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## PHYTOCHEMICAL AND *IN VITRO* ANTIOXIDANT POTENTIAL OF AQUEOUS LEAF EXTRACTS OF *BRASSICA JUNCEA* AND *CORIANDRUM SATIVUM*

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### ABSTRACT

**Keywords:**  
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In the present study, Phytochemical and *in vitro* Antioxidant potential of aqueous leaf extracts of *Brassica juncea* and *Coriandrum sativum* leaves was determined qualitatively. The Phytochemical screening of plants studied showed the presence of terpenoids, flavonoids, tannin and reducing sugar in aqueous extract of *Brassica juncea*. Alkaloids and glycosides were absent in it. Aqueous extract of *Coriandrum sativum* showed the presence of tannins, terpenoids, reducing sugars, flavonoids, and glycosides and alkaloids were absent in aqueous extract of *Coriandrum sativum*. It had been found that among the aqueous extracts of *Brassica juncea* and *Coriandrum sativum*, the highest activity of Catalase was observed in aqueous extract of *Brassica juncea* than in aqueous extract of *Coriandrum sativum*. The peroxidase activity was observed to be low in aqueous extract of *Brassica juncea*. The value of ascorbate oxidase activity and Vitamin C content was high in aqueous extract of *Coriandrum sativum*. The main purpose of the study is to evaluate phytochemicals and antioxidant activity of used plants.

**INTRODUCTION:** The medicinal value of plants lies in some chemical substances or group of compounds that produce a definite physiological action in the human body. These chemical substances are called secondary metabolites. The most important of these bioactive groups of plants are alkaloids, terpenoids, steroids, flavonoids, tannins and phenolic compounds<sup>1</sup>.

*Coriandrum sativum* is an annual herb in the family Apiaceae. It has eleven components of essential oils, six types of acids, minerals and vitamins, each having a number of beneficial properties. It also contains antioxidants, which can delay or prevent the spoilage of food seasoned with this spice. A study found both the leaves and seed to contain antioxidants, but the leaves were found to have a stronger effect<sup>2</sup>.

*Coriandrum sativum* has been documented as a traditional treatment for diabetes. A study on mice found that *Coriandrum sativum* extract had both insulin-releasing and insulin-like activity<sup>3</sup>. The Indian mustard (*Brassica juncea*) is an herbaceous, annual, of the family Brassicaceae.

It is an herbal plant. There is the role of detoxification and swelling that can fight infection and prevention of diseases, inhibit the toxicity of bacterial toxins, and promote wound healing, can be used to aid in treatment of infectious diseases. *Brassica juncea* contains a lot of ascorbic acid, is a strong active of restore substances. Important in the redox process of the body, can increase the oxygen content in the brain to stimulate the brain of oxygen use, there are revive and refresh, the lifting of fatigue.

Its seeds are high in calories; 100 g of seeds contain 508 calories. However they are good source of dietary fiber; recommended in cholesterol controlling and weight reduction programs. The main purpose of our observation is to evaluate phytochemicals and antioxidant activity of *Coriandrum sativum*, *Brassica juncea* as these plants are commonly used in food.

#### MATERIALS AND METHODS:

**Collection of plant material:** - The plant materials used were the leaves of *Brassica juncea* and *Coriandrum sativum* which were collected from local area of Paonta Sahib in November 2011.

**Extraction of plant material:** The plants (powdered form) taken for the study was stored under refrigerated condition till use. The samples were prepared by extraction of plant (powdered form) with distilled water by using sonicator and evaporating the aqueous mixtures on water bath and a crude extract was obtained from both plants.

#### Phytochemical investigations of *Brassica juncea* and *Coriandrum sativum*:

- 1. Alkaloid, flavonoids:**-The presence of alkaloid, flavonoids presence was investigated by using method of Harborne, 1973<sup>4</sup>.
- 2. Tannins:** - The presence of Tannins was investigated by using method of Trease and Evans, 2002<sup>5</sup>.
- 3. Glycoside, Terpenoids:** The presence of glycoside, Terpenoid was investigated by using method of Siddiqui and Ali, 1997<sup>6</sup>.

- 4. Reducing sugar:** To 0.5 ml of each extract solution add 1 ml of water and 5-8 drops of Fehling's solution was added at hot and observed for brick red precipitate.

#### Antioxidant activity of *Brassica juncea* and *Coriandrum sativum* leaves extract:

**Assay of Catalase activity:** Catalase activity was assayed by the method of Sinha A. K, 1972<sup>7</sup>.

**Assay of Peroxidase activity:** The assay was carried out by the method of Addy and Goodman, 1972<sup>8</sup>.

**Assay Procedure for Ascorbate Oxidase:** Assay of Ascorbate Oxidase activity was carried out according to the procedure of Vines and Oberbacher, 1965<sup>9</sup>.

**Quantification of vitamins:** The determination of ascorbic acid was carried out by the procedure given by Sadasivam and Manickam, 1997<sup>10</sup>.

**RESULTS:** Herbs and herbal extracts contain different phytochemicals with biological activity that can be of valuable therapeutic index Phytochemicals have been found to possess a wide range of activities, which may help in protection against chronic diseases.

Qualitative analysis of aqueous extract of *Brassica juncea* showed the presence of Terpenoids, Flavonoids, Tannins and Reducing Sugars, while aqueous extract of *Coriandrum sativum* showed the presence of Glycosides, Terpenoids, Flavonoids, Tannins and Reducing Sugars.

Qualitative analysis carried out on each plant extract the results are summarized in **Table 1**.

**TABLE 1: PHYTOCHEMICAL INVESTIGATION OF *BRASSICA JUNCEA* AND *CORIANDRUM SATIVUM***

Plant extracts	Alkaloids	Glycosides	Terpenoids	Flavonoids	Tannins	Reducing Sugars
Aqueous extract of <i>Brassica juncea</i>	-	-	+	+	+	+
Aqueous extract of <i>Coriandrum sativum</i>	-	+	+	+	+	+

From clinical studies, it is shown that terpenoids strengthen the skin, increase the concentration of antioxidant in wounds, and restore inflamed tissue by increasing blood supply.

A wide Variety of phenolic substances derived from edible plants have been reported to retain marked antioxidant and anti-inflammatory activities.

Hence, it is too important to investigate the phenolic contents, the antioxidant activity and antimutagenicity of some extract of some herbs, and to determine the relationship between antioxidant activity, phenolic contents and antimutagenicity activity.

**Antioxidant Activity of aqueous extracts of *Brassica juncea* and *Coriandrum sativum*:** Considering the important role of oxidative stress in the pathogenesis of several neurological diseases, and the growing evidence of the presence of compounds with antioxidant properties in the plant extracts, the herbal extracts exhibited good sources of water soluble

antioxidants, phenolic compounds and antimutagens. Antioxidants properties of various extracts from many plants have been of great interest in both research and the food industry, because their possible use as natural additives emerged from a growing tendency to replace synthetic antioxidants and antimicrobials with natural ones<sup>11</sup> (**table 2**).

**TABLE 2: ENZYMATIC ANTIOXIDANT ANALYSIS IN THE EXTRACTS OF *BRASSICA JUNCEA* AND *CORIANDRUM SATIVUM***

Samples	Catalase ( $\mu$ /moles of H <sub>2</sub> O <sub>2</sub> decomposed/min/g protein)	Peroxidase (Unit/mg protein)	Ascorbate oxidase ( $\mu$ mole/ml)
Aqueous extract of <i>Brassica juncea</i>	3.75	1.584 $\times$ 10 <sup>3</sup>	95.23
Aqueous extract of <i>Coriandrum sativum</i>	3.135	2.508 $\times$ 10 <sup>3</sup>	100.262
	1 unit = $\mu$ /moles of H <sub>2</sub> O <sub>2</sub> decomposed/min/g protein	1 unit = mg of GSH utilized / min	1 unit = 0.01 O.D change/min

The Peroxidase activity was observed to be low in aqueous extract of *Brassica juncea* (1.584X10<sup>3</sup> units/mg proteins), while the activity is high in aqueous extract of *Coriandrum sativum* (2.5 X 10<sup>3</sup> units/mg proteins).

The value of ascorbate Oxidase is high in aqueous extract of *Coriandrum sativum* (100.262  $\mu$  mole/ml) and low in aqueous extract of *Brassica juncea* (95.23  $\mu$  mole/ml). The present study recommends more consumption of these vegetables that may have potential health effects.

**Non-enzymatic antioxidants:** - The concentration of non-enzymatic antioxidant (Ascorbic acid) in extracts of *Brassica juncea* and *Coriandrum sativum* were also assessed and the results are represented in **Table 3**.

**TABLE 3: NON-ENZYMATIC ANTIOXIDANT ACTIVITY (ASCORBIC ACID)**

Samples	Vitamin C (mg/g)
Aqueous extract of <i>Brassica juncea</i>	0.100
Aqueous extract of <i>Coriandrum sativum</i>	0.295

Vitamin C content was high in aqueous extract of *Coriandrum sativum* (0.295 mg/ g tissue), whereas in Aqueous extract of *Brassica juncea* it is (0.100mg/ g tissue). Ascorbate has been found in the chloroplast, cytosol, vacuole and extracellular compartments of the plant cells and shown to function as a reductant for many free radicals<sup>12</sup>.

**DISCUSSION:** Among the aqueous extracts of *Brassica juncea* and *Coriandrum sativum*, the highest activity of Catalase was observed in aqueous extract of *Brassica juncea* (3.75 units/mg protein) and lowest in aqueous extract of *Coriandrum sativum* (3.135 units/mg proteins). According to the study of Valavala *et al.*, 2011<sup>13</sup>, *Brassica juncea* leaf extract (BJLE) delayed the cataract progression along with preventing oxidative and osmotic stress. In plants, antioxidant enzymes namely Catalase<sup>14</sup> and peroxidase<sup>15</sup> have been shown to increase when subjected to stress conditions.

**CONCLUSION:** The results from present study of phytochemical and antioxidant systems revealed that, the leaf extracts from both plants have phytochemical and antioxidant enzymes. The wide use of these plant leaves in the India in food may have inflammatory and anti hepatotoxic activity due to their antioxidant potency. However, further studies are necessary to examine underlying mechanisms of antioxidant and anti-inflammatory effects and to isolate the active compound(s) responsible for these pharmacological activities.

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