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International Journal of Current Research
Vol. 4, Issue, 12, pp. 370-371, December, 2012

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

EFFECT OF HERBAL AYURVEDIC MEDICINAL PLANTS (*BACOPA MONNIERI*, *EVOLVULUS ALSINOIDES* AND *TINOSPORA CORDIFOLIA*) ON LEARNING AND MEMORY- A REVIEW

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ARTICLE INFO

Article History:
Received 09th September, 2012
Received in revised form
12th October, 2012
Accepted 25th November, 2012
Published online 28th December, 2012

Key words:
Herbal ayurvedic medicinal plants,
Learning and Memory,
Nootropic, Dementia.

ABSTRACT

Dementia is a syndrome usually occurs Alzheimer's disease (AD) and related due to disease in brain. Alzheimer's disease is a progressive neurodegenerative disorder associated with impairment of thinking, learning, orientation, judgment and memory function. The various Nootropic drugs and herbal ayurvedic plants prescribed to enhance learning and memory function in dementia. The present study is therefore focused on discussing herbal ayurvedic medicinal plants (*Bacopa monnieri*, *Evolvulus alsinoides* and *Tinospora cordifolia*) for enhance learning and memory.

INTRODUCTION

Learning is defined as the acquisition of information and skills or in other words it is the process by which new information is acquired and subsequent retention of the information is called memory, which is the process by which acquired knowledge is retained. Learning and memory can be conceived as both a psychological process, as well as change in synaptic neural connectivity. Learning and memory are the basic constituents of cognitive behavior[1]. But Dementia is a mental disorder characterized by loss of intellectual ability (judgment or abstract thinking) which invariably involves impairment of memory. The most common cause of dementia is Alzheimer's disease (AD) which is a progressive neurodegenerative disorder associated with loss of neurons in distinct brain areas and cord[2]. Poor memory, lower retention and slow recall are common problems in today's stressful and competitive world. Age, stress and emotions are conditions that may lead to memory loss, amnesia, dementia, to more ominous threat like schizophrenia and Alzheimer's disease[3]. Memory enhancers and cognitive enhancers are drugs to improve mental functions such as cognition, memory, intelligence, motivation, attention and concentration. Nootropics are thought to work by altering the availability of the brain's supply of neurochemicals (neurotransmitters, enzymes and hormones) by improving the brain's oxygen supply[4]. Nootropics are referred to as smart drugs, memory enhancers and cognitive enhancers[5] and a nootropic is a neuroprotective or extremely nontoxic[6]. But the present study is therefore focused on discussing the various study of herbal ayurvedic medicinal plants (*Bacopa monnieri*, *Evolvulus alsinoides* and *Tinospora cordifolia*) related for enhancement Learning and memory.

Bacopa monnieri (Scrophulariaceae)

Bacopa monnieri L. (syn.: *B. monniera)* (Scrophulariaceae) occupies a predominant position in ayurvedic medicine and is recommended for the management of poor cognition and a lack of concentration[7], as a nerve tonic for memory and intelligence improvement[8] for an intellect promoting effect and helpful in cases of general debility[9]. *Bacopa monniera* Linn. (Brahmi) has been used since times immemorial as nerve tonic for Improvement of memory. The chemical constituent responsible for the effect of brahmion learning schedules was identified as a mixture of two saponins designated as bacosides A and B. They also enhanced protein kinase activity and produced an Increase in protein in hippocampus. Bacosides were also found to be safe in regulatory pharmacological and toxicological studies[10]. The effects of *Bacopa monnieri* (40mg/kg) on learning performance in rats were studied in shock-motivated brightness discrimination reaction and in conditioned fight reaction. In both schedules the treated groups showed a shorter reaction time than the control group. In addition, the rats improved learning capability confirmed by a maze-learning experimental method. Major chemical constituents found in *Bacopa monnieri* are saponins, triterpenes and dammaranes, such as bacosides A, B, C, bacosaponines D, E and F[11]. Dry extract of whole plant of *Bacopa monnieri* suggested potential for safely enhancing cognitive performance in the elderly patients[12].

Evolvulus alsinoides L. (Convolvulaceae)

Evolvulus alsinoides L. (Convolvulaceae) is used as nootropic or brain tonic in traditional systems of medicines. *Evolvulus*

alsinoides L. potential memory enhancing agent used in treating dementia[13]. *Evolvulus alsinoides* L. contains alkaloids betaine, sankhapushpine and evolvine, scopoletis, scopolin, umbelliferone, 6-methory-7-0-ß-glucophyranoside coumarin queretine-3-o-ß-glucophyrenoside are reported[14].

Evolvulus alsinoides (EA), considered as Shankhpushpi on learning and memory in rodents. Nootropic activity using Cook and Weidley's pole climbing apparatus, passive avoidance paradigms and active avoidance tests were used to test learning and memory. The ethanol extract of EA and its ethyl acetate and aqueous fractions were evaluated for their memory enhancing properties[15].

Tinospora cordifolia (Menispermaceae)

Tinospora cordifolia (GULVEL) (Menispermaceae) possesses memory enhancing property on learning and memory in normal and memory deficits animals. *Tinospora cordifolia* mechanism of cognitive enhancement by immunostimulation and increasing the synthesis of acetylcholine, this supplementation of choline enhances the cognitive function[16]. *Tinospora cordifolia* is known as a *Medhya rasayana* (learning and memory enhancer) in Ayurveda. It is also significant response has been found in children with moderate degree of behavior disorders and mental deficit, along with improvement in IQ levels[17]. The pure aqueous extract of the root of *Tinospora cordifolia* was found to enhance verbal learning and logical memory[18]**.** *Tinospora cordifolia* an Indian medicinal plant is known to be beneficial for improves intelligence, power of retention and memory[19]**.**

Conclusion

These herbal ayurvedic medicinal plants showing the nootropic activity were collected from the various journals and were reported above as we can say these plants (*Bacopa monnieri*, *Evolvulus alsinoides* and *Tinospora cordifolia*) are responsible for enhance learning and memory function properly under several researcher studied.

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