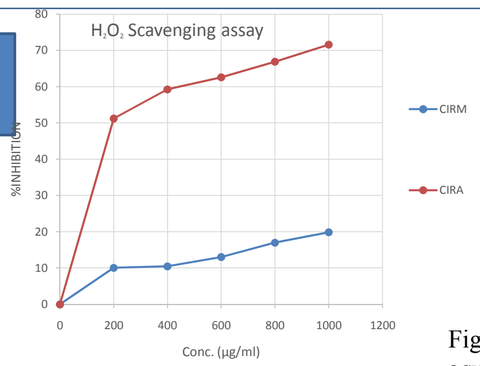


Fig.no.1 .H_2O_2 of rhizome Methanolic and aqueous extracts

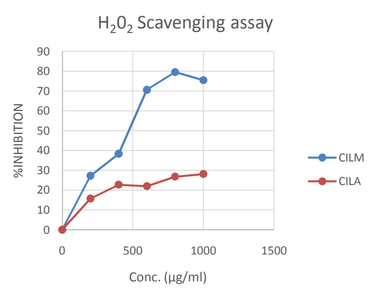
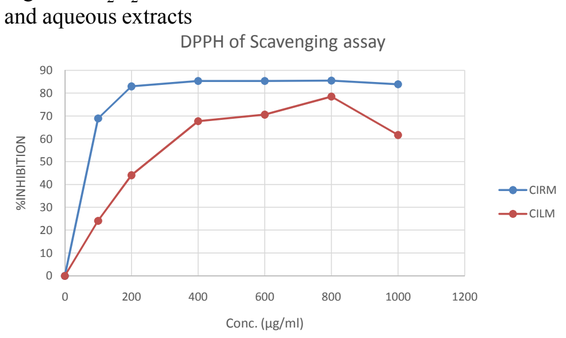


Fig.no. 2.H_2O_2 of leaves methanolic and aqueous Extracts



DPPH of Methanolic Extracts

Conclusion

The maximum zone of inhibition was found to be 26mm, 22mm and 24mm at 1000µg/ml Conc. against E.faecalis in rhizome methanolic extract and methanolic extract of leaves of costus igneus showed maximum zone of inhibition of 22mm, 22mm and 18mm at 1000µg/ml Conc. against B.subtilis, E.coli and E. faecalis. The aqueous extract of rhizome maximum zone of inhibition was found to be 20mm, 24mm, and 22mm against B.subtilis, E.coli and E. faecalis at 1000µg/ml Conc. Where as aqueous extract of rhizome maximum zone of inhibition was found to be 22mm, 26mm, and 24mm against B.subtilis, E.coli and E. faecalis at 1000µg/ml Conc. Zone of inhibition was not observed in organisms such as Proteus species, Pseudomonous aeruginosa and Staphylococcus aureus. In the given study Ciprofloxacin used as antibiotic which showed 20mm zone of inhibition against tested organisms.

References

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