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# Antioxidant Study Of Cordia Dichotoma

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**ABSTRACT:**The present study was aimed at evaluating the antioxidant activities of Cordia dichotoma known for their medicinal properties in folk medicine. In an effort to reduce the undesirable consequences of synthetic food conservatives in human health and food industries, scientists have recently changed their interest to search new conservatives. Antioxidants are important inhibitors of lipid per-oxidation not only as a defense mechanism of living cells against oxidative damage but also for food preservation. The free-radical scavenging activities of prepared extracts of Cordia dichotoma were carried out using DPPH (1,1–Diphenyl-2-Picryl-Hydrazyl). The results showed that all extracts of Cordia dichotoma had radical scavenging activity. This study showed that methanolic extract of Cordia dichotoma possess maximum antioxidant activity i.e. 66.99% out of all the extracts.Further research should be carried out to isolates compounds with radical scavenging capacity for industrial applications.

**KEYWORDS:** Antioxidant activity, Cordia dichotoma f . Free Radical, and Scavenging Activity.

## INTRODUCTION

***Cordia dichotoma Forst.f.*** a plant belonging to family Boraginaceae[1]**.** It is a tree of about 15 metres high, found spanning from north India and south China to Australia and Polynesia. Antioxidants are an inhibitor of the process of oxidation, even at relatively small concentration and thus have diverse physiological role in the body. Antioxidant constituents of the plant material act as radical scavengers, and helps in converting the radicals to less reactive species. A variety of free radical scavenging antioxidants is found in dietary sources like fruits, vegetables and tea, etc. Oxygen is absolutely essential for the life of aerobic organism but it may become toxic if supplied at higher concentrations. Dioxygen in its ground state is relatively unreactive; its partial reduction gives rise to active oxygen species (AOS) such as singlet oxygen, super oxide radical anion, hydrogen peroxide etc. This is partly due to the oxidative stress that is basically the adverse effect of oxidant on physiological function. Free oxygen radicals plays cardinal role in the etiology of several diseases like arthritis, cancer, atherosclerosis etc. The oxidative damage to DNA may play vital role in aging and the presence of intracellular oxygen also can be responsible to initiate a chain of inadvertent reaction at the cellular level and these reaction cause damage to critical cell biomolecules. These radicals are highly toxic and thus generate oxidative stress in plants. Plants and other organism have in built wide range of mechanism to combat with these Free Radical problems. Free radicals are an atom or molecule that bears an unpaired electron and is extremely reactive, capable of engaging in rapid change reaction that destabilize other molecules and generate many more free radicals. In plants and animals these free radicals are deactivated by *antioxidants.* These antioxidants act as an inhibitor of the process of

oxidation, even at relatively small concentration and thus have diverse physiological role in the body. Antioxidant constituents of plat materials act as radical scavengers, and convert the radicals to less reactive species. Plants have developed an array of defense strategies (antioxidant system) to cope up with oxidative stress. The antioxidative system includes both enzymatic and non-enzymatic systems.[2] A number of pharmacological properties such as analgesic, anti-inflammatory and hepato-protective have been reported. *Cordia dichotoma* reduce the blood glucose level when compared to diabetic control group and exert a significant hypoglycemic and antidiabetic activity[3]. Leaves used in Ulcers and in headache[4].

## MATERIALS AND METHODS

### Collection of leaves of *Cordia dichotoma*.:

Leaves of ***Cordia dichotoma*** were collected from locality of Kachchi Garhi, Distt. Shamli (U.P.) .Plant material was authenticated by **S. K. Srivastava** (Scientist D/HOD), in Botanical Survey of India, Northern regional centre, Dehradun (BSI). Authenticated specimen no is- A/C no.113678.

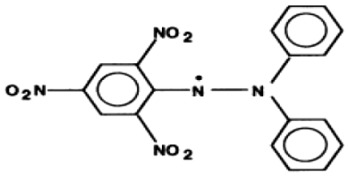
### Extraction of leaves of *Cordia dichotoma* in different solvents (Non-polar to Polar):

The collected plant Material was washed with water to removed other undesirable material and dried under shade. The air-dried leaves (200 gm) of *Cordia dichotoma* were crushed. The crushed leaves extracted with different solvents of increasing polarity viz. petroleum ether, chloroform, methanol by hot percolation method using Soxhlet Apparatous. The extract was evaporated till dryness to obtain residue. These extracts were concentrated under reduced pressure.

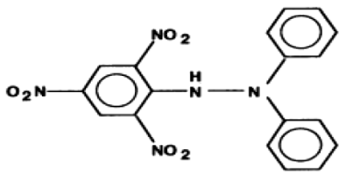
### Anti-oxidant activity:

### Mechanism of DPPH method:

The molecule of 1,1-diphenyl-2-picrylhydrazyl (α,α-diphenyl-β-picrylhydrazyl; DPPH:**1**) is characterized as a stable free radical by virtue of the delocalization of the spare electron over the molecule as a whole, so that the molecules do not dimerise, as would be the case with most other free radicals. The delocalization also gives rise to the deep violet color, characterized by an absorption band in ethanol solution centered at about 517 nm.




1: Diphenylpicrylhydrazyl (free radical)




2: Diphenylpicrylhydrazine (nonradical)

When a solution of DPPH is mixed with that of a substance that can donate a hydrogen atom, then this gives rise to the reduced form (**2**) with the loss of this violet colour (although there would be expected to be a residual pale yellow colour from the picryl group still present). Representing the DPPH radical by Z• and the donor molecule by AH, the primary reaction is Z• + AH = ZH + A• [1] where ZH is the reduced form and A• is free radical produced in this first step. This latter radical will then undergo further reactions which control the overall stoichiometry, that is, the number of molecules of DPPH reduced (de-colorised) by one molecule of the reductant.[5] The reaction is therefore intended to provide the link with the reactions taking place in an oxidising system, such as the autoxidation of a lipid or other unsaturated substance; the DPPH molecule Z• is thus intended to represent the free radicals formed in the system whose activity is to be suppressed by the substance AH.[6]

### Methodology of DPPH method

- Preparation of DPPH(1,1-diphenyl-2-picrylhydrazyl)
- Preparation of Ascorbic acid Solution
- Preparation of stock solution of *Cordia dichotoma extract* (Test sample) extract
- Preparation of concentration of *Cordia dichotoma leaves* extract (Test sample) from stock solution
- Preparation of test sample
- Preparation of standard

- ❖ Incubation
- ❖ Measurement of absorbance
- ❖ Calculations

**Preparation of DPPH:-**

DPPH is a highly oxidisable compound. It oxidized in light, so DPPH is prepared in dark. Weigh accurately 20 mg DPPH and dissolved in solvent. Generally Ethanol and for some cases Methanol is used as a solvent for DPPH.

**Preparation of standard Ascorbic acid solution:-**

Ascorbic acid is an strong anti-oxidizing agent. It is taken as standard. Standard solution of ascorbic acid is prepared. *viz.* 100µg/ml, 200µg/ml, 400µg/ml, 600 µg/ml.

**Preparation of different concentration of Cordia dichotoma leaves extract:-**

Different concentration of the test sample *Cordia dichotoma* leaves extract which is to be examined for anti oxidant activity is prepared. *viz.* 100µg/ml, 200µg/ml, 400µg/ml, 600 µg/ml.

**Preparation of test sample:-**

3 ml of different concentration of test sample *Cordia dichotoma* leaves extract was mixed with 1 ml of DPPH solution in dark.

**Preparation of standard:-**

3 ml of different concentration of standard solution of ascorbic acid was mixed with 1 ml of DPPH solution in dark.

**Incubation.**The prepared solution of ascorbic acid and test sample was incubated for 1/2 half an hour.

**Measurement of absorbance:-**

When procedure is done than absorbance is taken with the help of U.V. Spectrophotometer at 517 nm.

**Calculation:-**

We calculate the % activity of individual concentration of individual extract from the following formula:-

$$\%\ \boldsymbol{Activity} = \frac{\boldsymbol{Abs.of\ controll - Abs.\ of\ individual\ concentration}}{\boldsymbol{Abs.of\ controll}} \times \mathbf{100}$$

**Abs. =** Absorbance.

## RESULTS AND DISCUSSION

**Table-1** Absorbance of Pet. Ether extract of *Cordia dichotoma:*

| Sl. No. | Concentration In(µg/ml) | Pet. Ether extract | % |
|---|---|---|---|
| 1 | Control | 1.418 | _ |
| 2 | 100 | 1.414 | 0.46% |
| 3 | 200 | 1.344 | 5.21% |
| 4 | 400 | 1.291 | 8.95% |
| 5 | 600 | 1.233 | 13.04% |

**Table-2** Absorbance of Chloroform extract of *Cordia dichotoma:*

| Sl. No. | Concentration In(µg/ml) | Chloroform extract | % |
|---|---|---|---|
| 1 | Control | 2.894 | _ |
| 2 | 100 | 1.783 | 38.3% |
| 3 | 200 | 1.486 | 48.65% |
| 4 | 400 | 1.389 | 52.0% |
| 5 | 600 | 1.065 | 63.19% |

**Table-3** Absorbance of Methanol extract of *Cordia dichotoma:*

| Sl. No. | Concentration In(µg/ml) | Methanol extract | % |
|---|---|---|---|
| 1 | Control | 2.063 | _ |
| 2 | 100 | 1.899 | 7.94% |
| 3 | 200 | 1.652 | 19.92% |
| 4 | 400 | 1.140 | 44.74% |
| 5 | 600 | 0.619 | 69.99% |

Methanol extract of *Cordia dichotoma* leaves shows maximum Antioxidant activity. The other extract Petroleum ether, Chloroform, show weak mild activity. Methanol extract showed 69.99 % anti-oxidant activity in comparison to all extract and standard drug.

According to table and results the highly active antioxidant extract is Methanol.

## CONCLUSION

From Anti-oxidant studies it is concluded that Methanol extract showed maximum Anti-oxidant activity as comparison with other extracts (Chloroform and Pt. ether), further study is needed for isolation of active principle.

The results revealed that methanolic extract has a high antioxidant activity followed by flavonoids and alkaloids extracts suggesting the potential of this plant as a natural source of strongly antioxidant substances that can be use as a natural additive in food and pharmaceutical industries.

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