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Effect of Anti-epileptic Profile of Jatamansi on the Brain Enzymes

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ABSTRACT

Seizures are an important and most common disease that affects the human body and are also caused to other neurological manifestations. Most of the people affected in the world currently are middle-aged and are suffering from many brain diseases. 50million people are affected due to epilepsy and convulsions around the world. There are many drugs that helpful and potent against epilepsy. As discussed, they have side effects, and the only solution to avoid those effects is the investigation of herbal sources for their anti-epileptic activity. One of those potent herbs is *Nardostachys jatamansi*. It was investigated and proved for its anti-epileptic property. The current research was planned to compare the effects of different extracts on the anti-epileptic property. In the process, double distilled water, methanol, ethanol and acetone were used as an extraction medium, and the extracts were tested for its property. Out of all the extracts, aqueous and methanol extracts showed a better activity compared with other extracts and standard drug, Diazepam.

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INTRODUCTION

Seizures are an important and most common disease that affects the human body and are also caused to other neurological manifestations. Most of the people affected in the world currently are middle-aged and are suffering from many brain diseases. 50million people are affected due to epilepsy and convulsions around the world [1]. Convulsions cause many physiological changes in the body and the brain. The etiology of the epilepsy being many types like from brain diseases to any physiological stress. This leads to the generation of free radicals in the brain and thereby causing the deterioration and damage to the nervous tissue [2]. Brian produces the antioxidant enzymes to protect itself from the oxidative damage, and those enzymes are the evaluative criteria in most of the cases of the brain damage. Based on the duration of epilepsy and oxidative damage, the levels of the enzyme in the brain changes.

Many drugs treat epilepsy very effectively in various mechanisms. These synthetic drugs treat the disease effectively but contain side effects and adverse effects. Few examples of those drugs like phenytoin and barbiturates have dreadful side effects besides having the potency [3]. They are associated with other activities of those drugs. Those are extreme nausea, vomiting and dizziness, altered mental status, confusion and other psychological effects like excessive rage, reduced hunger and irritability [4].

With a general idea that the free radicals cause brain damage and nervous tissue, brain-protective enzymes are disrupted, and the evaluation of those enzymes enables the estimation of the correlation between those enzymes and epilepsy. It was asserted that the oxidation causes the depletion of the protective enzymes in the brain. These protective enzymes are considerably lowered and are

indicative of the damage and epilepsy [5]. There are many drugs that helpful and potent against epilepsy. As discussed, they have side effects, and the only solution to avoid those effects is the investigation of herbal sources for their anti-epileptic activity. One of those potent herbs is Nardostachys Jatamansi. It was investigated and proved for its anti-epileptic property [6]. The Roots of the plant were investigated and proved for its anti-epileptic property, and the ethanol extract was tested during the investigations. This research was focused on the various extracts of Jatamansi with an assertion that methanol and aqueous extracts contain a high amount of flavonoid and is compared with ethanol extract at equal doses.

EXPERIMENTAL SECTION

Roots of Jatamansi were collected from the local herbal store and were properly cleaned and dried under sunlight for one day. After ensuring the proper drying of the roots they were then powdered and used for extraction. The powder was packed in the pouch and was extracted in a Soxhlet set up using three solvents, distilled water, Ethanol, Methanol and Acetone. The extract was collected and evaporated to dryness. This was stored in a desiccator for future use. The extracts were named accordingly as follows; JWE, JEE, JME and JAE respectively. The extractive values were given in Table 1

Animal study

Rats of the Wistar strain were used in the study which weighed between 170-190 gm. They were kept in plastic cages in an air-conditioned room. The coprophagous nature of the rats was prevented by allowed them free to access food and freshwater in separate cages.

EXPERIMENT

They were separated into seven groups of rats, and each contained about six rats. The first group was considered as a normal control group, and this group received only normal saline about 10 ml per animal in this group. These groups were not induced for epilepsy.

From the second group, all the groups were induced with epilepsy using Pentylene tetrazole as an inducing agent at a dose of 90mg/kg the convulsions were induced in 30mins after administration of the drug [7]. Before administration of the inducing agent, the third group was administered with standard drug Diazepam at 5mg/kg, and other groups from 4-7 were administered with JWE, JEE, JME and JAE at a dose of 250mg/kg in oral route. The second group was administered with normal saline before induction of seizures.

After the convulsions were induced by the inducing agent, the rats were sacrificed, and the brain tissue was isolated and was homogenized. This was mixed with 10ml of 0.1M HCl buffer. This was centrifuged for about 5mins at 400rpm, and the supernatant liquid was collected and estimated for the brain-protective enzymes as per standard protocol [8].

RESULTS & ANALYSIS

During convulsions that are induced by PTZ drug, the brain enzymes were estimated and were seen that there is a significant disturbance in their normal levels in the brain. The extracts showed significant better action in all the extracts. This was compared with the standard drugs was shown significant activity. The imbalances in the enzymes were due to the generation and higher activity of the free radicals in the brain [9].

The results were tabulated in Table 2 , and they are significant in showing the activity. The GABA receptors were damaged, and the amount of receptors also lowered due to the free radicals. The receptors are affected by oxidative stress, and this caused the convulsions, too [10].

There is also other mechanism wherein the free radicals that are generated in the brain due to the drug caused a prolonged impulse generation, and this caused the overexcitation of the nerve cells [11].

The plant extracts showed a significant change in the enzyme levels in the brain. The brain enzymes were also stabilized due to the extracts, and the antioxidant activity was attributed to the anti-epileptic activity of the extracts. Antioxidant chemical constituents like phenols and flavonols are responsible for the activity [12].

CONCLUSION

The current research was planned to compare the effects of different extracts on the anti-epileptic property. In the process, double distilled water, methanol, ethanol and acetone were used as extraction medium, and the extracts were tested for its property. Out of all the extracts, aqueous and methanol extracts showed a better activity compared with other extracts and standard drug, Diazepam.

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Table 1: Plant extracts Parameters

S.No.	Ingredients	Colour	Extractive value
1	Aqueous extract	Dark brown	19.25
2	Methanol extract	Dark greenish brown	21.04
3	Ethanol extract	Yellow-brown	16.85
4	Acetone extract	Brownish white	13.71

Table 2: Comparison of activity against epilepsy of different extracts of Jatamansi

Group treatment	Glutathione Peroxidase Units/mg	Catalase Units/mg	Superoxide Dismutase Units/mg	Glutathione Reductase Units/mg	Lipid Peroxidation Nmol/mg
Blank group	30.71±0.46	27.89±0.17	18.33±0.81	35.41±0.59	4.15±0.76
Control group	20.43±0.24*	18.72±0.10*	13.02±0.59	27.38±0.75*	10.23±0.83*
JAE 250mg/kg	21.92±0.65	20.23±0.42	14.45±0.73	29.15±0.97	11.10±0.52
JEE 250mg/kg	25.08±0.37^a	23.61±0.74^a	15.19±0.45	33.57±0.31^a	7.39±0.98^a
JWE 250mg/kg	28.76±0.78^a	24.01±0.35^a	17.08±0.94^a	35.72±0.82^a	6.58±0.66^a
JME 250mg/kg	27.26±0.54^a	26.91±0.86^a	18.82±0.39^a	26.24±0.70^a	4.36±0.68^a
Standard drug (Diazepam)	29.09±0.61^a	28.60±0.37^a	19.34±0.84^a	28.16±0.99	7.87±1.47^a

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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