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Preparation and Investigation of the Effect of Polyherbal Syrup Formulation on Brain Enzymes

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ABSTRACT

Convulsions and seizures are the major neurological conditions that are the symptoms of brain diseases like brain stroke, aneurysm and other oxidative brain damage. This affects most of the people in the world as a symptom of other diseases and as a disorder on its own. Herbs are found to be the alternatives of the synthetic drugs that cause the side effects and are common in synthetic drugs as discussed above. So herbal extracts are safe and potent and do not contain or contain a very less amount of side effects. So, they can be used effectively in treating many conditions, including epilepsy. Most of the herbs show their potency by exhibiting the antioxidant activity. Since the oxidative free radicals that are generated in the brain are the cause of disturbance in the protective enzymes in the brain, the estimation of the protective enzymes in the brain during epilepsy. This work was carried out to prepare an effective polyherbal syrup to treat epilepsy effectively. The formulation was tested in 2 doses of 100 and 200mg, and they are also investigated for the activity to normal the enzymes that are in the brain, which help to fight the free radicals. From this, it can be advocated that the herbs in the syrup helped the formulation's antioxidant activity to attribute to the anti-epileptic activity in experimental animals.

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INTRODUCTION

Convulsions and seizures are the major neurological conditions that are the symptoms of brain diseases like brain stroke, aneurysm and other oxidative brain damage. This affects most of the people in the world as a symptom of other diseases and as a disorder on its own. There is a lot of middle-aged and old population that are affected by epilepsy due to oxidative damage [1]. As discussed, the oxidative brain damage is due to physiological stress, which results in the generation of free radicals. These free radicals were generated, and the brain is protected by the protective enzymes that fight against the free radicals. So, in any case of epilepsy, the disturbance in the protective enzymes is noticed [2].

Many drugs are used to treat epilepsy such as phenytoin, barbituric acid, diazepam etc. the free radicals that are generated in the brain due to drugs or stress can also cause nervine damage which eventually results in epilepsy [3]. These drugs which are used to treat epilepsy are potent and so have some unwanted side effects and adverse effects. They include vomiting, nausea, confusion, lack of alertness, reduced hunger, unwanted aggression etc. [4]. Usually, the free radicals stand as the evaluative criteria for the evaluation of epilepsy activity in the brain. During epilepsy, the free radicals are generated in the brain and are imbalanced during the

epileptic phase of the body. They can be evaluated in term of the changes in the enzymes of the brain that protects the brain [5].

Herbs are found to be the alternatives of the synthetic drugs that cause the side effects and are common in synthetic drugs as discussed above. So herbal extracts are safe and potent and do not contain or contain a very less amount of side effects. So, they can be used effectively in treating many conditions, including epilepsy. Most of the herbs show their potency by exhibiting the antioxidant activity. Since the oxidative free radicals that are generated in the brain are the cause of disturbance in the protective enzymes in the brain, the estimation of the protective enzymes in the brain during epilepsy. The herbs have the antioxidant property that can be attributed to the anti-epileptic property.

PREPARATION OF SYRUP

The plants that are used in the experiments are freshly collected from the local farm and are authenticated, and the herbarium was prepared and submitted in the laboratory. The plants are harvested and dried in the shade for five days, and then dried plant parts were powdered, and the powder was used directly for extraction. The plant powder was weighed and macerated in distilled water for seven days with continuous stirring once in every 6hrs. The macerate finally was collected and evaporated to get a thick extract. The extract thus obtained was stored in a desiccator and used in further experiments.

The syrup base that is used to prepare syrup incorporated with extracts was prepared in the laboratory using sugar and dextrose in the quantities specified. A weighed amount of sugar and dextrose are mixed with distilled water and heating for 1hr at 90^0C. When the sugar is dissolved in the water, this was cooled, and the weighed amounts of extracts were added and mixed in this syrup. This was finally achieved to a concentration of 100mg/ml and 200mg/ml in two concentrations. This was finally and directly used in the animal studies to evaluate the brain enzymes.

Animal procedure

The laboratory animals that are used in the experiments were procured from a local supplier in the city, and they weighed between 130-160gms. They are maintained under conditioned air and are acclimatized for the conditions in their propylene cages and are given free access to their food and water. The animals were divided into five groups, with 6animals in each group. The experimental design is done with four groups out of which one group is a normal group which didn't get induced with epilepsy using MES or PTZ. From the second group to fourth group epilepsy is induced by two methods; maximum electric shock-induced method and pentylene induced convulsions method. The second group was administered with saline 0.9% at a dose of 10ml, and the third group received standard drug phenytoin, and the fourth group received prepared syrup at a dose of 100mg/ml of 1ml and 200mg/ml of 1ml which corresponds to the doses of 100mg and 200mg.

In this method, the electric impulses were given to the animals from the second group to the fifth group. They were induced with the convulsions using electric convusiometer. The electricity was stopped, and the animals were sacrificed, and the brains were collected and stored [6–8].

In the PTZ method, the convulsions were induced with ptz drug at a dose of 90mg/kg body weight. This is continued to observe for the convulsions for 30mins, and the animals were sacrificed after the seizures are noted in the animals. The brain was collected from the rats and was stored and used in further experiments [9].

The isolated brains were minced using a blender and homogenized. This was then centrifuged, and the supernatant was mixed with tris HCl buffer and left to react for 5mins. Then this solution was evaluated analyze the protective enzymes in the brain solutions [10].

DATA & DISCUSSION

In both methods, the induction methods resulted in the significant disturbance in the brain enzymes, which were considered as the evaluative parameters of the convulsions in the rats. The syrups showed a rapid balance in the Protective enzymes. The results were tabulated in tables 2 and 3. The syrup was tested in two doses of 100 and 200 mg of the extracts overall. The dismutases levels were lowered, and they were elevated using both doses of the syrup. The induction of epilepsy was evaluated with the lowering of the enzymes in that rats [11].Tables 1, 2 and 3

The ptz also induced the convulsions, which was the result of the disturbance in the GABA levels and the amount of the receptor in the brain of the rats [12]. The electricity also excessively induced stimulation of the brain and the rat's brain responded in the generation of free radicals, and these caused the overstimulation and deterioration of the nerve cell membranes [13]. Few herbal chemical constituents are responsible for balancing the antioxidant enzymes they are flavonols, polyphenols, and other chem-

Table 1: Preparation of Polyherbal syrup

S.No.	Ingredients	Quantity
1	*Centella asiatica*	50mg
3	*Phyllanthus emblica*	25mg
9	*Piper longum*	25mg
10	Sugar	5g
11	Dextrose	5g
	Distilled water	100ml

Table 2: Brain enzymes in both methods

Group treatment	Catalase Units/mg		Glutathione Peroxidase Units/mg	
	MES	PTZ	MES	PTZ
Normal	25.82±0.12	25.34±0.9	27.53±1.21	28.64±0.41
Negative group	16.63±0.07*	22.41±0.58*	20.23±0.62*	18.37±0.13*
Syrup 100mg	19.99±0.38	22.52±0.13	23.72±0.76	20.82±0.82
Syrup 200mg	22.76±0.43^a	25.83±0.67^a	26.14±0.83^a	23.91±0.29^a
Standard drug	23.37±0.29^a	26.76±0.10^a	27.01±0.99^a	26.75±0.94^a

Table 3: Brain enzymes in both methods

Group treatment	Superoxide Dismutase Units/mg		Lipid Peroxidation Nmol/mg		Glutathione Reductase Units/mg	
	MES	PTZ	MES	PTZ	MES	PTZ
Normal	16.82±0.40	16.43±0.78	3.09±0.65	3.20±0.78	31.52±0.94	34.74±0.83
Negative group	9.49±0.92*	11.91±0.82*	8.12±0.87*	7.16±0.24*	9.89±0.98*	25.26±0.62*
Syrup 100mg	12.08±0.54	12.34±0.64	9.65±0.73	4.57±0.69	5.23±0.63	27.13±0.95
Syrup 200mg	14.90±0.45^a	13.7±0.93	5.36±0.99^a	4.00±0.52^a	4.65±0.55^a	30.42±0.8^a
Standard drug	16.17±0.78^a	15.06±0.45^a	4.24±0.52^a	5.62±1.31^a	6.41±0.86	33.61±0.93^a

ical constituents. These are also present in the extracts and transferred to the syrup so that it exhibited a potent activity against convulsion and enzymes induced by both the methods [14]. The enzymes in the brain like glutathiones and reductases responded well to the induction of the convulsions by lowering themselves and causing convulsions. The formulations controlled the protective enzymes in the brain, as evaluated in the investigation [15].

CONCLUSION

This work was carried out to prepare an effective polyherbal syrup to treat epilepsy effectively. The formulation was tested in 2 doses of 100 and 200mg, and they are also investigated for the activity to normal the enzymes that are in the brain, which help to fight the free radicals. From this, it can be advocated that the herbs in the syrup helped the formulation's antioxidant activity to attribute to the anti-epileptic activity in experimental animals.

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Conflict of Interest

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