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Antioxidant activity of various plant part extracts of *G. superba* (L) and *U. indica* (Roxb) Kunth

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ABSTRACT

Antioxidant potential of different plant parts of G. *superba* and U. *indica* was determined by using DPPH (2,2-diphenyl-2-picrylhydrazyl hydrate) assay and ascorbic acid as standard compound (IC_{50}: 10 µg/ml). The maximum antioxidant potential in G. *superba* was found in leaf (IC_{50}: 28µg/ml) followed by rhizome (IC_{50}: 95µg/ml) and Stem (IC_{50}: 120 µg/ml). In U. *indica* bulb (IC_{50}: 113 µg/ml) showed maximum antioxidant activity than the leaves (IC_{50}: 520µg/ml).

Keywords: Antioxidant, G. *superba*, U. *indica*, DPPH

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INTRODUCTION

An antioxidant is a molecule that is capable of slowing or preventing the oxidation of other molecules. Oxidation is a chemical reaction that transfers electrons from a substance to an oxidizing agent. Oxidation reactions can produce free radicals, which start chain reactions that damage cells. Antioxidants terminate these chain reactions by removing free radical intermediates, and inhibit other oxidation reactions by being oxidized themselves. As a result, antioxidants are often reducing agents such as thiols or polyphenols. Although oxidation reactions are crucial for life, they can also be damaging; hence, plants and animals maintain complex systems of multiple types of antioxidants, such as glutathione, vitamin C and vitamin E as well as enzymes such as catalase , superoxide dismutase and various peroxidases.

The possible mechanisms of action of antioxidants were first explored when it was recognized that a substance with anti-oxidative activity is likely to be one that itself is readily oxidized [3]. Research on how vitamin E prevents the process of lipid peroxidation led to the identification of antioxidants as reducing agents that prevent oxidative reactions, often by scavenging ROS before they can damage cells [1].

MATERIAL AND METHOD

Collection of Plant Material:-

Gloriosa superba and *Urgenia indica* were collected (July-August, 2006) from botanical garden of Dr. Y. S. Parmar University of Horticulture & Forestry, Nauni, Solan (Himachal Pradesh), Botanical Garden of National institute oceanography Goa, India. Plants were identified by comparing with those available in the Herbarium, Department of Botany, University of Rajasthan, Jaipur, India.

Preparation of extracts

The collected plants were shade dried and finely powdered. Different plant parts were extracted with constant agitation for 48 hrs. The extracts were filtered using Whatman No. 1 filter paper and then concentrated in vacuum at 40 °C using a Rotary evaporator and stored at 4°C [2].

10 gm of each of the powdered specimen samples of G. *superba* and U. *indica* was taken for the antioxidant activity and extracted with 100 ml of methanol for 3 days. The extracts obtained from each of the plant materials were filtered separately and concentrated by vacuum evaporation.

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DPPH Radical Scavenging Assay

Radical Scavenging Activity of plant extracts against stable DPPH (2,2-diphenyl-2-picrylhydrazyl hydrate) was determined spectrophoto-metrically. When DPPH reacts with an antioxidant compound, which can donate hydrogen, it is reduced. The changes in colour (from deep violet to light yellow) were measured at 515 nm on a UV visible light spectrophotometer.

Extract solutions were prepared by dissolving 2 g of dry extract in 10 ml of methanol. The solution of DPPH in methanol ($6x10^{-5}$ M) was prepared freshly, before UV measurements. 3.9 ml of DPPH is added in different concentration of extracts to measure IC_{50} value in microcuvettes [3]. The samples were kept in the dark for 15 min at room temperature and then the decrease in absorption was measured. Absorption of blank sample containing the same amount of methanol and DPPH solution was prepared and measured in every experiment. The experiment was carried out in triplicates. Radical scavenging activity was calculated by the following formula:

$$\% \text{ inhibition} = [(A_B - A_A)/A_B] \times 100$$

Where, A_B – absorption of blank sample (t = 0 min); A_A - absorption of tested extract solution

RESULTS AND DISCUSSION

Antioxidant potential of different plant parts of G. *superba* and U. *indica* was determined by using DPPH assay and ascorbic acid as standard compound (IC_{50}: 10 µg/ml).

The maximum antioxidant potential in G. *superba* was found in leaf (IC_{50}: 28µg/ml) followed by rhizome (IC_{50}: 95µg/ml) and Stem (IC_{50}: 120 µg/ml). In U. indica bulb (IC_{50}: 113 µg/ml) showed maximum antioxidant activity then the leaves (IC_{50} : 520µg/ml) (Table .1, Fig. 1).

The results obtained in the present investigations showed that the concentration of flavonoids and phenolic compounds in both the plant G. *superba* and U. *indica* is very high. These flavonoids have been reported to possess anti-oxidant and anti-radical properties [4]. The DPPH test [5] provided information on the reactivity of test compounds with a stable free radical. Because of its odd electron, 2, 2- diphenyl-picryl-hydrazyl radical (DPPH) gives a strong absorption band at 517 nm in visible spectroscopy (deep violet colour). Present study concluded the presence of antioxidant activity in varying degrees in all the plant parts of G. *superba* and U. *indica*.

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Table 1: Antioxidant potential (IC_{50} Value µg/ml) of deferent plant parts of G. superba and U. indica

S. No.	Plant part	IC_{50} Value µg/ml
1	G. *superba* leaf	28
2	G. *superba* rhizome	95
3	G. *superba* Stem	120
4	U. *indica* bulb	113
5	U. *indica* leaf	520

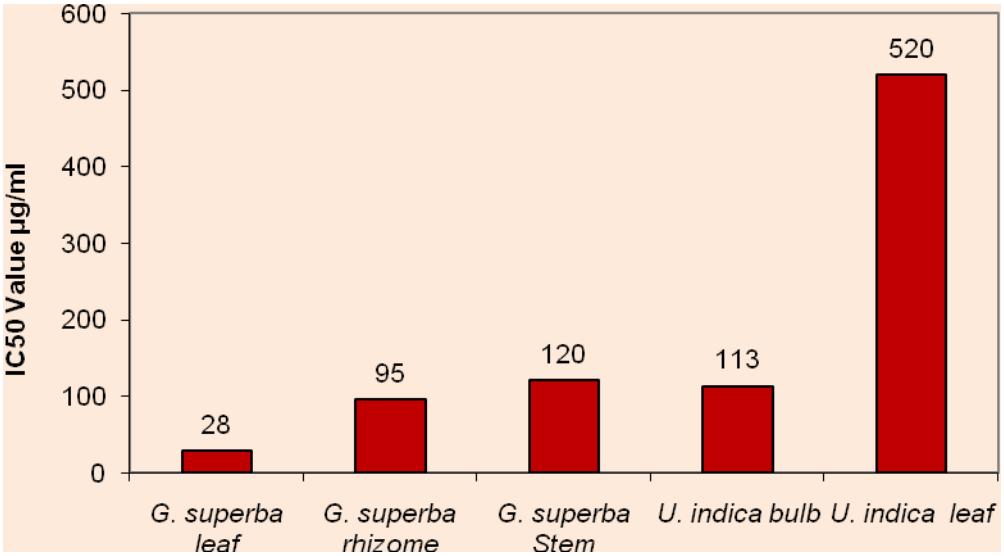

Fig 1: Antioxidant potential (IC_{50} Value µg/ml) of different plant parts of G. *superba* and U. *indica*.

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