



Anti epileptic activity of some medicinal plants

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Abstract: Epilepsy is a neuropsychological disorder, caused due to discharge of neurotransmitter. From time immemorial, plants have been used for their healing and therapeutic abilities, thus healing action. The aim of the present study was to highlight the anti epileptic activity of some medicinally important plants like *Withania somnifera* (amhar), *Ocimum sanctum*, *Brahmi grihta* (bacopa), *Catharanthus roseus*, *Caesalpinia crista*, *Citrus sinensis*, *Datura stramonium*, *Ricinus communis*, *Terminalia glaucescens*, *Tetrapleura tetraptera*, *Senna singuena*, *Jatropha gossypifolia*, *Mentha cardifolia*. The role of such plants, with specific properties of their parts has been demonstrated and proved in earlier studies. This paper reviews the potential of such plants that can be explored to ascertain anti epileptic activity.

Keywords: *Withania*; Anti Convulsant activity; *Caesalpinia*; Nootropic agent; Phytotherapy.

Introduction

Epilepsy is a disease that affects about 40 million people worldwide (Njamnshi et al. 2010). Epilepsy is a condition, which causes seizures to occur. It is one of the most common chronic diseases affecting human beings (Muralidharan et al. 2009). It is a neuropsychological disorder which occurs due to over discharge of neuro transmitter substance. In 1968, the prevalence of epilepsy in Africa was about 4.8 to 40 %, whereas in Senegal a prevalence of epilepsy increased to 21 % as reported by Diop and collaborators in 1996 (Diop et al. 1996). In 2006, Ngoungou and collaborators estimated the prevalence in sub-Saharan Africa to be two or three time highest than the rate in developed world (Ngounou et al. 2006). The exact number of people suffering from epilepsy in the South-East Asia Region (SEAR) Member Countries is not known. As per some studies in the region, it is known that the problem of epilepsy varies from 2–10 per 1000 population. In other words, for every 1000 persons there will be between 2 and 10 persons suffering from epilepsy. In India, the earliest population surveys were carried out by mental health professionals in 1964 in

Pondicherry. Neurologists began to study this problem in 1980. Studies from different parts of India reveal that the problem varies from 9/1000 in Bangalore, 5/1000 in Mumbai, 3/1000 near Calcutta to 4/1000 in New Delhi. In a survey in the Kandy district of Sri Lanka, it was observed that 9 out of 1000 people had epilepsy. Similarly, survey of nearly 3000 people in Thailand revealed that 50 had probable epilepsy. Though there are no national statistics in Bangladesh, it is estimated that there are at least 1.5–2.0 million people with epilepsy (WHO 2001a; WHO 2001b; WHO 2001c).

The risk of having epilepsy at some point in the average life span of any individual varies between 2% and 5%. In some countries particularly, phytotherapy in traditional medicine still plays an important role in the management of diseases, mainly among populations with very low income (Geoffrey and Kirby 1996). And phytotherapy relies on the use of a wide variety of plant species like *Bryophyllum pinnatum* (Lam) Oken (Crassulaceae), *Citrus sinensis* (Linn) Osbeck (Rutaceae), *Datura stramonium* Linn (Solanaceae), *Jatropha gossypifolia* Linn (Euphorbiaceae), *Mentha cordifolia*, *Ricinus*

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communis are few plants that are being used empirically in traditional medicine to treat epilepsy and diseases related to the brain like agitations, anxiety, convulsions, dizziness, headaches, insomnia, migraines, pains and schizophrenia according to our traditional Healers and the literature (Abbiw 1990; Arbonnier 2000; Biholong 1986; Iwu 1993; Malgras 1992; Mutasa et al. 1990; Nwaiwu and Akah 1986; Pousset 1989; Saulnier 1998)

Traditional medicinal practices have remained as a component of health care system of many societies in spite of the availability of well-established alternatives (Oyeka 1981; Ndoye 2005). But focus has shifted to the use of herbal remedies in the management of epileptic seizures, probably because these measures fit into the cultures of people and are not usually as expensive and do not possess many side effects, contraindications and possible interactions with drugs used simultaneously. The alternative drug therapy for the management of this disease can be by the use of medicinal plants and their active principles. In the present study some medicinal plants from India with a traditional claim of anti epileptic activity and neuro protective properties were reviewed. This study was undertaken to evaluate the anticonvulsant and sedative properties of few medicinal plants used in the treatment of insomnia and epilepsy in different parts of the world.

***Withania somnifera* (Amhar)**

It is used for coughs and asthma, as a narcotic with anti-epileptic activity in Ethiopia and other traditional uses for headache (as a dressing), paludism (malaria), ague, fever, stomachache and as a diuretic. The smoke of the burning root is commonly inhaled for 'Satan beshita' or 'devil disease' (Asres et al. 2001). *Withania* or *Gisewa* (Figure 1) is also found to have anti-fertility properties and to be traditionally used as a vaginal douche (aqueous extract) for its uterotonic and anti-implantation activity on butanol fraction extract (Desta 1994). Western herbalists are familiar with *Withania* (*Ashwaganda*), and it is used as tonic. In Western herbal medicine, decoction or extract made from the root is a popular remedy from the

ayurvedic tradition, as an 'adaptogen' remedy and for the treatment of debility and nervous exhaustion, for convalescence and as a general tonic (Mills and Bone 2000)



Figure 1: *Withania somnifera*

Ocimum sanctum

During the last two decades, *O. sanctum* L. has demonstrated various pre-clinical activities in animal models *in vitro* testing. Different extracts of stem, leaf and stem callus (induced on slightly modified Murashige and Skoog's medium and supplemented with 2,4-dichlorophenoxyacetic acid and kinetin) have been tested for anticonvulsant activity (Jaggi et al. 2003) using Phenytoin as standard. It has been observed that ethanol and chloroform extractives of stem, leaf and stem calli are effective in preventing tonic convulsions induced by transcorneal electroshock.

Ethanollic extract of leaves of *O. sanctum* L. (Figure 2) have been used as smooth muscle relaxants and reported to possess diuretic properties. They have been known to prolong the time of lost reflex in mice due to induced convulsions (Sakina et al. 1990). Nootropic agents are a new class of drugs used in situations where there is

organic disorder in learning abilities. Joshi and Parle (2006) assessed the potential of *O. sanctum* L. extract as a nootropic and anti-amnesic agent in mice. So *O. sanctum* L. preparation could be beneficial in the treatment of cognitive disorders such as dementia and Alzheimer's disease (Pattanayak et al. 2010)



Figure 2: *Ocimum sanctum*

***Brahmi grihta* (Bacopa)**

A polyherbal formulation. It exhibits reduced alertness, spontaneous locomotory activity. It protects mice from electroshock and convulsions (Achaliya et al. 2005). Regular intake of *Bacopa monniera* (Figure 3) tea improves learning ability and high reasoning capacity in both children and adult people. It is also used in treating insanity, loss of memory, epilepsy, and many other diseases of nervous system. Triterpenoid saponins and Bacosides of *B. monnieri* play an important role in enhancing nerve impulse transmission, while bacosides support the repair of damaged neurons by enhancing kinase activity, neuronal synthesis, restoration and regeneration of synaptic activity resulting in nerve impulse transmission. These effects make it a wonderful nerve tonic or nerve nourishing agent as against the neuroleptic drugs that modulate the behavior.

Despite its mention as anti-epilepsy role it was found to exert this effect only on very high doses over long periods. The dose near LD₅₀ showed effect against seizures. Research in India found hersaponin to exert some anticonvulsant effect. So it could better be used as an adjuvant in treatment of Epilepsy. Simultaneous

administration of this botanical with phenytoin improved acquisition and retention of memory.

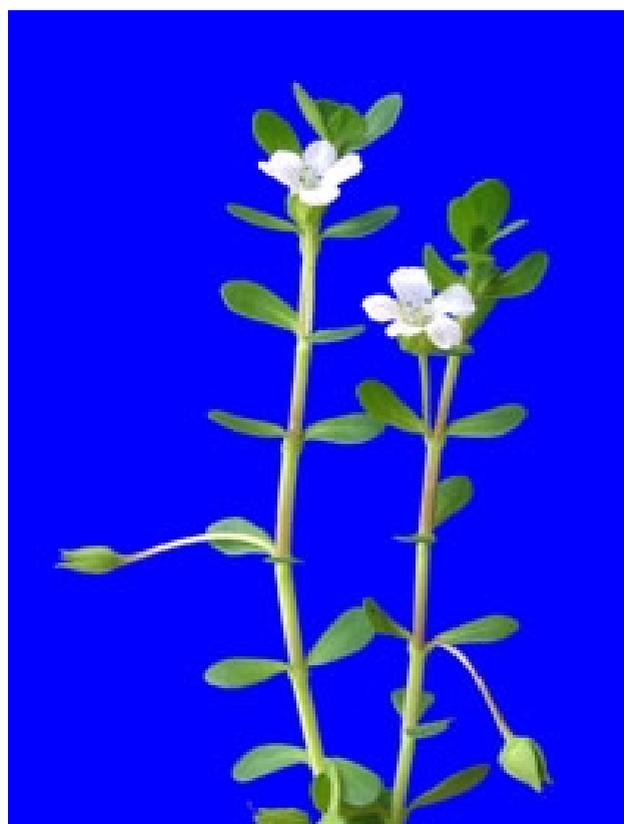


Figure 3: *Brahmi grihta* (*Bacopa*)

Catharanthus roseus

Decoction of young leaves used for stomach cramps. Root decoction for intestinal parasitism; as emmenagogue; may produce abortion. Infusion of leaves used for treating menorrhagia. Crude leaf extract has anticancer activity. In Madagascar, the bitter and astringent leaves used as vomitive; roots used as purgative, vermifuge, depurative, hemostatic and toothache remedy. In the Bahamas, flower decoction used for asthma.

Study of *C roseus*, *A indica* and *A sativum* showed significant antidiabetic activity for all three medicinal plants supporting its Ayurvedic use for diabetes. Leaf juice of *Catharanthus roseus* (Figure 4) has demonstrated dose-dependent lowering of blood glucose in both normal and diabetic rabbits comparable to the standard drug, glibenclamide. The mechanism of action was probably through enhanced secretion of insulin from the β -cells.

The anti-cancer drugs, vincristine and vinblastine, are derived from the alkaloids of periwinkle. The alkaloid has growth inhibition effects to some human tumors. Vinblastine is used experimentally for treatment of neoplasms and is recommended for Hodgkin's disease and choriocarcinoma. Vincristine, another alkaloid, is used for leukemia in children. Vinblastin is sold as Velban; vincristine, as Oncovin (Srinivas Nammi et al. 2003, Mostofa 2007).



Figure 4: *Catharanthus roseus*

Caesalpinia crista

It is used in vast range of diseases. It is the best panacea for abdominal pain due to flatulence, as it effectively alleviates the vata dosha. The powder of its roasted seeds with ghee mitigates the condition and relieves the pain. During postpartum period, the abdominal pain is eliminated with the roasted seed powder, asafoetida, ghee and little amount of salt. The seeds powder, given with milk, controls the diarrhea. The skin of the seed being astringent is beneficial as a medicament for diarrhea, dysentery and colitis. In worm infestations, the juice of its leaves or powder of its roasted seeds is given along with palasa, amra and haridra.

Dried seed kernels of *Caesalpinia crista* extract have a potential as a learning and memory enhancer (Nadkarni and Nadkarni 1976). Reports suggest *C. crista* can be beneficial in improving cognition in disorders like demential and other neurodegenerative disorders (Kshirsagar 2011.). According to Ayurveda, the heartwood is bitter, astringent, sweet, constipating, sedative, hemostatic. It is useful in conditions of burning sensation, wounds, ulcers, lep-

rosy, skin diseases, diarrhea, dysentery, epilepsy, convulsions, menorrhagia, leucorrhoea, diabetes and haemorrhages (Kirtikar. and Basu 1989; Warriars et al. 1993; CSIR 1992).



Figure 5: *Caesalpinia crista*

Table 1: Some other medicinal plants being used successfully as remedy against Epilepsy are described below (Adeyemi et al. 2010; Adjanohoun et al. 1984; Adjanohoun et al. 1996; Adzu et al. 2003; Agassounon et al. 2008; Anete et al. 1998; Anuradhal et al. 2008; Arbonnier 2000)

S.No.	Name of plant	Part of plant	Diseases
1	<i>Citrus sinensis</i>	Leaves, flowers, barks, roots	Epilepsy, Insomnia, Malaria, Schizophrenia, headache, anxiety
2	<i>Datura stramonium</i>	Fruits, leaves	Epilepsy, cough, asthma
3	<i>Ricinus communis</i>	Leaves, flowers	Epilepsy, convulsions, diarrhea, asthma
4	<i>Terminalia glaucescens</i>	Leaves, barks, roots	Malaria, stomach aches, hepatitis, leucorrhoea, epilepsy
5	<i>Tetrapleura tetraptera</i>	Barks, fruits, roots	Epilepsy, fever, convulsions, malaria
6	<i>Senna singuena</i>	Leaves, flowers, barks, roots	Fever, conjunctivitis, convulsions, epilepsy, syphilis, constipation
7	<i>Jatropha gossypifolia</i>	Leaves, roots	Convulsions, hypertension, fever
8	<i>Mentha cardifolia</i>	Leaves	Insomnia, muscle relaxant

Conclusions

The present study revealed anti convulsant potential of some medicinal plants. These remedies can make anti convulsant treatment more rationale and patient friendly. In conclusion, the medicinally important plant species, listed in the present paper appear to be promissory sources of anticonvulsant agents. The future outlook for the development of new antiepileptic drugs derived from these medicinal plants is therefore positive.

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