

Research Article

Saraswati Panchak – A Novel Herbal Combination for Mental Health

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Abstract. Herbal medicines have a history of long therapeutic use and are still serving a lot of the health needs of a big population of the world. However, the quality control still remains a challenge because of the variation of chemical constituents involved. There are numerous compounds in herbal drugs that are in complex matrices in which no single active constituent is responsible for the overall efficacy. This creates a challenge in establishing quality control standards and standardization of finished herbal drugs. Saraswati Panchak is a novel combination given by Pandit Shri Ram Sharma Acharya for mental health. In this study, components of this novel herbal combination were explained for its potential utility in mental illness. In addition, the study also detailed how Saraswati Panchak Churna was converted into tablet form to increase the shelf life, make it easy to dispense, for dose fixation, etc. The tablet was subjected to organoleptic analysis and physico-chemical analysis to establish its efficacy. After performing complete analysis it was found that all the parameters are within the range. The coarse powder of these herbs may be used as havan samagri in brain related disorders because of the presence of nootropic herbs.

Keywords. *Saraswati Panchak*, quality control, tablet, Yagya therapy

Introduction

According to World Health Organization mental health is a “state of well-being whereby individuals recognize their abilities, are able to cope with the normal stresses of life, work productively and fruitfully, and make a contribution to their communities.” Although mental disorders reflect psychiatric disturbance, people may be affected by mental health problems (1). Mental illness accounts for about one-third of the world’s disability caused by all adult health problems, resulting in enormous personal suffering and socioeconomic costs (2). Severe mental health problems including major depressive disorder, bipolar disorder, schizophrenia and substance use disorders affect all age groups and occur in all countries. Mental illness is closely associated with poverty, wars, and other humanitarian disasters, and in some cases, leads to suicide, one of the most common causes of preventable death among adolescents and young adults (3).

A visionary seer sage Pt. Shri Ram Sharma Acharya long back ago realized the need of hour and given a ayurvedic combination named “Saraswati Panchak” to combat with above mentioned problems as the role of herbal medicine in the treatment of various psychological disorders has become well established over the past decade with phytotherapeutic preparations such as St John’s wort and kava possessing respectable clinical evidence (4).

Saraswati Panchak comprises of two words, ‘Saraswati’ and ‘Panchak’. The word Saraswati is the name of a goddess, and also symbolizes ‘intellect’. Panchak denotes a drug comprises of five elements. Saraswati Panchak is a novel herbal combination containing combination of drugs which are known for potential multiple

benefits including mental illness and in psychological disorders. It contains five herbs—Brahmi, Shankhpushpi, Vach, Gorakmundi and Satavari. The combination gives the properties such as ‘brain’ tonic, memory enhancer and general health tonic. Brahmi, Vacha, and Shankhpushpi are known Medhya Rasayana or nootropic herbs.

Nootropics are known as memory enhancers, brain tonics and cognitive enhancers. A cognitive enhancer is a substance that enhances memory and concentration. Nootropics are thought to work by altering the availability of the supply of neurochemicals (neurotransmitters, hormones and enzymes) in brain, by stimulating nerve growth or by improving the brain's oxygen supply. Memory herbs are responsible to increase the level of neurotransmitters, particularly acetylcholine and improve blood flow to the brain, by increasing its oxygen and nutrient supply, which will aid memory and brain function (5).

This study presented the overview of the novel combination, its ayurvedic and modern mechanistic inside based on the literature, and its applications in the form of tablet and as a Hawan Samagri (for Yagya Therapy) as well as standardization of preparation of Saraswati Panchak Vati (tablet) in the herbal pharmacy.

Herbs used in Saraswati Panchak

Brahmi (Bacopamonnieri)

B. monnieri is a creeping perennial with small oblong leaves and purple flowers, found in warm wetlands, and native to Australia and India. It is commonly found as a weed in rice fields, the plant grows throughout East Asia and the United States (6). The whole plant is used medicinally. *B. monnieri* was initially described

around the 6th century A.D. in texts such as the Charaka Samhita, Atharvaved, and Susruta Samhita as a medhya rasayana—class herb taken to sharpen intellect and attenuate mental deficits. The herb was allegedly used by ancient Vedic scholars to memorize lengthy sacred hymns and scriptures (7).

Brahmi contains alkaloid nicotine, herpestine, brahmine, bacosides A and B, saponins A, B and C, triterpenoidsaponins, β -sitosterol, stigmastanol, betulinic acid, D-mannitol, stigmasterol, α -alanine, glutamic acid, aspartic acid, and serine (8).

It is used traditionally to treat various nervous disorders, digestive aid, improve learning, concentration and memory to provide relief to patients with anxiety, and skin diseases; specific uses include the treatment of insanity, asthma and epilepsy (9–11).

The Bacopa herb, also called nootropic herb, helps in the repair of damaged neurons, neuronal synthesis, the restoration of synaptic activity, and improves brain function. Numerous studies suggested that *B. monnieri's* bioactive components (ie, bacosides) protect the brain against oxidative damage and age-related cognitive deterioration with several mechanisms of action (12-13), the bioactive constituent, bacoside A was present in the *B. monnieri* extract (BME)-treated rat serum and could directly or indirectly interact with the neurotransmitter systems to improve memory and learning ability (14). A clinical study also suggested that the oral treatment with *B. monnieri* was able to enhance memory in both adults and children (15).

Shankhpushpi (Convolvulus pluricaulis)

C. pluricaulis is a perennial herb that seems like morning glory. Its branches are spread on the ground and may be more than 30 cm long. The flowers are blue in color and the leaves, which are elliptical in shape, are located at alternate positions with flowers or branches. Known as Aloe weed in English, the herb is commonly found in India, especially in the state of Bihar (16).

C. pluricaulis contains D-glucose, maltose, rhamnose, sucrose, shankhpushpine, convolamine, convoline, convolidine, convolvine, confoline, convosine, volatile oils, fatty acids, fatty alcohols, hydrocarbons, myristic acids, palmitic acids and linoleic acids, Scopoletin, β -sitosterol, ceryl alcohols, 20-oxodotriacontanol, tetratriacontanoic acids, flavonoid-kampferol, steroids-phytosterols (17).

Shankhpushpi is a reputed drug of Ayurveda and reported as a brain tonic, nervine tonic, alternative and laxative (18-19). This plant is reported to be a prominent memory improving drug, a psycho-stimulant and tranquilize, and reduce mental tension. There are many references in Ayurvedic texts about the use of this drug as brain tonic in hypotensive syndromes (20).

Two important forms of synaptic plasticity known to be involved in the processes of memory formation are long-term depression (LTD) and long-term potentiation (LTP). In a study, the effect of *C. pluricaulis* plant extract on LTP and LTD were evaluated and found that prolonged treatment of *C. pluricaulis* extract, at a specific dose in healthy animals, can augment memory functions by modulating hippocampal plasticity (21).

Vach (Acoruscalamus)

A. calamus (L.) (Sweet flag), a member of the family Acoraceae, generally used alone or in combination with other herbs in Indian and Chinese traditional medicine has generated great interest and is found to be beneficial (22). The plant is widely cultivated in different parts of sub-temperate and temperate regions of the world and is native to India, Japan, Sri Lanka, China, Mongolia, Burma, Europe, Southern Russia and Northern USA (23).

The oil contains varying concentrations of α -asarone, β -asarone, γ -asarone, calamenolcalamene, calameone, camphene, α -pinene, β -pinene, p-cymene, eugenyl acetate, eugenol, isoeugenol, methyl isoeugenol, azulene, calamol, eugenol methyl ether, dipentene, methyl eugenol, asaronaldehyde, terpinolene, camphor, 1,8-cineole, α -caryophyllene and hydrocarbons (24-26). The oil also contains fatty acids such as palmitic acid and its ester, heptylic acid, an ester of butyric acid (27).

The traditional use of *A. calamus* in Indian Ayurvedic system is widely accepted. The plant has been used to cure many diseases like cough, fever, asthma, hysteria, epilepsy, depression, insomnia, mental retardation, skin diseases, haemorrhoids, dysentery, diarrhea, kidney and liver problems, bronchitis and as a sedative (28).

Methanol extracts of *A. calamus* showed significant acetylcholine esterase enzyme inhibition at a concentration 200 mg/mL (25). Houghton and coworkers reported the in-vitro acetylcholinesterase inhibitory effect of β -asarone and α -asarone. The AChE-inhibitory activity of the oil may be ascribed to β -asarone. Because memory and cognitive performance are

related to acetylcholine levels, the AChE-inhibitory effect of this plant may account for its traditional use (29).

Gorakhmundi (Sphaeranthusindicus)

S. indicus is a multi-branched herb having round purple flowers which grows plentifully in rice fields and is distributed throughout India, Malay, Ceylon, China and Africa. It is distributed throughout India, Sri Lanka, Africa and Australia from sea level to 1200 m altitude (30).

Large numbers of phytochemicals were isolated from whole plant, leaves and flowers of *S. indicus*. Aerial parts of this plant showed presence of an essential oil, glycosides, and eudesmanoids, alkaloids sphaeranthine and an isoflavone 5,4'-dimethoxy-3'-prenylbiochanin 7-o- β -galactoside with some interesting sesquiterpene, n-pentacosan, hentriacontane, n-triacontanol, β -sitosterol, stigmasterol, β -D-glucoside of β -sitosterol, sphaeranthine and a phenolic glycoside. The essential oil, obtained by steam distillation of the whole herb, contains ocimene, α -terpinene, methyl-chavicol, α -citral, geraniol, α -ionone, β -ionone, d-cadinene, p-methoxy-cinnamaldehyde (31). All the parts of the *S. indicus* have medicinal uses.

In Ayurvedic system of medicine, the entire plant is used in tuberculous glands, insanity, indigestion, bronchitis, elephantiasis, anaemia, pain in the vagina and uterus, piles, biliousness, epileptic convulsions, leukoderma, dysentery, vomiting, urinary discharges, looseness of the breasts, hemicranias (32).

S. indicus flower derived constituents exhibit synergistic effect against acetylcholinesterase and possess potential anti-amnestic activity (33).

Satavari (Asparagus racemosus)

A. racemosus grows throughout the subtropical and tropical parts of India up to an altitude of 1500 m. The plant is a spinous under-shrub, with, short rootstock bearing numerous succulent tuberous roots which are ash colored or silvery white externally and white internally. These roots are use in various medicinal preparations. The stem is climbing, woody, whitish grey or brown colored with small spines. The plant flowers during February–March leaving a mild fragrance in its surrounding and by the end of April, fruits can be seen with attractive red berries (34).

The powdered roots contain protein, saponins, carbohydrate and oil. The major active chemical constituents of *Asparagus* are a group of steroidal saponins. The plant also contains vitamins A, B1, B2, C, E, P, Mg, Ca, Fe, and folic acid. Other primary chemical constituents of *Asparagus* are essential oils, asparagine, arginine, tyrosine, flavonoids (kaempferol, quercetin, and rutin), resin, and tannin (35).

A. racemosus is a well-known Ayurvedic rasayana which prevents ageing, increase

longevity, impart immunity, improve mental function, vigor and addvitality to the body and it is also used in nervous disorders, dyspepsia, tumors, inflammation, neuropathy and hepatopathy (36).

Methanolic extract of *A. racemosus* showed significant antidepressant-like activity almost certainly by inhibiting Monoamine oxidase (MAO-A and MAO-B) activity; and through interaction with adrenergic, dopaminergic, serotonergic and GABAergic systems (37).

Quality control parameters of Saraswati Panchakvati (tablet)*Procurement of plant material*

The crude drugs for the preparation of SP were taken from the pharmacy of Shantikunj, Haridwar after proper authentication. Then, the physical impurities were removed and the drugs were washed with water and sun dried below 45°C. Dried drugs were stored in tightly closed containers. The crude drugs used in Saraswati Panchak with their botanical identities and parts used are given in Table 1.

Drug Name	Botanical Name	Family	Part Used
Brahmi	Bacopa Monnieri	Plantaginaceae	Whole Plant
Shankhpushpi	Convolvulus Pluricaulis	Convolvulaceae	Whole Plant
Vach	Acorus calamus	Acoraceae	Root
Gorakhmundi	Sphaeranthus Indicus	Asteraceae	Whole Plant
Shatawar	Asparagus Racemosus	Asparagaceae	Root

Table 1. Components of 'Saraswati Panchak' combination

Sr. No.	Test Parameters	Batch No.1	Batch No.2	Batch No.3	Batch No.4	Batch No.5	Batch No.6	Batch No.7	Batch No.8	Limits
1	Description	Brown colored, uncoated biconvex tablets with specific odour and bitter in taste								
2	Weight variation (Table 3)	Within Limits	Within Limits	Within Limits	Within Limits	Within Limits	Within Limits	Within Limits	Within Limits	±5%
3	Hardness of tablet	3.14	3.5	3.9	3.8	3.6	3.1	3.5	3.63	3-6 kg
4	Tablet disintegration time	15 min	12.9 min	15.7 min	14.2 min	15.5 min	13.8 min	13.3 min	14 6 min	NMT 15 min.
5	Friability Test	0.8	0.91	0.95	0.89	0.87	0.92	0.9	0.93	NMT 1%
6	pH of 1% aqueous solution	7.02	7.08	7.06	7	7.06	7.03	7.05	7.06	NA
7	Loss on drying at 105°C (%w/w)	6.36	6.32	6.52	6.45	6.08	5.31	3.16	1.83	NA
8	Total Ash (%w/w)	10.89	11.75	10.52	11.38	12.48	18.38	12.74	12.92	NA
9	Acid Insoluble Ash (%w/w)	2.4	2.4	2.39	2.34	2.44	3.61	0.92	2.12	NA
10	Alcohol Soluble Extrative (%w/w)	3.29	3.26	3.26	3.21	3.28	13.11	19.25	18.31	NA
11	Water Soluble Extrative (%w/w)	38.86	31.78	40.58	37.76	39.58	43.47	39.12	43.06	NA
Test For Heavy Metals: By AAS (all units in ppm)										
12	Lead as Pb	6.8	ND*	ND*	ND*	5.2	0.76	ND*	ND*	NMT 10
	Mercury as Hg	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	NMT 01
	Arsenic as As	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	NMT 03
	Cadmium as Cd	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	NMT 0.3
Test for Aflatoxins: By LCMSMS (all units in ppm)										
13	B1	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	NMT 0.5
	G1	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	NMT 0.5
	B1	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	NMT 0.1
	G2	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	NMT 0.1
14	Parameter tested for Pesticide Residue									
14.1	Azinophos-methyl	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	0.04
14.2	Diazinon	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	0.04
14.3	Dichlorvos	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	0.04
14.4	Malathion	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	0.04
14.5	Methidathion	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	0.04
14.6	Parathion	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	0.04
14.7	Parathion Methyl	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	0.04
15	BIOLOGICAL TESTING AYUSH PRODUCT									
Test For Microbiology (Total count unit in (cfu/gm))										
15.1	Bacteria	3200	33000	500	1570	680	54000	24x10 ³	500	1X10 ⁵
	Yeast &Mould	620	620	29	220	<10	200	2x10 ²	100	1X10 ³
Any Specific Pathogens (unit in (cfu/gm))										
15.2	E.coli/gm	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	NA
	Salmonella/gm	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	
	S. aureus/gm	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	
	P. aeruginosa/gm	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	

Table 2. Analysis of Saraswati Panchak Tablet (Vati). NA= Not Available as it is a new combination; ND=Not Detected; NMT=Not More Than; Ab=Absent



Batch No	1	2	3	4	5	6	7	8
Sample (readings)	9	8	12	17	8	10	12	12
Mean (20 tablets weight in grams)	13.02	13.05	13.01	13.13	13.01	13.06	13.07	13.18
Standard Deviation	0.02	0.05	0.05	0.21	0.05	0.05	0.07	0.30
% variation	0.14	0.41	0.08	0.99	0.10	0.45	0.51	1.37

Table 3. Weight Variation Test of Saraswati Panchakvati

Preparation of Saraswati Panchak tablet

All the authenticated crude drugs were crushed to a coarse powder separately and after that mixed thoroughly with eight parts of water in a stainless steel container. Then continuous mild heat was applied until it was reduced to one-fourth of its initial quantity. During heating, continuous stirring was done to avoid any deterioration due to burning of materials. After a desirable reduction in volume was achieved, the decoction was filtered through single folded cotton cloth and collected in a separate vessel. Then, the decoction was boiled again with addition of 10% acacia gum over slow fire on a gas stove, maintaining the temperature between 90°C and 95°C till a semisolid consistency is obtained. As the water evaporates the viscosity of the extract increases resulting in 'Ghana' form (38). Then, the Ghana was mixed with the Churna of Saraswati Panchak (up to 10% of extract) further forming a solid mass. Now, the dissolved starch is mixed with the complete mixture. The solid mass (Ghana) was forced through a no. 16 sieve and granules were prepared and then dried at 50°C in a hot air oven for 16 hours. The dried granules were passed again through a no. 20 sieve. The combination was then compressed in a single-punch tablet press with a target weight of 650 mg.

Analysis of the Tablet as per Ayurvedic pharmacopoeia of India (API)

Saraswati Panchak tablet were subjected to various analytical parameters (Table 2) as

follows: 1) Organoleptic parameters: Rupa (color), Rasa (taste), Gandha (odor) and Sparsha (touch), 2) Physico-chemical parameters: pH of 5% aqueous soln., loss on drying at 110°C, ash value, acidinsoluble ash, water soluble extractive, methanol soluble extractive, 3) Quantitative tests for tablet: Weight variation test (Table 3), table hardness test, tablet disintegration time, friability, 4) Toxicological: Heavy metal analysis, pesticide residue value, 5) Microbial overload: Bacterial and fungal growth study was carried out, 6) Reagents and chemicals: All the reagents and chemicals used for the study were of analytical grade.

Application of Saraswati Panchak coarse powder in Yagya Therapy

Yagya Therapy or Yagyopathy is an ancient Indian method of herbal inhalation therapy that allows for the pulmonary administration of herbs. In Kashyap Samhita an entire chapter named 'Dhoopa Kalpa' is dedicated on this subject. Various types of 'Dhoopan' are widely used in Ayurvedic treatments for various disorders. During this process, medicinal fumes are generated by fumigating the desired herbs or minerals and patient is asked to inhale medicinal herbal fumes, which contains phyto-constituents that provide therapeutic advantages (39-40). The method of medicinal fume inhalation is not a new concept; rather, it prevailed in many traditional and cultural practices for pulmonary and neuronal diseases (41). Herbal fumes produced at high temperature are considered as a

simple way of administering a drug, which exhibits rapid pharmacological activity when inhaled. The herbal medicine combination inhaled in this therapy first reach the brain, followed by lungs and other subtle components of the body. Thus, Yagya therapy has direct biochemical healing effect on CNS tissue diseases & complexities. Acharyas also described multiple drug formulae through nasal route particularly for CNS disorders. Ayurveda also recommended nasal route as a preferred mode of administration of drugs for epilepsy (42).

Now, Yagya Therapy has been proved as a tool for medicinal herbal fumes inhalation as it has shown therapeutic advantage in mental health (43) and epilepsy (44), Saraswati Panchak coarse powder can be used to cure brain related problems (45) as the specific energy currents reduced by Dhoopan and mantra can have significant remedial effect on the disorders & diseases ranging from headache, migraine, intellectual deficiency, depression, seizure disorders (46).

Conclusion

It is now widely accepted that the nature has best answer to all the diseases affecting the human body from time to time. This study has included the Ayurvedic treatments, which is described for mental disorders and are currently part of the Ayurvedic prescriptions. Thus, it could be concluded that the Ayurvedic system of herbal medicine is certainly a treasury of plant drugs for treatment of mental disorders which needs to be explored.

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