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PHYTOCHEMICAL SCREENING AND CENTRAL NERVOUS SYSTEM ACTIVITY OF ETHANOLIC EXTRACT OF PHOENIX DACTYLIFERA

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Abstract
Herbal medicine has a long and storied history that includes Indigenous peoples, the Chinese, the Egyptians, and the Greeks. These cultures have a long history of using plants for medicinal purposes, and they have preserved this knowledge via both written records and oral traditions. The antipsychotic activity was assessed using catalepsy caused by haloperidol. When compared to the usual medication (haloperidol), the ethanolic extracts of Phoenix Dactylifera (400 mg/kg & 800 mg/kg) caused dose-dependent catalepsy in rats. The Forced Swim Test is used to assess anxiolytic action. This experiment takes into account the time that mice remain motionless in water. Phoenix Dactylifera ethanolic extracts (400 mg/kg and 800 mg/kg) prolonged immobility in a dose-dependent manner.
Keywords: Antipsychotic activity, haloperidol, anxiolytic action, Phoenix Dactylifera, ethanolic extracts.

Introduction
The human brain, with its trillions of synaptic connections and billions of neurons, is both a mystery and a marvel, and it is fundamental to our very being. To be human is to have a brain that orchestrates fundamental physiological activities like breathing and heart rate as well as sophisticated cognitive processes like memory, language, and emotion. This article delves into the brain's complex architecture and ever-changing physiology, illuminating its structure-function links and revealing the processes that drive human thought and action [1].

Decreased neuronal activity, which in turn causes altered levels of awareness and reduced neurological function, characterises a range of neurological diseases known as central nervous system (CNS) depression. There is a vast variety of clinical situations involving central nervous system depression, each with its own unique causes and symptoms. These include sedation, anaesthesia, drug overdose, and neurological illnesses. In order to better understand the therapeutic relevance and implications of central nervous system depression, this article will attempt to explain its origins, effects, and processes [2].

Indian medicinal plants have a long history of veneration as a powerful resource for the treatment of many different diseases and conditions, and its reputation for efficacy has spread over the world. eighty percent of the global population uses traditional medicines, most of which are derived from plants, to address their healthcare requirements, according to the world health organization [3]. Natural products have an essential role in the field of medication development, according to many studies. Clinical trials have shown that phytoconstituents, when used as a medicinal treatment, may effectively treat serious health problems with fewer side effects than traditional pharmaceuticals. factors including availability, therapeutic value, and the amount of study done, which isn't always enough, are usually used to choose medicinal plants [4].

Although there are several potential origins of depression, an imbalance in brain chemistry that disrupts neurotransmitter levels is the most common. Depression is mainly caused by changes in three important monoaminogenic neurotransmitters in the central nervous system (cns): norepinephrine, serotonin, and dopamine. Depression symptoms are brought on by a lack of these neurotransmitters [5]. Decreased

psychomotor activity is a common symptom of depression, which may be used to diagnose drowsiness, anxiety, psychosis, and other underlying illnesses. Relapse, side effects, and drug interactions are some of the problems that have been found in clinical trials of the several neurotransmitter receptor-targeting medications that are now on the market. Therefore, research into herbal medicines that provide increased effectiveness with less side effects and interactions is being pursued due to the urgent demand for new pharmaceuticals [2, 6].

The present research aims to identify phytoconstituents in phoenix dactylifera extract and understand how they contribute to the plant's antidepressant effects.

Method and Methodology

Extraction of plant material

Ethanol extraction procedure

Approximately 500 gms of dried and crushed leaves were placed into a soxhlet apparatus containing 1000 milliliters of solvent. The material was initially extracted with petroleum ether intended for 15 hrs awaiting the solvent appear colorless. Following extraction, the residual material, known as marc, was removed and dried. Once dried, the powdered marc was weighed and subjected to a second extraction process using ethanol for an additional 72 hours until colorless. The next step was to distill the concentrated extract. After additional evaporation, the concentrated solution became a greenish-syrupy substance.

Animal model and experimental conditions

swiss albino mice measuring 20–25 g and male albino wistar rats weighing 200–250 g were used in the present investigation. In the animal facility, the rats were kept at a constant temperature of 22 ± 30°c. We took great care to house and treat all of the animals in accordance with the most recent and widely recognised ethical standards for the care of laboratory animals. Standard food was given to the rats before the tests began, and they were allowed to adjust to the laboratory setting, which included maintaining a 12-hour light-dark cycle at 22 ± 30°c. The rats in the research were given unlimited amounts of distilled water and standard rat food. The ethics committee reviewed and approved all animal experiments to make sure they followed all the rules when it came to treating the animals in the lab [7].

Acute toxicity assessment

In accordance with oecd guideline 425 and using the up and down approach, a research of the acute oral toxicity of phoenix dactylifera was carried out. Acute oral toxicity may be evaluated with fewer animals using this testing approach. it makes it possible to see symptoms of poisoning and finds compounds that may not be really harmful [8].

The animals were fasted the night before dosing, meaning they didn't eat but still had access to drink. The correct dose was determined by recording each animal's fasting body weight.

Assessment of antipsychotic activity

The effectiveness of the ethanolic extract from phoenix dactylifera as an antipsychotic was assessed in wistar rats using an experimental model of haloperidol-induced catalepsy. This assessment approach is derived on the well-established preclinical assays for predicting antipsychotic efficacy and motor side-effect liability, respectively, which are conditioned avoidance response (car) behavior and catalepsy, respectively.

Haloperidol induced catalepsy test

A hallmark of catalepsy is a protracted incapacity to rectify an aberrant posture that is imposed from outside. Catalepsy may be caused by neuroleptic medicines that block the nigrostriatal dopamine pathway. The possible action mechanism of the ethanolic extract from phoenix dactylifera is investigated using this experimental model. For the sake of comparison and reference, this model employs a conventional pharmacological dosage of 1 mg/kg of haloperidol.

Forced swim test (FST)

When it comes to pharmacological in vivo models for evaluating antidepressant effectiveness, the FST is by far the most utilized. Mice exhibit hallmark behavior of immobility when confined to a swimming pool from which they have no way out. Tests and the conventional medicine, diazepam 2 mg/kg, may either amplify or alleviate this behavior, which indicates a condition of depression [10].

Water (at a temperature of 24±1 ◦c) was poured to a depth of 15 cm within a transparent plexiglass cylinder (20 cm height × 12 cm diameter) that made up the apparatus. The first time rats are put in the cylinders, they are very active, swimming around and around, attempting to climb the wall, and even plunging to the bottom. The first two or three minutes are characterised by a gradual slowing of activity, followed by increasingly lengthy periods of floating or immobility. after around five or six minutes of immobility, the rats hit a plateau and stay that way for about eighty percent of the time. We take the rats out of the water after 15 minutes and let them dry in a heated container (32 °c) before putting them back in their original cages. After a day has passed, they are reinserted inside the cylinder for a 5-minute test to determine their overall immobility length. Multiple mouse groups have shown that this 5-minute phase of floating activity is repeatable. When an animal does nothing more than float still in the water with its head slightly bent but still erect and its nose hovering just above the surface, we say that it is immobile. The standard or test medicines are given 30 minutes before the test. It was hypothesised that the animals' lack of movement was indicative of a depressed attitude, since they had apparently accepted their fate in the experiment and no longer hoped to escape [10].

We measure the average levels of immobility in each group both before and after medication delivery.

%=before-after/before x 100

Experimental design

The experimental rats were divided into five groups, each consisting of six animals. These groups were designated for treatment as follows.

Experimental design

GROUP(N=6)	TREATMENT
group i.	normal control rats
group ii	rats treated with low dose ext. *phoenix dactylifera*(400mg /kg)
group ii	rats treated with high dose ext. *phoenix dactylifera*(800mg /kg)
group iv	rats treated with standard drugs

Results and Discussion

The current research demonstrates that, in animal models, the ethanolic extract of phoenix dactylifera has cns depressant action. Some illnesses produced by central nervous system depression were the focus of the current investigation. Those areantipsychotic activity by haloperidol induced catalepsy test:

Preliminary phytochemical analysis

Percentage yield extracts

extract	yield (%w/w)colour
ethanol *phoenix dactylifera*	5.23 (greenish)

Chemical tests of leaf extracts of *phoenix dactylifera*:

s.no	phytoconstituents	
1	carbohydrates	+
2	glycosides	-
3	alkaloids	+
4	phytosteroids	-
5	flavonoids	+
6	protein and amino	-
7	saponins	+
8	phenols & tannins	+
9	terpenoids	+

Results from a series of extractions using solvents of progressively increasing polarity from powdered phoenix dactylifera are shown in the table as a percentage yield.

Carbohydrates, alkaloids, sterols, saponins, tannins, and phenolic substances were identified in the phoenix dactylifera extract during early phytochemical screening. in table 8 you can see a list of all the phytoconstituents that are in the extract. Some phytoconstituents, including alkaloids, phenols, saponins, terpenoids, tannins, and sterols, have been shown to have psychopharmacological effects, according to research.

it is thought that these substances might cause changes in psychopharmacology by perhaps interacting with inhibitory receptors in the CNS, namely dopamine and gabaergic receptors

There were also discovered to be flavonoids, alkaloids, phenols, tannins, triterpenoids, and saponins in the ethanol extract of phoenix dactylifera. It is possible that these phytoconstituents in the extract contribute to the induction of depression in the cns. Sedation, myorelaxant effects, and lower psychomotor activity might be therapeutic outcomes of this induced depression, which could be used to treat psychosis and anxiety. according to berenguer et al. (2005), flavonoids are antioxidants and phenols and phenolic compounds are very effective antioxidants.

Pharmacological studies

Acute oral toxicity studies

The ethanolic extract from phoenix dactylifera was tested for acute oral toxicity according to the protocols laid forth in oecd 425. The acute toxicity experiments came to the conclusion that the extract had an ld50 higher than 2000mg/kg. The following details are derived from the acute oral toxicity data collected in accordance with oecd 425 standards.

Antipsychotic activity

Haloperidol induced catalepsy test

s.no	Group	Dose	Degree of catatonia(score)			
			0.5hr	1hr	2hr	3hr
1	control	0.5% cmc	0.0±0.0	0.0±0.0	0.0±0.0	0.0±0.0
2	test1	ext400 mg/kg	179.8±2.4**	167.5±2.5**	123.5±3.8**	109.5±3.3**
3	test2	ext800 mg/kg	333.2±2.4**	327.7±2.7**	307.7±2.0**	283±2.3**
4	standard	1 mg/kg	349.2±1.61**	347.5±1.77**	323.7±1.83**	304±1.4**

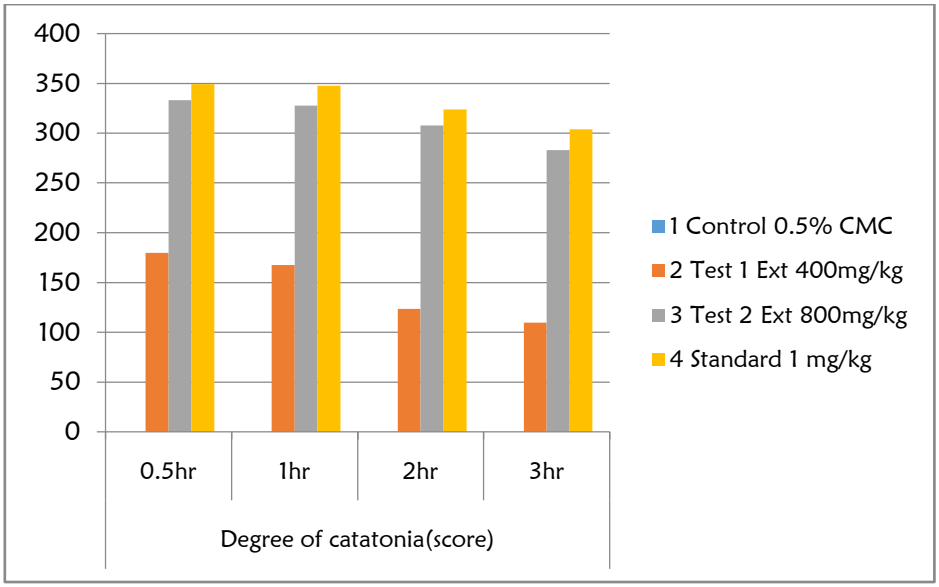

Fig 01: Graphical representation of Haloperidol induced catalepsy test

Anxiolytic activity

Forced swim test

S.No	Group	Dose	Immobility(Sec)		% Increasein Immobility
			before	after	
1	control	0.5%cmc	145±1.3**	155±1.2**	6.89%
2	test1	ext400mg/kg	130±2.4**	190±1.3**	46.1%
3	test2	ext800mg/kg	140±1.5**	260±1.6**	85.7%
4	standard	2 mg/kg	143±3.0**	270.2±1.8**	88.81%

All values are expressedas mean±s.e.m.;(n=6) animalsin each group.**p<0.01.

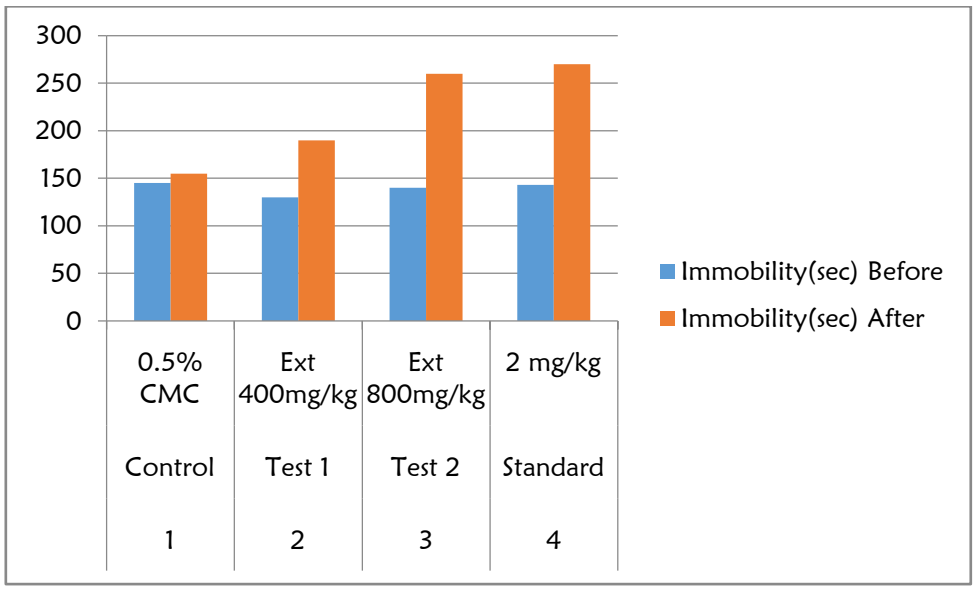

Fig 02: Graphical representation of Forced swim test

Discussion

In the current study, the central nervous system activity of an ethanolic extract of phoenix dactylifera was assessed using behavioural tests on mice and rats, including the forced swim test and the haloperidol induced cateterization test. These screening models are traditional methods for assessing the activities of the central nervous system that give data on the anxiolytic and antipsychotic functions [2,3,11].

The current investigation demonstrated how ethanolic extracts of phoenix dactylifera affected antipsychotic activity as measured by a rat test for haloperidol-induced catalepsy. The metric that is measured is the catalepsy score. The findings indicated that the test1 group (400 mg/kg) produced a mean catalepsy score of 179.8±1.4**, 167.5±1.5**, 123.5±2.8**, and 109.5±2.3**, indicating less catalepsy. in contrast, the test2 group (800 mg/kg) produced significant catalepsy, 333.2±1.4**, 327.7±1.7**, 307.7±2.0**, and 283±1.3**, compared to the standard group (haloperidol 1 mg/kg) (349.2±0.61**, 347.5±0.77**, 323.7±0.83**, 304±1.2**) at 0.5, 1, 2, and 3 hours of time [12]. The test 2 group experienced the highest catalepsy score and catalepsy for one hour following the administration of the extract (800 mg/kg). The findings demonstrate that experimental rats developed a dose-dependent catalepsy in response to the test1, test2, and higher doses of phoenix dactylifera ethanolic extract [4, 13].

The forced swim test was used to measure the anxiolytic effect of ethanolic extracts of phoenix dactylifera on mice. The metric being measured is the duration of immobility of mice in water. in comparison to the standard group (diazepam 2 mg/kg), the test1 group (400 mg/kg) exhibited a shorter length of immobility, while the test2 group (800 mg/kg) demonstrated a significantly longer period of immobility. in the test, test 2, and standard groups, the percentage increases in immobility time are 46.1%, 85.7%, and 88.81%. according to these findings, mice's immobility duration was dose-dependently prolonged when exposed to 400 and 800 mg/kg concentrations of the ethanolic extract of phoenix dactylifera in the test1 and test2 groups [8,9,10,14].

Summary and conclusion

This paper reviews the biological activities of shade-dried phoenix dactylifera leaves, which are a medicinally significant active ingredient and belong to the fabaceae family. Reports on preliminary pharmacological and phytochemical activity have been investigated.

The extract of phoenix dactylifera leaves underwent a preliminary phytochemical screening, which revealed the presence of phenolic substances, glycosides, sterols, flavonoids, saponins, tannins, terpenoids, and carbohydrates. The extract contains alkaloids, tannins, terpenoids, and glycosides, which may be the cause of the psychopharmacological depressive activity. dactylifera phoenix

The antipsychotic activity was assessed using catalepsy caused by haloperidol. When compared to the usual

medication (haloperidol), the ethanolic extracts of phoenix dactylifera (400 mg/kg & 800 mg/kg) caused dose-dependent catalepsy in rats. One factor contributing to the antipsychotic action is the suppression of dopamine at its receptors. The inhibition of dopaminergic transmission at its receptors may be attributed to alkaloids such guanidine alkaloids like canarosine. Phoenix dactylifera's antipsychotic properties may also be attributed to other phytochemical components found in the extract, including as tannins, terpenoids, and glycosides, in addition to alkaloids. The precise route of action may be suggested by more research to be conducted to validate the antipsychotic activity with different dosage levels and with different chronic & acute models.

The forced swim test is used to assess anxiolytic action. This experiment takes into account the time that mice remain motionless in water. Phoenix dactylifera ethanolic extracts (400 mg/kg and 800 mg/kg) prolonged immobility in a dose-dependent manner.

Compared to the standard group, the test1 and test2 group mice's time. The current investigation shows that phoenix dactylifera ethanolic extracts (400 & 800 mg/kg) have anxiolytic properties. Similar in function to benzodiazepines, which are frequently used as anxiolytics, is how phoenix dactylifera works. the gaba receptors are how benzodiazepines work. further research is required to confirm if an effect on gabaergic transmission underlies the mechanism of phoenix dactylifera extract's anxiolytic efficacy.

Previous studies on the pharmacology and chemical components of plants indicate that plants with flavonoids, tannins, and saponins have anti-central nervous system (cns) disease-preventing properties. the ethanolic extract of phoenix dactylifera has been shown to include flavonoids, tannins, saponins, and terpenoids, according to phytochemical studies. it is guaranteed that any of these phytochemical components that bind to the gabaa-bzd complex will generate anxiolytic action.

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