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EVOLUTION OF ANTI MICROBIAL AND ANTI OXIDANT ACTIVITY OF ALCOHOLIC EXTRACT OF *CORIANDRUM SATIVUM* SEEDS

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ABSTRACT

The aim of the present study was to evaluate the antimicrobial, anti oxidant activity of *Coriandrum sativum* seeds extract plant belongs to family Apiaceae. Antimicrobial activity of alcoholic extracts of these plant leaves were tested against Gram positive and Gram negative bacterial strains by observing the zone of inhibition. Antimicrobial activity was done by disc diffusion method at a concentration of 500µg disc of the extract, using ofloxacin 5µg disc as the standard. The bacterial strains used in the study were *Staphycococcus aureus, Bacillus subtilis, Escherichia coli, Proteus vulgaris,* the anti oxidant activity of extract was tested by using DPPH radical scavenging method at concentration of 5, 10, 15, 20, 25, 30µgml, using Ascorbic acid as standard. The outcomes of the present study indicated that the alcoholic extract of the *Coriandrum sativum* seeds shows the significance anti microbial and anti oxidant activity in a concentration of 500µml and 30µgml respectively.

KEYWORDS

Coriandrum sativum, Alcoholic extract, Antibacterial activity, Antioxidant activity and DPPH method.

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INTRODUCTION

According to the WHO, more than 80% of people in underdeveloped countries still rely on traditional medicines, the majority of which are plant-based, to meet their basic medical needs. In the past few years, a number of dangerous and fatal side effects have been linked to the use of herbs. Antimicrobial properties of herbs must be studied urgently in order to treat a variety of ailments caused by germs. Natural antimicrobials can be derived from a wide variety of plant species, which are reservoirs of powerful chemotherapeutics[1,2]. As a result, plant extracts have been employed for a wide range of

purposes for thousands of years[3]. Coriandrum Sativum (C. sativum) is a perennial herbaceous annual plant that belongs to the Umbelliferae/Apiaceae family. Cooking using dried seeds and leaves from the plant is a common culinary practise, and they can also serve as a flavouring ingredient and preservative. Essential oils are the primary bioactive component. Only C. sativum and C. Tordylium[3] have been identified as distinct species. It has anti-insect, anti-inflammatory, anti-diarrheal, anti-hyperglycaemic, and anti-ulcer properties, as well as anti-microbial and anti-ulcer activity[4,5]. Thus, the current study is a step in the right direction by evaluating the alcoholic extract's antibacterial and antioxidant properties.

EXPERIMENTAL SECTION

Plant Material

The plant material was collected local market and authenticated through internet sources (Internet source)

Preparation of plant extract[6-9]

It was opted to dry the Coriandrum Sativum seeds in the shade. The dried seeds were grinded to create coarse powder. In this experiment, 250g of coarse powder were dissolved in ethanol using a cold maceration method. At room temperature and with periodic shaking, the extraction was allowed to proceed for two days. Filtered and concentrated at 50^{o}C over a heating mantle until a soft mass was formed. Afterwards, it was air-dried extensively to remove all traces of solvent, and then frozen dried. For the duration of the treatment, the plant extract was kept at a temperature of 0^{o}C or lower.

Preliminary phytochemical screening[10-12]

Standard qualitative screening test of the extract was carried out for various plant constituents. The crude extract was screened for the presence or absence of secondary metabolites using standard procedures[6, 7].

Anti microbial evolution[13-15]

Test Organisms Bacterial strains were obtained from National Chemical Laboratories (NCL), Pune and Microbial Type Culture Collection (MTCC), Chandigarh. The strains used for the present study were Staphycococcus aureus (NCIM 2079), Bacillus subtilis (NCIM 2063), Escherichia coli (NCIM 2931, Proteus vulgaris (NCIM 2027).

Procedure

In order to determine the extract's antibacterial properties, researchers used the disc diffusion method. An autoclave was used to sterilise the nutrient agar media. They were put onto petridishes and allowed to harden at room temperature in an aseptic chamber to a uniform depth of 4mm. In order to conduct antibacterial studies, the sterile swab containing bacterium was used to spread the test organisms, including Escherichia coli, Staphylococcus aureus, and Proteus vulgaris, over the media. DMSO was used to dilute the ethanol extract leftovers, which were then diluted to a concentration of 100, 250, 500g/disc for use in the experiment. The gold standard was ofloxacin 5g/disc. Finally, six-millimeter-thick sterile filter paper discs were submerged in a definite concentration of plant extracts and laid over the solidified agar in order to ensure that the zone of inhibition does not overlap. It took half an hour for the material to diffuse into the agar substrate on these plates. Petri dishes containing the organism were incubated for 24 hours at 37 degrees Celsius. The zone of inhibition created by the samples and the standard was assessed when the incubation period was completed. All tests were carried out three times over.

Anti-oxidant activity[16,17]

The DPPH radical scavenging technique was used to measure antioxidant activity. Different extracts of the plant's leaves and flowers were tested for their ability to scavenge free radicals using 1, 1-diphenyl-2-picryl hydrazyl (DPPH). Ethanol was then used to dilute 0.01mg/mL of dimethylphosphonylhydrazyl (DPPH). We prepared this solution (1ml) by diluting various ethanol extracts (5, 10, 15, 20, 25, 30g/ml) and adding them to 3ml of ethanol. Extracts that can be dissolved in ethanol are employed in this study and their quantities were obtained by dilution. When the mixture was agitated vigorously for 30 minutes at

room temperature, it was ready to use. Then, using a spectrophotometer, the absorbance was determined to be 517nm (UV-VIS Shimadzu). Ascorbic acid was employed as a reference standard and the experiment was carried out in triplicate. It was necessary to use the log dosage inhibition curve to determine the sample's IC 50 value, which is the concentration at which it inhibits 50% of the DPPH radical. Increased free radical activity was shown to be associated with a decrease in reaction mixture absorbance.

The percent DPPH scavenging effect was calculated by using following equation:

DPPH scavenging effect (%) or Percent inhibition = A0 - A 1 / A0 × 100.

Where A0 was the Absorbance of control reaction

A1 was the Absorbance in presence of test or standard sample.

RESULTS AND DISCUSSION

Discussion

This study shows that the alcoholic extract is less active than the reference standard, as expected. Concentrations of 100g/ml to 500g/ml were used to dilute the extracts. To be more active than the other concentrations, only the extract with a concentration of 500 g/ml has any significance. The DPPH Assay technique was used to investigate the antioxidant activity of the alcoholic extract of Coriandrum Sativum. The standard Ascorbic acid was compared to the results here. The extract's performance falls short of the expected level. The extract was taken at a concentration of 5-30g/ml. Figures demonstrate that up to 30g/ml is effective in inhibiting In comparison to other concentrations, the percent inhibition consequently displays more action.

Table No.1: Results of Preliminary Phytochemical Screening of *Coriandrum Sativum* extract

S.No	Name of the Test	Result
1	Flavonoids	++
2	Phenols	++
3	Alkaloids	++
4	Saponins	++
5	Carbohydrates	++
6	Proteins and amino acids	++
7	Tannins	++
8	Cardiac glycosides	++

Table No.2: Anti microbial evolution of compounds

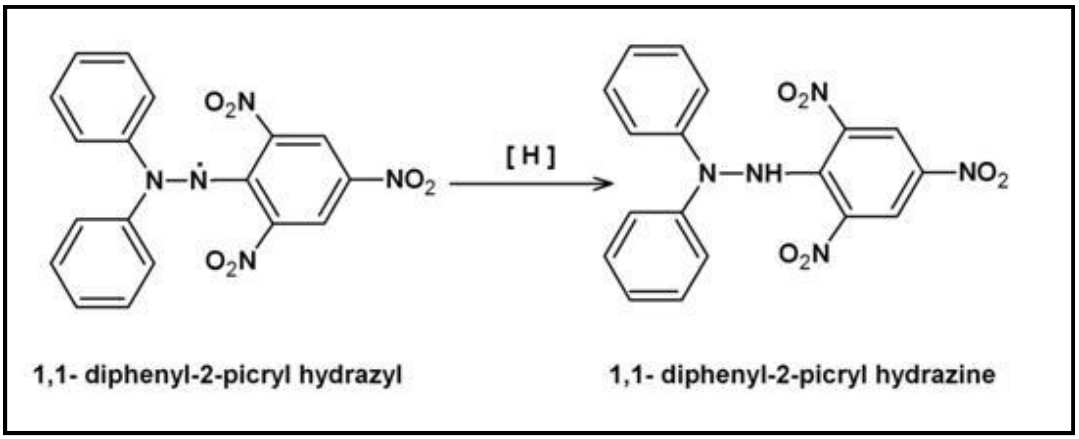
S.No	Alcoholic extract of *Coriandrum Sativum*					Ofloxacin		
		Zone of inhibition in mm						
			100µg/ml	250mg/ml	500µg/ml	100µg/ml	250mg/ml	500µg/ml
1	*Name of the organisms*	*Staphylococcus aureus*	10	14	18	12	20	26
2		*Bacillus subtilis*	8	16	20	14	18	24
3		*Escherichia coli*	6	18	22	12	16	25
4		*Proteus vulgaris*	12	14	20	12	14	22
5	Control	DMSO	-	-	-	-	-	-

Table No.2: Anti-oxidant activity of alcoholic extract of *Coriandrum Sativum*

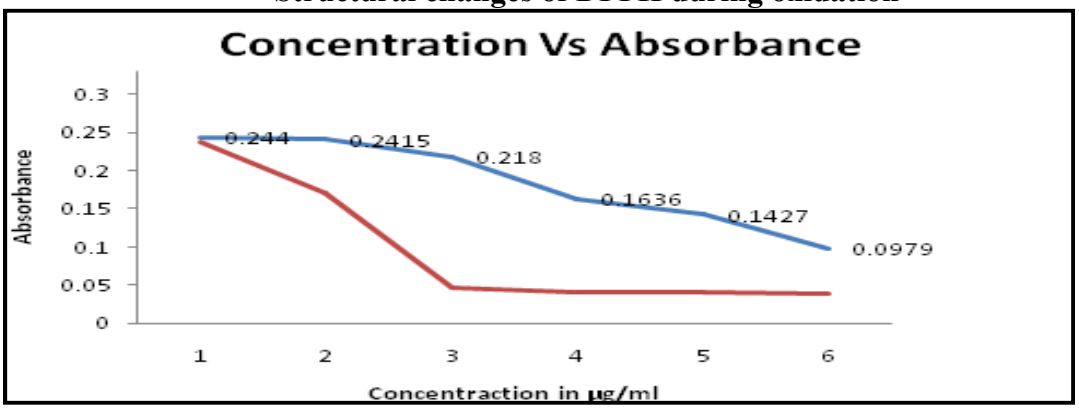
S.No	Concentration (µg/ml))	Ascorbic acid (Abs)	Alcoholic extract of *Coriandrum Sativum*(Abs)
1	5	0.2380	0.244
2	10	0.1719	0.2415
3	15	0.0469	0.218
4	20	0.0415	0.1636
5	25	0.0410	0.1427
6	30	0.0390	0.0979
7	Control	0.2444	

Table No.3: % inhibition of alcoholic extract of *Coriandrum Sativum* with ascorbic acid

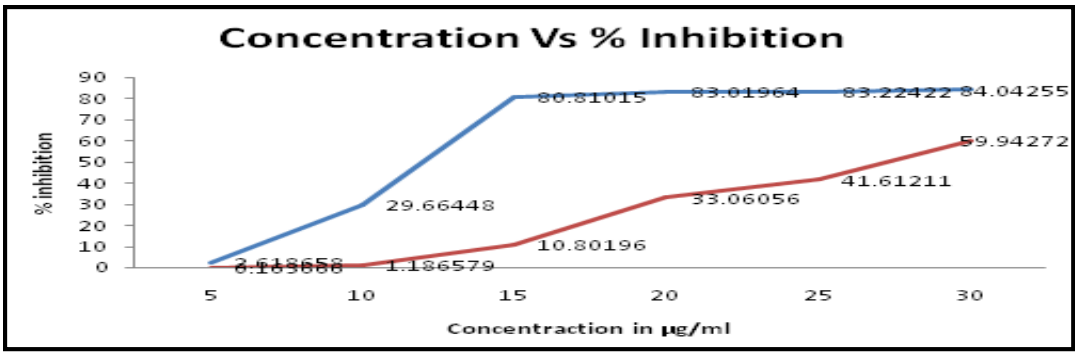
S.No	Concentration (µg/ml))	Ascorbic acid (% Inhibition)	Alcoholic extract of *Coriandrum Sativum* (% Inhibition)
1	5	2.618658	0.163666
2	10	29.66448	1.186579
3	15	80.81015	10.80196
4	20	83.01964	33.06056
5	25	83.22422	41.61211
6	30	84.04255	59.94272



Structural changes of DPPH during oxidation



Graph No.1: Concentration Vs Absorbance



Graph No.2: Concentrations Vs % Inhibition

CONCLUSION

Anti-microbial and anti-oxidant properties of the alcoholic extract of Coriandrum sativum seeds were shown to be significant at concentrations of 500 and 30g/ml, respectively, in this investigation. Ofloxacin and ascorbic acid were used as benchmarks for the results.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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