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RESEARCH ARTICLE
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CORIANDRUM SATIVUM: A NATURAL THERAPEUTIC AGENT FOR NEUROLOGICAL AND PYHSIOLOGICAL DISORDERS

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ABSTRACT:
Background: One of the most important and concerning issues of the world is how to fight the psychological problems everyone is facing every now and then in their personal and professional lives. Multiple studies have been done on various extracts to explore the benefits of a variety of substances in helping psychological wars. However, the most facilitating things were always under the nose and yet unaware of their potential benefits.
Objective: The current study was designed to explore the psychological facilitation characteristics of one of the most commonly used household herbs i.e. *Coriandrum sativum.* This study focused on evaluating the anti-depressant, anxiolytic as well as anti-bacterial, anti-inflammatory and cytotoxic properties of this herb.
Materials & Methods: 50 rats were used in this study, 250mg/kg and 500mg/kg doses of the test sample were given and the results were evaluated. To evaluate the behavioral outcomes Tail immersion test, Light and dark box test, Elevated T-Maze model tests were used. MTT assay was used for cytotoxic activities and Microplate Alamar Blue Assay (MABA) for anti-microbial activities.
Results: Significant results were obtained in all the tests designed to evaluate psychological and behavioral impact of the test samples. The sample also showed significant inhibition against *Bacillus subtilis* and low inhibition against *Staphylococcus aureus* and MTT assay showed non-cytotoxic properties.
Conclusion: Inclusion of *Coriandrum sativum* in the diet can significantly help in managing not only the psychological but multiple physiological conditions also in a non-cytotoxic manner.

Keywords: Coriandrum sativum, psychological health, anti-bacterial, non-cytotoxic

INTRODUCTION:

In the world of A-I, the most intelligent and the smartest world, the sufferings of mankind are still not as well managed and well organized as it should be. The reasons of these suffering are many, from diseases to professional and work place issues to personal life traumas; everything is affecting how a person is affected emotionally and psychologically while balancing all these. Any past trauma, loss of a loved one, any disability, work place stress, or even hormonal alterations can lead to psychological abnormalities that can affect a person in long or/and short term basis (National Institute of Health, 2024).

In both the developing and under-developing worlds, the humanity is suffering due to various reasons. In recent times, this suffering has increased so much that it leads to homicidal and suicidal incidences because of lack of awareness, diagnosis and inability for timely management because most of the times such conditions often go un-noticed and that often results in disasters (Damásio et al., 2013; Blustein 2008). While many studies have been done to improve these conditions and increase the quality of life in general, the data still suggests that there is a consistent increase in health issues related to psychological wellbeing of individuals (Elliott and Guy 1993). Many factors including a low physical activity as compared to emotional and psychological burden also affects the behavioral properties of an individual. Sedentary life style, availability of help in conducting even minor tasks at home and at work often results in decrease in physical activity (Martín-Rodríguez et al., 2024).

Anxiety, depression, mood disturbances and other behavioral alterations can be managed with the use of proper life style modifications and proper Pharmacological drugs. There are multiple drugs like SSRIs (Selective Serotonin Reuptake Inhibitors), TCAs (Tri Cyclic Anti-depressants), Benzodiazepines, Barbiturates and a lot of many other Pharmacological substances are available which are conventionally used for managing these conditions along with some non-medicine managements like use of Magnetic and Electrical resources (Liu and Fan, 2024; Looi et al., 2024; Osahon et al., 2024; Jovanović et al., 2024). With time, a shift has been observed in using herbal products as compared to allopathic products due to the potent difference in their side effects producing ability. The herbs and spices which were once considered as a culinary component are now used for their possible health related benefits. Along with potential beneficial effects, these herbs have been found to be less toxic and possess very little to no side effects (Adil et al., 2025; Engmann and Agede 2024; Zaenal and Mustamin 2024). The current study was planned to focus and analyze the possible beneficial health related outcomes of a commonly used house hold herb, *Coriandrum sativum*, its effects on psychological pattern of individual and its use as an alternative to expensive therapies with improvement in the patient compliance. The test samples used in this study were previously explored for multiple other activities but their neuro-pharmacological studies along with the potential anti-microbial and cytotoxic characteristics were never evaluated together. This study will help in boosting the physiological and psychological health outcomes with use of *Coriandrum sativum* in daily life.

MATERIALS AND METHODS:

Extract code as provided by the Pharmacy faculty, University of Karachi: CSS-27-23

Doses: 250mg/kg & 500mg/kg given as 1mg/ml and 2mg/ml respectively for test samples. (4ml) dose of Diazepam (2mg) was used for analysis of anxiolytic and (4ml) of Imipramine (10mg) was used for anti-depressant effects as standard drugs.

Animal details: 50 Winster rats weight in range of 300-400 gram were recruited from animal house of Karachi University. 16 of them were used as standard (8 for anxiolytic and 8 for anti-depressant activities), 34 animals were used as test (17 in each group for 250mg and 500mg dose). Ethical permission was obtained from the Board of advance studies and research, University of Karachi.

The standard temperature (25 ± 2°C) and humidity (45 – 55%) was maintained in animal house along with 12-12 h light and dark cycle.

Methods:

Extract Preparation

Ethanolic extract of *Coriandrum sativum* was prepared and administered in the doses of 250mg/kg/day and 500 mg/kg /day orally for 60 days. Seeds of the test sample i.e. *Coriandrum sativum* were coarsely powdered and subjected to Soxhlet extraction using 50% hydro-alcoholic (Ethanol and water 1:1 ratio v/v). The extract was concentrated under rotary evaporator at a temperature of 40°C and stored till further use.

Pharmacological tests

The following tests were performed in order to explore the various pharmacological benefits of *Coriandrum sativum*:

Tail immersion test: This test was done on 50 animals which were recruited for accessing anti-depressant and anxiolytic properties of *Coriandrum sativum.* 16 animals were placed on standard drugs (8 on Diazepam and 8 on Imipramine) while 34 animals were on test extracts (17 on 250mg dose and 17 on 500mg dose). Tail of animals were dipped in 52 degrees temperature maintained water bath and readings were noted for all samples after observing how long they take to withdraw their tails (Sewell and Spencer 1976).

Dark and light box: This test was used to evaluate the behavior of test animals i.e. how much time the animals spend in light versus dark box as an indicator of their mental capability of hiding in dark when depressed or anxious (Bilkei-Gorzo et al., 1998). Animals were placed inside a dark and light box for 8minutes and the time they spent in dark vs. light box was monitored for day 0, day 30 and day 60.

Elevated T-Maze model: This test was done to test specifically the anxiety and memory of animals by observing their movement in open arm and closed arm (Viana et al., 1994).

Bioactivity Assessment

These tests were performed to evaluate the safety profile of *Coriandrum sativum*:

Cytotoxicity Activity: MTT assay was performed to measure the viability of cells using Hela cell line and BJ fibroblast cell line (Bahuguna et al., 2017; Tolosa et al., 2014).

Antimicobial Activity: Microplate Alamar Blue Assay (MABA) was performed to evaluate the viability of cells or the metabolic activity in a format having 96-well microplate format. In this assay, Alamar Blue dye is used and if it changes from blue to pink after reduction by cells, it allows the fast quantitative analysis of cell growth or the efficacy of test samples, this test is often used to evaluate microbial sensitivity and resistance (Vanitha and Paramasivan 2004).

RESULTS & DISCUSSION:

Neuro-pharmacological effects of *Coriandrum sativum*

The tail immersion test showed highly significant results as the animals were able to bear pain due to analgesic properties of *Coriandrum sativum* in pulling their tails back as the experiment days progressed, the results were even far better than the conventional drugs indicating the positive impact of *Coriandrum sativum* on the neurological levels of the subjects as many of them were able to keep their tails indicating improvement in their psychomotor abilities and pain management. This positive result due to natural therapy is coinciding with a lot of literature available that suggests that using natural measures as compared to artificial and lab based drugs can help in managing psychomotor wellbeing of a living subject under trial (Rawat et al., 2024). The pharmacological usefulness of this herb is not limited to its anti-inflammatory, anti-oxidant and anti-microbial properties but it also helps in better behavioral patterns in the test animals (Nouioura et al., 2024).

The experimental models including Dark and light transition box and Elevated T-maze model results also showed positive effect of test substances *Coriandrum sativum* on the way animals behaved. They tend to spend more and more time in the light box and open arm as the time passed as compared to dark box and closed arms (Kolhe et al., 2024). This pattern showed that their psychological condition improved with the use of our test substance and it had helped them in staying in an open space and a bright box.

Table 1: Tail immersion test (10 seconds was the cut off time to save tail from damage)

Groups	Dosage (mg)	Loco-motor Activity (seconds)		
		Baseline	30 days	60 days
Control				
Standard group 1 (Diazepam)	2	3±0.60	2±1.0	2±1.0
Standard group 2 (Imipramine)	10	4±0.61	3±0.92	2±0.91
Test group 1	250	4±0.69	5±1.0	6±0.71
Test group 2	500	4±0.78	6±0.95	7±0.96

Table 2: Dark and light box test

Group	Dosage (mg)	Conditions	Psychomotor Activity (minutes)		
			Baseline	30 days	60 days
Control					
Standard group 1 (Diazepam)	2	Dark	3±0.53	4±0.88	2±0.74
		Light	5±0.53	4±0.88	6±0.74
Standard group 1 (Imipramine)	10	Dark	4±0.64	4±0.83	2±0.74
		Light	4±0.64	4±0.83	6±0.74
Test group 1	250	Dark	3±0.71	3±0.70	2±0.72
		Light	4±0.71	5±0.71	6±0.72
Test group 2	500	Dark	4±0.58	3±0.87	1±0.93
		Light	4±0.58	5±0.87	7±0.93

Table 3: Elevated T-Maze Model

Group	Dosage (mg)	Conditions	Loco-motor Activity (minutes)		
			Baseline	30 days	60 days
Control					
Standard group 1 (Diazepam)	2	Open	4±0.74	5±0.51	7±0.70
		Closed	4±0.74	3±0.51	1±0.70
Standard group 1 (Imipramine)	10	Open	4±0.53	6±0.53	7±0.70
		Closed	4±0.53	3±0.53	1±0.70
Test group 1	250	Open	4±0.52	5±0.60	5±0.50
		Closed	4±0.52	3±0.60	3±0.50
Test group 2	500	Open	4±0.63	6±0.61	6±1.06
		Closed	4±0.63	2±0.61	2±1.06

Therapeutic potential of *Corriander sativum*

The calorimetric tests done also showed that our test extract showed very significant inhibition against Bacillus subtilis and little inhibition against Staphylococcus aureus indicating that the test extract is also helping in combating micro-organisms (Ferreira et al., 2024; Noujoura 2024).

The MTT assay showed non-cytotoxic properties which is again a very positive sign for using this extract as it will not only help in fighting the psychological issues but simultaneously saving the cells from any kind of toxicity. These results are coinciding with many studies making it a very potent and beneficial characteristic of *Coriandrum sativum* (Chinmayi et al., 2024; Thanapaul et al., 2024).

Table 4: Cytotoxicity activity of *Coriander sativum*

SAMPLES	CONCENTRATION (ug/mL/um)	% Inhibition/Stimulation	IC_{50}±SD
MTT assay (HeLa cells)			
Coriander sativum	30 ug/mL	-6.0	Inactive
Doxorubicin	30um	100%	0.9±0.14
MTT assay (BJ cells)			
Coriander sativum	30 ug/mL	-10.9	Inactive
Doxorubicin	30um	89.9%	0.1±0.02

Table 5: Antimicrobial activity of *Coriander sativum* using Microplate Alamar Blue Assay (MABA)

Microbial strains	Percent (%) inhibition of Compound	Percent (%) inhibition of Drug
***Escherichia coli* ATCC 25922**	No inhibition	96.61
***Bacillus subtilis* ATCC 23857**	85.85	95.99
***Staphylococcus aureus* NCTC 6571**	34.89	89.74
***Pseudomonas aeruginosa* ATCC 10145**	No inhibition	94.60
***Salmonella typhi* ATCC 14028**	No inhibition	95.42

CONCLUSION:

Inclusion of *Coriandrum sativum* in daily routine can significantly improve individual life style and helps in maintaining a balanced personal and professional life due to its potent effect on neurological health as well as it will also provide an increased control over micro-organisms and infections.

Not only these, this inclusion will also help in keeping the integrity of normal cells because of its non-cytotoxic characteristics and it will improve the patient compliance due to its non-expensive and easily available properties.

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