A STUDY OF PHYTOCHEMICAL SCREENING AND ANTICONVULSANT ACTIVITY OF PALM LEAVES PHOENIX DACTYLIFERA

By

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ABSTRACT

The present study aimed to evaluate the anticonvulsant activity of leaves plant extract of phoenix dactylifera L. using PTZ-induced seizure models. The leaves of date-palm was subjected to extraction in methanol (99.9%). The phytochemical screening of the extract revealed the presence the alkaloids, falvonoids, glycosides, saponin, steroids, tannins, and gum. The methanolic activity of the extract of the leaves of date-palm was observed for their anticonvulsant activity induced by pentylenetetrazole test using Albino Westar rats. The extract in doses (100, 200, 400 mg/kg, intraperitoneal) for 5 successive days. Complete protection against Tonic–clonic convulsion and mortality were observed. We concluded that phoenix dactilifera leaves pose anticonvulsant properties and further investigation and phytochemical screening are needed to find out the much action.

KEY WORDS: Phoenix Dactylifera, Leaves, Date Palms, Epilepsy, Convulsion, PTZ.

INTRODUCTION

Epilepsy is the second most common neurological disorder after stroke, affecting at least 50 million persons worldwide, it shows a prevalence rate of 1-2% of the world population [1]. It is a chronic and often progressive disorder characterized by the periodic and unpredictable occurrence of epileptic seizures, and involuntary contraction of striated muscle repeatedly. Seizures are characterized by an excessive, hyper-synchronous discharge of cortical neuron activity, which can be measured by the electroencephalogram [2]. Seizures of Epilepsy are classified into; Partial seizures which may be (a) Simple partial seizures [3] or (b) Complex partial seizures [4] and Generalized seizures in the form of (a) Absence [petit mal] seizures, (b) Myoclonic seizures, (c) Clonic seizures, (d) Tonic seizures, (e) Tonic-clonic [grand mal] seizures, (f) Atonics seizures or drop attacks [4-6]. These seizures can be chemically induced, electrically induced and genetically induced seizures [7]. Treatment of Epilepsy is helpful in up to 70% of patients. However, in developing countries, 75% of people with epilepsy do not receive treatment [8].

The problem of antiepileptic drugs (AEDs) arises from their inability to control seizures efficiently and adverse effects which have not been circumvented completely. Many people living in developing countries still rely on herbal medicine for the management of epilepsy [9]. The clinical effectiveness, minimal side effect profile and relatively low costs of herbal drugs are the reasons for their various application in traditional medicine.

Traditional medicine, especially medicinal plants, has been practiced for a long

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time in most parts of the world. Medicinal plants used for the therapy of epilepsy in traditional Medicine have been shown to possess promising anticonvulsant activities in animal models and can be invaluable sources of new antiepileptic compound [1]. About 8 million date palm trees are cultivated in Libya distributed in the desert as well as in the eastern and western coastal belt regions where about [4] varieties are recognized. In Libya, the phoenix dactylifera is an important tree for humans, animals and birds [11]. This study aims to study the Phythochemical screening of Phoenix dactylifera leaf and to estimate the anticonvulsant activity of the Phoenix dactylifera leaf.

RESULTS

Phytochemical investigation of the methanolic extract of phoenix dactylifera leaf (date palm) contains bioactive compounds (Saponins, Flavonoids, glycosides, steroids, Phenolic compounds), but our investigation does not reveal the presence of amino acid (Table: 1).

Table (1): The results of phytochemical screening for a methanolic extract of phoenix dactylifera leaf

NO	Phytochemicals	Results	Colour
1	Alkaloids	+	Cream with Mayer's reagent
2	Flavonoids	+	A yellow coloration that disappears on standing
3	Saponins	+	Formation of emulsion
4	Tannins	+	Brownish
5	Terpenoids	+	Green or Blue- black colouration
6	Anthraquinones	+	Colour changed
7	Steroids	+	Blue or Bluish-green
8	Gum	+	Red violet ring
9	Phenolic compound	+	Greenish – Black
1]	Iridoids	+	Black precipitate
11	Free quinolones	+	Yellow
12	Amino acid	-	No change colour to red

(+) Presence, (-) Absence.

Effects of phoenix dactylifera leaves and diazepam on pentylenetetrazol induced convulsions in rats:

In control animals, intra-peritoneal administration of PTZ caused clonic-tonic convulsion (140 ± 90.33 sec) after administration as well as lethality in all rats after tonic seizure. Normal saline did not show any protection against PTZ-incident of convulsion and mortality (Table 2). Surprisingly phoenix dactylifera L. leaf (100, 200, and 400 mg/kg, I.P.)

for five successive days produced 100% protection against clonic-tonic convulsion and mortality induced by PTZ 100mg/kg I.P (Table 3).

In addition, pretreatment with phoenix dactylifera L. leaf extract (200 mg/kg, I.P.) 30 minutes before injection of PTZ produced complete protection against mortality and prevented clonic tonic convulsions in 50% of the animals while the other animals appeared only clonic convulsion with significant delayed in onset time. Whereas the standard drug diazepam (4mg/kg, I.P.) completely abolished the convulsion and mortality (Table 2).

Table (2): Acute effect of the extract of phoenix dactylifera leaf and diazepam on pentylenetetrazol-induced seizures in rats.

Treatment	Mean onset of seizures (sec)	No. convulsione / No. used drug	protection %	Mortality (% delay)
PTZ 100mg/kg	140± 90.33	6 out of 6	0.00	6/6 (100%)
Extract 200mg/kg	560± 192.87	3 out 6	50	0.00

Table (3): Chronic effect of phoenix dactylifera leaf on PTZ-induced seizures in rats.

Treatment P	Mean onset of seizures[sec]	No. convulsione / No. used drug	Protection %	Mortality (% delay)
PTZ 100 mg/kg, I.P	140 ± 90.33	6 out of 6	0.00	6/6 (100%)
Extract 100 mg/kg, I.P	-	0 out of 6	100	0/6 (0.00%)
Extract 200 mg/kg, I.P	-	0 out of 6	100	0/6 (0.00%)
Extract 400 mg/kg, I.P	-	0 out of 6	100	0/6 (0.00%)

DISCUSSION

Epilepsy is a symptom of a variety of conditions and is the most common of chronic neurological disorders. Where the patient's death may be due to epilepsy [15]. The convulsant action of PTZ, involves the disruption of GABAergic neurotransmission in the central nervous system. It has been reported that PTZ inhibits glutamic acid decarboxylase (GAD) [16]. PTZ is an antagonist of GABA at the GABA receptor which has been widely implicated in epilepsy [17].

The effect of phoenix extract in this model can therefore suggest its involvement in the GABAergic or noradrenergic pathway and its efficacy against generalized tonic-clonic and partial seizure in animals. Prevention of seizures induced by PTZ and maximal electroshock in laboratory animals is the most commonly used preliminary screening test to characterize potential anticonvulsant drugs. PTZ test represents a valid model for human generalized myoclonic and also absence seizures [18]. Furthermore; drugs which protect animals against the

generalized clonic seizure induced by PTZ are effective in the protection and management of petit mal epilepsy [19].

The data obtained in this study demonstrated Phytochemical studies revealed that the methanolic extract of phoenix dactylifera L. leaf contains alkaloids, flavonoids, steroids, glycosides, quinones, gum, iridoids, phenolic compounds, terpenoids, tannins, saponins and steroids. It seems that these phytochemical constituents of date palm leave present in methanolic extract might be responsible for the observed anticonvulsant activity.

The observed anticonvulsant activity of one of its constituents the methanolic extract of phoenix dactylifera L. leaf suggests that it can one or more easily cross the Blood-brain barrier. In agreement with this suggestion the anticonvulsant activity of flavonoids [20,21]. saponins alkaloids and steroids in experimental animals have been demonstrated. One of these components might act by increasing the synthesis and release of GABA which affords allosteric receptor facilitation or reduce inactivation. Therefore, we postulate that methanolic extract might have a definite impact on the GABAergic system so, the anticonvulsant activity may be due to the presence of steroidal compounds in the extracts.

Herbal medicine represents one of the most important fields of traditional medicine all over the world. Over the past 20 years, there has been an increased interest in the investigation of natural materials as sources of new drugs. Different extracts from traditional medicinal plants have been tested to identify the source of the therapeutic effects.

CONCLUSION

This study concluded that Date palm leaf [Type Abel (EL-ammi)] contains many phytoconstituents such as saponins, flavonoids, glycosides, steroids, and phenolic compounds. Methanolic extract of this plant can cross blood-brain barriers because it has CNS effects such as anticonvulsant activity.

The metabolic extract of palm leaves Phoenix dactylifera Is considered a promising Sources the anticonvulsant activity There this plant needs further pharmacological and pharmacognosy studies for the discovery of new natural anticonvulsant drugs.

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