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Antioxidant Activity of Leaf, Stem and Flower of *Ixora coccinea* Plants by Using Hydrogen Peroxide Scavenging Assays

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ABSTRACT

In this paper, we studied antioxidant activity of the ethanolic extract of leaf, stem and flower of Ixora coccinea plants by using the hydrogen peroxide scavenging assay. Initially qualitative analysis of some phytochemical parameters, it was revealed that the extract of an Ixora coccinea plants parts possesses the contents of flavonoids, phenols, alkaloids and tannin. It gave significant activities in all antioxidant assays compared to the standard antioxidant in a dose dependent manner and remarkable activities to scavenge reactive oxygen species may be attributed to the high amounts of flavonoids and phenol contents. In hydrogen peroxide scavenging assay, % of leaf inhibition value is 87.40% at 500 µg ml^{-1} concentration, while for % of stem and % of flower inhibition value is 84.40% and 83.90% respectively. However, Ixora coccinea extract showed strong reducing power and total antioxidant capacity.

Keywords: Antioxidant activity, hydrogen peroxide, Ixora coccinea, phytochemical parameters.

INTRODUCTION

Oxidation is basic to many living beings for the creation of energy to fuel biological procedures. The main role of oxygen radicals has been ensnared in a various disease such as diabetes, cancer, cardiovascular illness, maturing etc. antioxidants that scavenge these receptive oxygen species and free radicals are vital in forestalling the beginning and movement of numerous infections brought about by oxidative pressure[1]. Synthetic antioxidants, for example, butylated hydroxy anisole (BHA) and butylated hydroxytoluene (BHT) are exceptionally viable and are utilized for industrial preparing, however they may have side reactions and toxic properties that influence human wellbeing. Nowadays the searching of antioxidants agents from plants natural sources has gotten a lot of consideration and compounds have been placed into the recognizable proof of antioxidants[1] and having no side effects. Ixora coccinea plants taxonomical characterization as appeared in the table 1, Bakora (local name) is a little evergreen bush, it has been utilized traditionally for an assortment of ailments, the leaves are utilized to treat diarrhoea, the roots are utilized to treat hiccough, fever, wounds, incessant ulcers and the blossoms have been utilized in catarrhal bronchitis and an Ayurvedic Drugs. Studies on this plant have uncovered the phytochemical screening indicated the presence of flavonoids, phenol, alkaloids, tannins etc and so gives numerous pharmacological impacts[3,6].

Ixora coccinea:

Photo plate 1. Ixora coccinea plants

Table No. 1. Taxonomic classification of Ixora coccinea

Botanical Name	Ixora coccinea	
Common Name	**Bakora** (Marathi local Name)	
Classification	**Kingdom**	Plantae
	Subkingdom	Tracheobionta
	Division	Magnoliophyta
	Class	Magnoliopsida
	Subclass	Asteridae
	Order	Gentianales
	Family	Rubiaceae
	Genus	Ixora
	Species	Coccinea

It found that the aqueous extract of Ixora coccinea plants showed antimicrobial, antifungal[7], antinociceptive, antioxidants[4,6] and anti-inflammatory activities[2,8]. In view of this, we report the antioxidant activity and qualitative analysis of some phytochemical parameters of the flower, leaf, and stem of Ixora coccinea plants by using hydrogen peroxide radical scavenging assay.

MATERIALS AND METHODS

Materials:

Leaves, stem and flower of the Ixora coccinea plants were collected from the campus of K. K. Wagh College, Ranwad, Nashik (Maharashtra)

Plant extract:

Fresh aqueous extraction method.

Qualitative Phytochemical analysis:

Test for Flavonoid (Shinoda Test):

$Mg_{(s)}$ + conc. HCL (few drops) + plants extract ----------→ reddish colour.

Test for Terpenoid (Copper Acetate test):

Copper acetate + plants extracts -----→ Green colour.

Test for Alkaloids (Wagner's reagent test):

Wagner's reagent + plants extract ---→ reddish brown precipitate.

Test for Tannins ($K_2Cr_2O_7$ test):

Plants extract + $K_2Cr_2O_7$ -----→ red precipitate

Antioxidant activity of Ixora coccinea plant extract by H_2O_2 method:

The different concentration[5] of plant extracts 100 to 500 µg ml^{-1} was prepared and H_2O_2 solution was added, then incubated for 25 minutes in a dark condition, after readings were taken by using ultra violet (UV) spectrophotometer at 517 nm.

Table No. 2. Hydrogen peroxide scavenging antioxidant activity for ethanolic leaf extract. (Stock concentration is 20000 µg ml^{-1}), Protocol for Hydrogen peroxide assay of leaf extract.

Conc. µg ml^{-1}	**Stock (µl)**	**Solvent (µl)**	**H_2O_2 (µl)**	**Incubation (min)**
100	18	1982	1000	30
200	36	1964	1000	30
300	55	1945	1000	30
400	73	1927	1000	30
500	100	1900	1000	30
Blank	-	2000	1000	30

Table No 3. Hydrogen peroxide Scavenging antioxidant activity of ethanolic stem extract (Stock concentration[5] is 9500 µg ml^{-1}). Protocol for Hydrogen peroxide assay of stem extract.

Conc. µg ml^{-1}	**Stock (µl)**	**Solvent (µl)**	**H_2O_2 (µl)**	**Incubation (min)**
100	42	1958	1000	30
200	84	1916	1000	30
300	126	1874	1000	30
400	168	1832	1000	30
500	211	1789	1000	30
Blank	-	2000	1000	30

Table No. 4. Hydrogen peroxide Scavenging antioxidant activity of ethanolic flower extract (Stock concentration is 35000 µg ml^{-1}). Protocol for Hydrogen peroxide assay of flower extract.

Conc. µgml^{-1}	**Stock (µl)**	**Solvent (µl)**	**H_2O_2 (µl)**	**Incubation (min)**
100	11.26	1988	1000	30
200	22.52	1978	1000	30
300	33.80	1966	1000	30
400	45.06	1955	1000	30
500	56.32	1944	1000	30
Blank	-	2000	1000	30

Formula:

Hydrogen peroxide scavenging effect (% inhibition) = $\frac{A0-A1}{A0}$ x 100

A_0 = Absorbance of control

A_1 = Absorbance of extract.

RESULT AND DISCUSSION

Qualitative phytochemical analysis

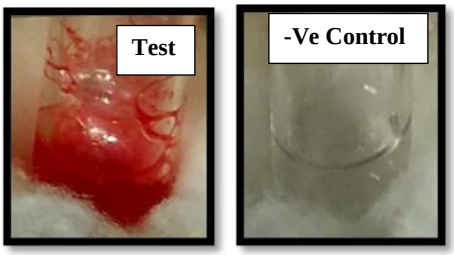

Photo plate 2. Test of Flavonoids

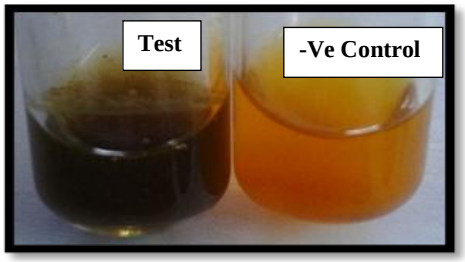

Photo plate 3. Test for phenol

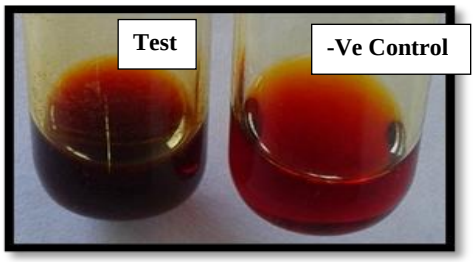

Photo plate 4. Test for alkaloid

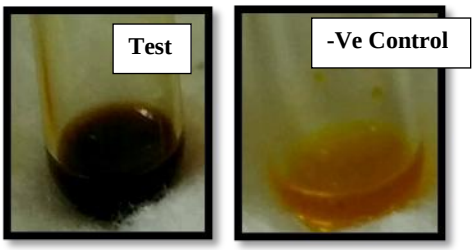

Photo plate 5. Test for tannin

Antioxidant activity of Ixora coccinea plant extract by H_2O_2 method:

Hydrogen peroxide Scavenging antioxidant activity of ethanolic leaf, stem and flower extract as shown in table no. 2, 3 and 4 resp. used for absorbance and % inhibition was calculated by using its formula.

Table No. 5. Result of Hydrogen peroxide scavenging antioxidant activity of Ixora coccinea plant extract

Concentration (µg/ml)	Leaf % inhibition	Stem % inhibition	Flower % Inhibition
100	22.70	33.10	24.60
200	41.40	48.00	51.50
300	54.00	58.00	59.10
400	70.70	76.00	78.00
500	87.40	84.40	83.90

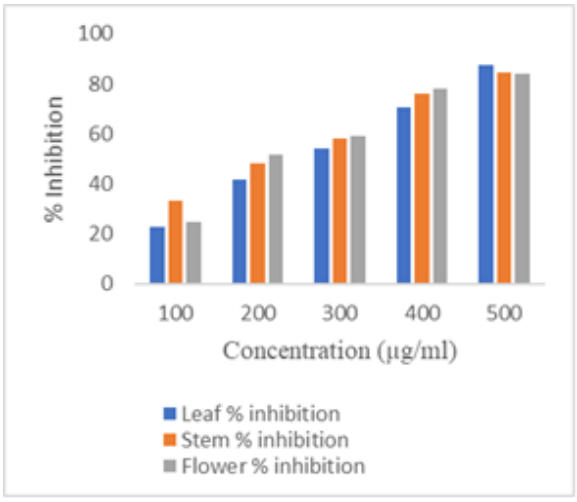

Figure. 1. Graph of Hydrogen peroxide scavenging antioxidant activity of Ixora coccinea plant extract

CONCLUSION

After observing the result of antioxidant activity of leaf, stem and flower of Ixora coccinea as shown in table 5 and figure 1. we came to conclusion that the plant showed good antioxidant activity. Each part of this plant has medicinal property thus we should proceed for the formulation of some herbal product and should conduct its clinical trials.

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