



Effect of traditional medicine brahmi vati and bacoside A-rich fraction of *Bacopa monnieri* on acute pentylenetetrazole-induced seizures, amphetamine-induced model of schizophrenia, and scopolamine-induced memory loss in laboratory animals

Amrita Mishra ^{a,*}, Arun K. Mishra ^a, Shivesh Jha ^b

^a School of Pharmaceutical Sciences, IFTM University, Moradabad 244102, India

^b Department of Pharmaceutical Sciences, Birla Institute of Technology, Mesra, Ranchi 835215, India

ARTICLE INFO

Article history:

Received 29 December 2017

Accepted 30 December 2017

Available online xxx

Keywords:

Brahmi vati
Schizophrenia
Polyherbo-mineral
Ayurvedic
Acetylcholinesterase

ABSTRACT

Objective: Brahmi vati (BV) is an Ayurvedic polyherbal formulation used since ancient times and has been prescribed in seizures associated with schizophrenia and related memory loss by Ayurvedic practitioners in India. The aim of the study was to investigate these claims by evaluation of anticonvulsant, antischizophrenic, and memory-enhancing activities. Antioxidant condition of brain was determined by malondialdehyde (MDA) and reduced glutathione (GSH) levels estimations. Acetylcholinesterase (AChE) was quantitatively estimated in the brain tissue.

Methods: Brahmi vati was prepared in-house by strictly following the traditional Ayurvedic formula. Bacoside A rich fraction (BA) of *Bacopa monnieri* was prepared by extraction and fractionation. It was then standardized by High Performance Liquid Chromatography (HPLC) and given in the dose of 32.5 mg/kg body weight to the different groups of animals for 7 days. On the seventh day, activities were performed adopting standard procedures. **Key findings:** Brahmi vati showed significant anticonvulsant, memory-enhancing and antischizophrenic activities, when compared with the control groups and BA. It cause significantly higher brain glutathione levels. Acetylcholinesterase activity was found to be significantly low in BV-treated group.

Conclusion: The finding of the present study suggests that BV may be used to treat seizures associated with schizophrenia and related memory loss.

© 2018 Elsevier Inc. All rights reserved.

1. Introduction

Epilepsy is the second most common neurological disorder in India. Seizures affect around 7 million people in India, and 50 million worldwide. Approximately 40% of them are women. The prevalence of seizures is 0.7% in India, which is comparable with the USA and other developing nations [1]. Epilepsy is a chronic disease, with high rates of functional incapacitation and impairment. The anxiety, psychosis, and aggressive behaviors are frequently diagnosed in patients with epilepsy, and their clinical presentations can vary according to onset of time with convulsions [2]. Nearly 30 to 50% of the epileptic population has some type of psychiatric comorbidity, and patients with seizures develop psychosis or schizophrenia at a rate exceeding that expected if the two disorders are independent. Similarly, patients with schizophrenia

are more prone to seizures than the general population [3]. Memory impairment is a common consequence of seizures. The most common form of seizure-related memory problems are with immediate, recent (short-term), and prospective memory. Seizures are also related to the oxidative stress in brain, which is regarded as a possible mechanism involved in epileptogenesis [4]. There is evidence that neuronal hyperexcitability and oxidative injury produced by an excessive production of free radicals may play a role in the initiation and progression of seizures [5].

Conventional treatment of epilepsy consists primarily of anticonvulsant medications. Although these drugs often control or reduce the frequency of seizures, some patients show little or no improvement. These medications only control the seizures but do not cure other symptoms like memory loss. In complicated cases where epileptic seizures are associated with schizophrenia and memory loss, the medication become complex, and patients have to take many medicines together. These medications cause side effects, dizziness, and toxicity. The use of traditional medication has increased dramatically in recent times. A significant numbers of these medicines are used for treating patients with neurological and psychiatric disorders [6].

* Corresponding author at: School of Pharmaceutical Sciences, IFTM University, Lodipur-Rajput, Moradabad 244102, India.

E-mail address: amrita_azam@rediffmail.com (A. Mishra).

A number of medicinal plants have been reported to have significant anticonvulsant, memory-enhancing, and antischizophrenia activities. However, most of the studies carried out on these plants are on extracts or chemical fractions. In Ayurvedic therapeutics, the plants are normally processed in combination with other plants or with mineral- or animal-derived substances. Thus, majority of the pharmacological studies are not in conformity with indications mentioned in Ayurvedic classics. Keeping this fact into consideration, the present study was designed to evaluate anticonvulsant, memory-enhancing, and antischizophrenia activities of BV, which is a traditional Ayurvedic formulation used for centuries with claimed efficacy in treatment of convulsions, mental disorders, heart weakness, and fever. It contains abhraka bhasma (mica), sangeyasaba bhasma (jadite), akik bhasma (agate), manikya bhasma (ruby), candrodaya (sulfur and mercury), pravala bhasma (red coral), kaharuba pisti (amber), svarna bhasma (gold foil), mukta bhasma (pearl), brahmi (*Bacopa monnieri*), nisotha (*Operculina turpethum*), aguru (*Aquilaria agallocha*), kumkuma (*Crocus sativus*) as its main ingredients and twenty-four other plant drugs [7]. The results of the study were compared with the group receiving dried bacoside A rich fraction of *Bacopa monnieri* (BM).

2. Materials and methods

2.1. Experimental animals

Swiss albino mice ($n = 6$) were used for antiseizure and memory-enhancing activity. Wistar rats ($n = 6$) were used in amphetamine induced model of schizophrenia. The animals were kept in well ventilated

area for the period of experiment until 1 month. All the animals were housed in groups in polypropylene cages and placed in a climate-controlled central animal house having temperature 27 ± 2 °C, relative humidity $65 \pm 2\%$. Standard laboratory diet and drinking water was served during the study. The animals were kept in animal house as per requirement of CPCSEA (Committee for the purpose of control and supervision on experiments on animals) and approved by IAEC (Institutional Animal Ethical Committee).

2.2. Materials

Diazepam, pentyleneterazol (PTZ), ketamine, amphetamine, scopolamine, thiobarbituric acid, 5,5'-ditiobis-(2-nitrobenzoic acid), reduced glutathione, tetraisopropyl pyrophosphoramidate, and piracetam were purchased from Sigma–Aldrich, USA. Brahmi vati was prepared in laboratory, adopting standard procedure under controlled conditions. The ingredients of brahmi vati are mentioned in Table 1.

Bacopa monnieri plant were collected from herbal garden of Jamia Hamdard University, Delhi, authenticated, dried under shade, powdered and stored in poly bags for further use.

2.3. Methods

2.3.1. Preparation of in-house brahmi vati

All plant drugs were powdered separately and stored in sterile poly bags. Powdered candrodaya, kumkuma, kasturi, and ambara were mixed together. To this mixture, one by one *bhasma* and *pisti* were added and mixed properly. After this, powdered plant material were

Table 1
Ingredients of brahmi vati [7].

S. No.	Local name	Botanical name/source	Part used	Qty	Ref.
1	Abhraka bhasma	Calcined biotite mica	–	6 g	[8]
2	Aguru	<i>Aquilaria agallocha</i> Roxb.	Heart wood	18 g	[9]
3	Akarkara	<i>Anacyclus pyrethrum</i> DC.	Root	4 g	[10]
4	Akik bhasma	Calcined agate	–	6 g	[8]
5	Amber	Ambergris	Substance produced from digestive system of sperm whales	18 g	[11]
6	Anisuna	<i>Pimpinella anisum</i> Linn.	Fruit	4 g	[12]
7	Ashwagandha	<i>Withania somnifera</i> Dunal.	Root	4 g	[13]
8	Brahmi	<i>Bacopa monnieri</i> Linn.	Aerial part	18 g	[10]
9	Brahmi svarasa	<i>Bacopa monnieri</i> Linn.	Aerial part	Q.S.	
10	Candrodaya	Calcined sulphur and mercury	–	6 g	[14]
11	Chitraka	<i>Plumbago zeylanica</i> Linn.	Root	4 g	[13]
12	Dhanyaka	<i>Coriandrum sativum</i> Linn.	Fruit	4 g	[13]
13	Ela	<i>Elettaria cardamomum</i> Linn.	Seed	4 g	[13]
14	Jatipatri	<i>Myristica fragrans</i> Houtt.	Arl./mace	4 g	[15]
15	Jayaphala (Jatiphala)	<i>Myristica fragrans</i> Houtt.	Seed	4 g	[13]
16	Kaharuba pisti	Processed amber	–	6 g	[11]
17	Kasturi/Lata kasturi	<i>Hibiscus abelmoschus</i> Linn.	Seed	18 g	[14]
18	Krsnajiraka	<i>Carum carvi</i> Linn.	Fruit	4 g	[13]
19	Kulinjana	<i>Alpinia galanga</i> Willd.	Rhizome	4 g	[12]
20	Kumkuma	<i>Crocus sativus</i> Linn.	Stigma	18 g	[9]
21	Kustha	<i>Saussurea lappa</i> C.B. Clarke	Root	4 g	[13]
22	Lavanga	<i>Eugenia caryophyllata</i> Thunb.	Flower bud	4 g	[13]
23	Manikya pisti	Processed ruby	–	6 g	[14]
24	Mukta bhasma	Calcined pearl	–	6 g	[14]
25	Nagakesara	<i>Mesua ferrea</i> Linn.	Androcium	4 g	[10]
26	Nisotha	<i>Operculina turpethum</i> Linn.	Root	18 g	[16]
27	Patra	<i>Cinnamomum tamala</i> Buch. Ham.	Leaf	4 g	[13]
28	Pippali	<i>Piper longum</i> Linn.	Fruit	4 g	[9]
29	Pippalimula	<i>Piper longum</i> Linn.	Root	4 g	[10]
30	Pravala bhasma	Calcined Red Coral	–	6 g	[14]
31	Rumimastagi	<i>Pistacia lentiscus</i> Linn.	Exudates	4 g	[12]
32	Sangeyasaba pisti	Processed jadite	–	6 g	[11]
33	Sankhapuspi	<i>Convolvulus pluricaulis</i> Choisy	Plant	4 g	[10]
34	Surpha	<i>Foeniculum vulgare</i> Mill	Fruit	4 g	[13]
35	Svarna bhasma	Calcined gold foil	–	6 g	[8]
36	Sveta Chandana	<i>Santalum album</i> Linn.	Heart wood	4 g	[16]
37	Tvak	<i>Cinnamomum zeylanicum</i> Blume.	Stem bark	4 g	[13]
38	Vansalochana	<i>Bambusa arundinacea</i> Retz. Willd	Silicious concretion	4 g	[17]

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات