Seizures and Epilepsy are those significant conditions that are common symptoms of many diseases that affect the human nervous system. It is one of the most chronic and most frequent neurological disorders that are prevalent in almost 5 crore people around the world. Even though the drugs are effective and potent, there are various side effects, and adverse effects are associated with those drugs. General side effects include nausea and vomitings; many other specific side effects include altered mental consciousness, confusion anorexia and excessive aggression are also noted in many cases of drugs. In this research, herbal formulations were designed to fight back the free radicals that are generated in the brain, and those protective enzyme levels were analyzed to estimate the activity of the formulation in the brain tissue. In the research, the prepared formulation showed a dose-dependent activity in restoring the brain-protective enzymes and balancing them. The formulation contained herb powders that contain anti-oxidant chemical constituents which helped for the anti-epileptic formulation. The herbal capsules at dose 500mg/kg showed a better activity compared to the standard drug but without notable side effects and adverse effects.
clear that the generated free radicals also cause an increase in seizures [5]. There are also reports and investigations that the oxidative reactions are primary aetiology for Epilepsy. With this hypothesis, the anti-oxidant activity of the drugs, they also fight the oxygen free radicals that lower the protective enzymes in the brain that will lead to recovery and regeneration of nervous tissue. These anti-oxidant enzymes will protect the brain, and with this idea, formulations have been designed for combating the Epilepsy using the anti-oxidant activity and restabilizing the brain enzymes.

In this research, herbal formulations were designed to fight back the free radicals that are generated in the brain, and those protective enzyme levels were analyzed to estimate the activity of the formulation in the brain tissue.

**FORMULATION**

The fresh plants were collected in the local area and were duly identified and authenticated. Herbarium sample is stored in the college library for future references. The plant parts were dried adequately under direct sunlight for two days, and the dried plants were powdered and then sieved. This powder was measured and then mixed using a baffled mixer in the proper proportions that are given in Table 1.

**Table 1: Formulation parametres of Formulation-40 capsules**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Ingredients</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Centella asiatica</td>
<td>50mg</td>
</tr>
<tr>
<td>2</td>
<td>Bacopa moneirii</td>
<td>50mg</td>
</tr>
<tr>
<td>3</td>
<td>Phyllanthus emblica</td>
<td>50mg</td>
</tr>
<tr>
<td>4</td>
<td>Acorus calamus</td>
<td>50mg</td>
</tr>
<tr>
<td>5</td>
<td>Terminalia chebula</td>
<td>50mg</td>
</tr>
<tr>
<td>6</td>
<td>Withania somnifera</td>
<td>50mg</td>
</tr>
<tr>
<td>7</td>
<td>Nardostachys jatamansi</td>
<td>50mg</td>
</tr>
<tr>
<td>8</td>
<td>Asparagus recemosus</td>
<td>50mg</td>
</tr>
<tr>
<td>9</td>
<td>Piper longum</td>
<td>25mg</td>
</tr>
<tr>
<td>10</td>
<td>Sida cordifolia</td>
<td>25mg</td>
</tr>
<tr>
<td>11</td>
<td>Tribulus terrestris</td>
<td>10mg</td>
</tr>
</tbody>
</table>

It was filled in the hard gelatin capsules at a dose of 500mg of whole powder and is weight balanced with additives. It was used in the animal experiments at an appropriate dose as prescribed.

**Animal procedure**

The animals that are used in the experiment are albino Wistar rats which are between 15-170 grams of weight. They are kept in the air-controlled room inside cages with one animal in each cage and allowed free to eat and drink water. It prevents coprophagy also. They were divided into five groups, with five animals in each group. The first group was treated as a healthy control group. From groups 2-5, they are administered with seizures induction. 2nd group was considered a negative control group which received just the normal saline. 3rd group received standard drug phenytoin, and 4th and 5th groups received formulation at two doses like 250mg/kg and 500mg/kg for animals.

**Electricity Induced Convulsions Method**

This method involves the use of the electric current to induce the convulsions. The animals received the current shock using an electric convulsimeter. When the animals were produced Epilepsy the current was stopped, and the animals were sacrificed. The brain tissue was isolated carefully and then stored for further experiments [6–8].

**Pentylene Tetrazole induced Convulsions method.**

This method uses PTZ as an induction agent of convulsions. It is administered at a dose of 90mg/kg of the body weight. It was given in subcutaneous route, and the animals were seen to have convulsions after 30mins of administration of PTZ. The seizures were observed in the animals, and they were sacrificed, and the brain tissue was carefully isolated and stored. It was used to proceed for further experiments [9].

**Estimation of enzymes**

The isolated tissue of brain was homogenized using a blender, and this homogenate weighed to 100 mg and was mixed with 10 ml of Tris HCl solution of buffer at 4°C. It was centrifuged at 3000rpm for 5mins. The supernatant liquid was collected, and the solid matter was discarded. This supernatant liquid was evaluated for the anti-oxidant enzymes like Glutathione peroxidases, Glutathione Reductases, Superoxide Dismutases, Catalases and Peroxidases using standard procedures [10].

**DATA & DISCUSSION**

In both methods, the results showed a potent activity of the formulation in restoring the brain-protective enzymes. The formulation at the dose of 500mg/kg showed better activity than at the dose of 250mg/kg. It normalized brain activity by increasing the brain enzymes that were lowered by electric shock. The results of the activity were tabulated in Tables 2 and 3.

The formulation was compared to the standard drug phenytoin and showed comparably signicant and similar activity. SOD’s are enzymes that protect the brain from oxidative free radicals that are generated
due to physiological stress and oxidation. Due to the induction of Epilepsy, their levels were lowered and caused Epilepsy in the animals.

The PTZ is an antagonist of the GABA receptor and reduces GABA levels in the brain and also lowers the receptors in the brain [11]. EIC leads to the continual stimulation of the brain cells and results in the seizures in humans and also affects the enzyme levels [12]. In addition to this, herbal chemical constituents like Apigenin, Ellagic acid, Quercetin, Kaempferol, Piperine and terpineols have anticonvulsant activity in many models [13]. Brain enzymes like Glutathiones also help in the lowering of the free radicals that are produced by the stress or other chemicals in this case PTZ and electrical shock. The formulation had a positive impact on the enzyme levels in the brain and prevented oxidative damage in the brain [14].

Peroxidases level in the brain were elevated due to the induction of Epilepsy or convulsions. This elevation in the peroxidases that causes the lipid peroxidation, which results in the damage to the nervous tissue membrane and thereby causing breakage of nerve cells. Due to the presence of the anti-oxidant chemical constituents like flavonoids and polyphenols, the formulation could effectively balance the enzymes in the brain.

**CONCLUSION**

In the research, the prepared formulation showed a dose-dependent activity in restoring the brain-protective enzymes and balancing them. The formulation contained herb powders that contain antioxidant chemical constituents which helped for the anti-epileptic formulation. The herbal capsules at dose 500mg/kg showed a better activity compared to the standard drug but without notable side effects and adverse effects.

**ACKNOWLEDGEMENTS**

The authors are thankful to all who have extended their constant support for the completion of the work.
Funding Support

None

Conflict of Interest

Authors declared no conflict of interest.

REFERENCES


