LITERATURE REVIEW

1. **M.Tripathi et.al [2000]** reviewed the basic concept of Ayurveda in epilepsy in the article called “Ayurvedic Medicine & Epilepsy”. He described the etiology, manifestation, diagnosis and treatment of epilepsy; which were documented in the vedic text. The review also mentioned various herbal treatment of epilepsy.

2. **N.E.Bharucha [2003]** reviewed etiological factors, prevalence rate, treatment gap in india compared to other developing countries in the article “epidemiology of epilepsy in india”. The epidemiological studies include a multicenter hospital study & Community based door to door study.

3. **S.Jain & PN Tandon [2004]** reviewed on “Ayurvedic medicine & indian literature on epilepsy”. The article focused on modern ayurvedic practice and application of various therapies in epilepsy.

4. **R. Sridharan [2002]** discussed about the “Epidemiology of epilepsy” in his article published in Current Science. The article covers about prognosis, prevalence, etiology, morbidity & mortality with epilepsy. It gives an idea about the treatment gap, unexplained death in epilepsy and also about medically intractable epilepsy.

5. **Geeta Khwaja et al [2007]** discovered the impact of religion on the management of epilepsy. The article stated the false beliefs and superstitions regarding epilepsy. The findings suggest that religion is helping to coping the epilepsy.

6. **S.V.Thomas [2000]** described the economical & cost benefit evaluation of epilepsy in the article “Money matters in epilepsy” published in Neurology India. The cost description includes direct medical, indirect, tangible cost and consequence like morbidity, mortality, psychological & economic benefits.

7. **Steven C.Schachter [2009]** described the use of herbal therapies for epilepsy in the article “Botanicals and Herbs: A Traditional Approach to Treating Epilepsy”. He outlined the role of U.S. Food and Drug Administration in regulating herbal product and scientific assessment of herbal therapy as potential therapy for patients with epilepsy.

8. **Girish S Achliya et al [2004]** evaluated the anticonvulsant activity of Unmadnashak Ghrita ;a ayurvedic formulation containing Farula Narthex, Gardenia Gummifera, Ellataria cardamom, Bacopa monneri & Cow’s ghee. The formulation protected mice
from Maximal Electro shock (MES) & Pentylenetetrazole (PTZ) induced convulsion. The formulation also showed CNS-depressant activity.


10. Marjan Nassiri et al [2008] studied that various synthetic flavonoids have anticonvulsive action. In the article “anticonvulsive effect of intracerebroventricular administration of rutin in rats” stated that rutin (3, 3’, 4’, 5, 7-pentahydroxyflavone-3-rhamnoglucoside), possesses anticonvulsant effects in rat; possibly through positive allosteric modulation of the GABA$_A$ receptor complex via interaction at the benzodiazepine site.


12. Ruta Muceniece et al [2008] evaluated that the Lupane type pentacyclic triterpene ‘Betulin’ bound to GABA$_A$ receptor site in mice and antagonized GABA$_A$–receptor antagonist Bicuculline-induced seizures.

13. Vyawahare N.S. et al. [2007] reviewed herbal plants having anticonvulsant effect with no side effects as compared to other synthetic antiepileptic drug therapies which had severe side effects and potential drug interactions.

14. Visweswari G. [2010] studied the antiepileptic effect of Centella asiatica on the activities of Na+/K+,Mg$^{2+}$ and Ca$^{2+}$-ATPases in rat brain during pentylenetetrazol – induced epilepsy. Aqueous extract had shown anticonvulsant and neuroprotective action.

15. Veena S. Kasture et al. [2002] established the anticonvulsive principle of *Butea Monosperma* called triterpene which had exhibited protection against pentylenetetrazole, electrical kindling and combination of lithium sulphate - pilocarpine nitrate induced seizure.

16. B.E. Bastidas et al. [1998] discovered that the ethanolic and aqueous extract of *Magnolia grandiflora* seeds abolish the extensor reflex of maximal electric induced
seizure in wistar rats. They significantly induced sleeping time by pentobarbital and ethanolic extract induced hypothermia.

17. **Hossein & Fatemeh[2005]** determined the two constituents safranal & crocin from crocus sativus. In the study, safranal reduced the seizure duration, delayed the onset of tonic convulsion and protected mice from death. Crocin did not show anticonvulsant activity.

18. **Shirish D.Ambawade et al. [2002]** determined that the extract of Glycyrrhiza glabra significantly and dose dependently delayed the onset of clonic convulsions induced by pentyleneetetrazol. The extract also protected rats against seizures induced by lithium-pilocarpine.

19. **G.S.Sonavane et al. [2002]** investigated the anticonvulsant activity of Myristica fragrans seeds against MES, PTZ & Litium-pilocarpine induced seizure.

20. **E. Ngo Bum et al. [2004]** determined the activity of Mimosa Pudica decoction against the PTZ test, NMDA test, Strychnine test & Picrotoxin test in mice. The decoction protected mice against PTZ &strychnine induced seizure. It also antagonized turning behavior induced by NMDA.

21. **Reinaldo Nóbrega de Almeida et al. [2008]** investigated the anticonvulsant effect of α,β-epoxy-carvone (EC), a monoterpenic monocyclic which showed an increase of latency for development of convulsions induced by picrotoxin (PIC) at 300 or 400 mg/kg and presented a significant protection against convulsions at doses of 200, 300 or 400 mg/kg, resulting in 12.5%, 12.5% and 100% of protection, respectively.

22. **B. Abila et al. [1993]** investigated the water extract of Piper guineense for its anti-convulsant effect against audiogenic seizure in DBA/2 mice & against seizure induced in T.O. Strain mice by PTZ,MES &NMDA.

23. **N.S.Vyawahare et al. [2009]** evaluated that the hydrolic extract of Argyreia speciosa significantly delayed the latency to the onset of first clonus as well as onset of death in unprotected mice & protection in PTZ treated mice. The extract also reduced the duration of hind limb extention in maximal electroshock seizure.

24. **Mohammad Ebrahim Rezvani et al. [2009]** studied that the part of anticonvulsant effect of valerian probably is mediated through activation of adenosine system in rats. The aqueous extract of valerian had significant anticonvulsant action.
25. G.P. Coelho de Souza [1997] determined that the systemic administration of y-decanolactone (essential oil from *Aeollanthus suaveolens*) had dose dependent hypnotic, anticonvulsant and hypothermic activity.

26. Dharmesh K. Golwala et al. [2010] evaluated that the ethanolic extract of *Abutilon indicum* showed significant protection against the pentylenetetrazole and maximal electroshock induced seizure. It may be due to linoleic acid and flavonoid compound present in leaf extract.

27. Shivalinge Gowda KP et al. [2009] evaluated that the extract of *Hemidesmus indicus* reduced the time spent in hind limb extensor phase. The plant possess significant anti convulsant action.

28. Karunakar Hegde et al. [2009] investigated the anticonvulsant activity of the ethanolic extract of the root of *Carissa carandas*. It reduced duration of seizure produced by maximal electroshock as well as delayed latency of seizures produced by pentylenetetrazole and picrotoxin.

29. Dilipkumar Pal [2008] evaluated that ethanolic extract of *Cynodon dactylon* inhibited the onset and the incidence of convulsion in dose dependent manner against pentylenetetrazole induced convulsion.

30. Lucindo J. Quintans-Júnior et al. [2007] evaluated the total alkaloid fraction (TAF) from the arial part of *Rauwolfia ligustrina*. The TAF had shown significant increase in the latencies of clonic seizures induced by pentylenetetrazol and picrotoxin in rat.

31. Dilipkumar Pal [2009] studied about the biogenic estimation from the brain of mice. In the article; “Determination of Brain Biogenic Amines in Cynodon dactylon pers and Cyperus rotundus L. treated mice.”, the ethanolic extract of plants had increased the GABA amount in the brain which protected against convulsion.

32. In the article “Effect of Indigofera Tinctoria extracts on neurotransmitters concentrations in rat brain after induction of seizure.”; E. Madhan Mohan [2010] evaluated anti-seizure activity against MES and PTZ induced seizure. It may be due to restored neurotransmitters in rat brain.

33. Wudayagiri Rajendra et al. [2010] studied that the pretreatment with *Centella Asiatica* extract caused recovery of the levels of acetylcholine and acetylcholinesterase. Increased
Acetylcholine content and decrease acetylcholinesterase activity may be responsible for protection against PTZ induced convulsion.

34. **Deepak Sharma [2009]** evaluated that the dietary intake of curcumin had decreased the onset and progression of seizure induced by FeCl₃. Curcumin significantly prevents the pathogenesis and seizure associated with FeCl₃ induced epileptogenesis.

35. **Ahmad Khalighi et al. [2005]** evaluated the botanical and phytomedical content of plant ‘**allium sativum**’. Allicin content was determined from the extract.

36. **Dinesh & Vaibhav kumar[2008]** investigated the anti-depressant action of garlic in mice model. In the studies, there were evidences for the involvement of monoaminergic and GABAergic system in anti-depressant action of garlic extract.

37. **Li Yu & Xu shi ying [2007]** determined the powder of garlic using microwave oven & vacuum drying as well as microencapsulation to protect the alliinase activity. They had produced garlic powder with high Allicin content.

38. **E.Kyo et al. [1997]** studied the anti-aging effect of aged garlic extract. The aged garlic extract modified the directly/indirectly, the function of mast cells, Basophils and activated T-lymphocytes.

39. **C.S.Paulose et al. [2010]** studied the effect of Bacopa monnerii and its constituent Bacoside –A in epileptic rats. The treatment with these extracts had prevented seizure by reducing the impairment of GABAergic activity, motor learning and motor deficit.

40. **K.K. Senthil Kumar & B. Rajkapoor [2010]** determined that the methanolic extract of Oxalis Corniculata increased the monoamines level on rat brain in PTZ & MES induced seizure. The extract significantly restored the monoamine levels such as NA,DA, 5-HT & GABA in forebrain of rat.

41. **Mohamed Nagui Attia & Magdy A.Ali [2006]** studied that the allicin, an organosulfur compound inhibit the deleterious pathological changes in liver tissues in Ccl₄ treated rat. The alleviations of these deleterious effects may be due to improvement in the antioxidant defense system by allicin.

42. **John A.O. Ojewole [2008]** investigated the anticonvulsant effect of the extract of plant stem bark of Rhus chirindensis against pentylenetetrazole (PTZ)-, picrotoxin (PCT)- and bicuculline(BCL)-induced seizures in mice. It produces its antiseizure effect by enhancing GABAergic neurotransmission and/or action in the brain.
43. **Hosseinzadeh H., Parvardeh S.[2004]** investigated the anticonvulsant effects of thymoquinone, the major constituent of *Nigella sativa* seeds against pentylenetetrazole (PTZ)- and maximal electroshock (MES)-induced seizure models. Thymoquinone may have anticonvulsant activity in the petit mal epilepsy probably through an opioid receptor-mediated increase in GABAergic tone.

44. **Goyal R.K.,Singh D. [2009]** investigated the anticonvulsant effect of *Ficus religiosa* in maximal electroshock, picrotoxin & pentylenetetrazole induced seizure in mice. In the results, they found that *Ficus religiosa* has significant antiepileptic activity.

45. **Stringer et al. [2006]** studied the anticonvulsant and neuroprotective effect of ginsenosides in rats. The individual ginsenosides significantly increased the latency to onset of seizures after administration of kainic acid.