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POLY HERBAL FORMULATION: A PROMISING MEMORY-ENHANCER IN WISTER RATS

Ratnamanjula R[(1)] Uppuluri Spandana, P Jyotsna[(2),] A Kusumitha[(3)],MD Salma Begum([4),] R Ramanaiah[(5)]
Depaertment Of Pharmaceutical Chemistry And Phytochemistry, Nirmala Collage Of Pharmacy, Atmakuru (Village), Mangalagiri Guntur (Dist) (A.P), India.
Acharya Nagarjuna University, Guntur, A.P, India.
Corresponding author:
RatnaManjula.R nirmala college of pharmacy
Ratnamanjula.nrml@gmail.com

Abstract:
Dementia is a general term for loss of memory ,problem- solving ,and other thinking abilities that are serve enough to interfere with daily life .Alzheimer's is the most common cause of dementia.Alzheimers disease is a progressive neurodegenerative disorder characterized by a gradual decline in memory. The occurrence of Alzheimer's disease is common place among the Asian population, particularly among senior citizens. The present study under taken to assess the of poly herbs as a memory –enhancer .healthy adult rat of Wister strain of either sex were employed in the present investigation .Elevated plus-maze and Y-maze method served as the exteroceptive behavioural models .and scopolamine ,and aging-induced amnesia served as the interoceptive behavioural models. Herbal drugs have shown the promising effect in the treatment of memory loss. Nootropic popularly referred as smart drug to improve memory such as Piracetam, Amiracetam, and cholinesterase etc.., will improve the memory. However these drugs have severe adverse effects, so to overcome to this effect there is a vast experience of traditional drugs to enhance the memory activity
.**Key words:**poly herbal formulation ,dementia, Nootropic

Introduction:

Dementia:

According to the definition provided by the World Health Organisation (WHO,2017), dementia is an " an umbrella term for several diseases affecting memory, other cognitive abilities and behaviour that interfere significantly with the ability to maintain daily living activities. Although age is its strongest known risk factor, dementia is not a normal part of ageing". The associated brain disease can cause a long-term, often gradual decrease in cognitive abilities, "emotional problems, language difficulties and decreased motivation". The definition provided by the U.S. National Institute of Neurological Disorders and Stroke (NINDS, 2018) is more detailed in starting that dementia is "a group of symptoms caused by disorders that affect the brain. It is not a specific disease" and memory loss is a common symptom of dementia. However, memory loss by itself does not mean having dementia. People with dementia have serious problems with two or more brain functions, such as memory and language. Although dementia is common in very elderly people, it is not part of normal aging.[(1)] Many different diseases can cause dementia, including Alzheimer disease (AD), frontotemporal dementia (FTD), Lewy body dementia (LBD), vascular dementia (VD), syphilitic dementia (SD), mixed dementia (MD), senility dementia (SD), or the combined effect of two or more dementia types, and even stroke. About 10% of individuals present with MD, a usual combination of AD and another type of dementia such as FTD or VD. However, not being a specific disease, the above potential contributors do not reach to the primary cause of the disease. There lies our greatest short coming: unable to pinpoint the root cause of the disease, we are powerless in treating it. Sure, drugs are available to treat some of the symptoms of these contributing diseases but not the diseases themselves. Likewise, drugs available for dementia can also only alleviate its symptoms; they cannot cure it or repair brain damage. They may improve symptoms or at best slow down the disease. Indeed, there is no known cure for dementia [(2-10)]. This is a sad observation on the state of the situation. It stems from our incomplete understanding of the deep biology of the contributing diseases and associated epigenetic/Eco 0genetic influences.

Types of Dementia:

There are approximately 100 types of dementia the most common being Alzheimer's disease (estimated to make up 62 per cent of cases in the UK), vascular dementia (17%), dementia with Lewy bodies (4%), frontotemporal dementia (2%) and Parkinson's disease (2%)[(11)] Less common causes are Huntington's disease, alcohol related dementias, prion disease and dementia resulting from syphilis. It has been estimated that ten per cent of cases are of mixed origin, for example incorporating aspects of both Alzheimer's disease and vascular dementia.[(12)] These figures are not, however, universally accepted: there is significant dispute, for example, over the prevalence of Lewy dementia[(13)] and post-mortem studies of donated brains suggest that many more people may, in fact, have had 'mixed' dementias than is recognised in clinical practice.[(14)]

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- Alzheimer Disease (AD): This is the first most common contributing factor to dementia. For a recent review of this disease and recent research developments, refer to Fymat. [15-18]
- Vascular Dementia (VD): This second most important contributing factor to dementia is due to reduced blood flow to the brain either as a result of clogged blood vessels or fatty deposits within. It is more common among people who had strokes or are at risk for strokes, especially those with longstanding high blood pressure and diabetes. It typically involves a series of minor strokes.
- Dementia with Lewy bodies (DLB): Caused by abnormal proteins (the Lewy bodies) within brain cells, this form of dementia shows symptoms similar to those in Parkinson disease (PD). The primary symptoms are visual hallucinations, attention disorganization, executive functions difficulties, "Parkinsonism", etc. Imaging is not always necessary and may not be diagnostic although there are particular signs in SPECT images (occipital hypo-perfusion) and PET images (occipital hypo metabolism). Diagnosis is generally straight forward for the practicing neurologist.
- Parkinson disease Dementia: It can occur in the course of PD with very similar symptoms to DLB [For a recent review of PD and Parkinsonism.[18-21]
- Fronto -temporal Dementia (FTD): As its name implies, fronto-temporal dementia (FTD) targets two specific brain areas, the frontal and temporal lobes. It is caused by nerve cell loss in the brain and may precede the onset of AD. It manifests itself in three forms: speech impairment and eventually loss, language difficulty, and drastic personality change but memory problems are not its main feature. The three main types are: Behavioural variant FTD: The most common with major personality and behaviour symptoms. Temporal variant (or semantic) dementia: Loss of meanings (words, objects, etc.) Progressive non fluent aphasia (PNFA): A speech problem (use of one-syllable words leading eventually to becoming mute).[22]
- Mixed Dementia (MD): Among persons at more advanced age (especially 85 and greater), there can be more than one cause of dementia, often both AD and vascular damage. Progressive supra-nuclear palsy (PSP): A form of dementia characterised by eye movement problems, balance problems, rigid muscles, irritability, apathy, social withdrawal, depression. It is sometimes misdiagnosed as PD. On brain scans, there are no common visible brain abnormalities except on atrophied midbrain.[23]
- **Cortico-basal Degeneration (CBD)** : A rare form of dementia with the following signs: difficulty using only one limb (named "alien limb") over which there seems to be no brain control, asymmetric movement symptoms (myoclonus, dystonia, tingling of the limbs), speech difficulty (inability to coordinate mouth muscles). The affected brain areas are the posterior frontal and parietal lobes, although many other brain parts can be affected. Creutzfeldt-Jacob disease (CFD): Caused by prions, CFD is a slowly progressive dementia.

Herbals as Potential Memory Enhancers:

In recent times, the use of herbal products has increased tremendously in the western world as well as in developing countries. Numerous natural products have been evaluated as therapeutics for the treatment of variety of purposes, including poor memory. A number of medicinal plants and medicines derived from the plants have shown memory enhancing properties by virtue of their medicinal constituents. Recently, the interest in the use of herbal products has grown dramatically in the western world as well as in developing countries[24]

A cognitive enhancer is a substance that enhances concentration and memory. Nootropics are referred to as smart drugs, memory enhancers, and cognitive enhancers.[25] The word nootropic was coined in 1972 by a Romanian, Dr.Corneliu E. Giurgea, derived from the Greek words $\nu o \upsilon \varsigma$ nous , or "mind," and $\tau \rho \xi \pi \epsilon \iota \upsilon$ trepein meaning "to bend/turn". A nootropic is a cognitive enhancer that is neuroprotective or extremely nontoxic.[26] The natural memory enhancing drugs control the activity of acetylcholinesterase (Ach). Ach modulates acetylcholine (Ach) to proper levels by degradation. According excessive Ach activity results in the Ach deficiency which leads to memory and cognitive impairments. These natural agents inhibit the excessive Ach activity and protect the people suffering from dementia. This focuses on natural herbal drugs as memory enhancing agents on curing the dementia.[27] Medicinal plants have been used to treat such psychotropic and behavioural conditions as anxiety, depression, seizures, poor memory, dementia, insomnia and drug intoxication.[28] Memory herbs increase the level of neurotransmitter, particularly acetylcholine, and improve blood flow to the brain, thereby increasing its oxygen and nutrient supply, which will aid brain function and memory. Therefore, natural products may provide a new source of beneficial neuropsychotropic drugs provided they are adequately tested and their mechanisms are properly deciphered[29].

While pharmaceutical companies continue to invest enormous resources in identifying agents that could be used to alleviate debilitating disorders and retard mental deterioration afflicting numerous people around the world, a source of potentially beneficial agents, namely phytochemicals, would appear to have significant benefits that have yet to be fully exploited. Therefore, several plants have been selected based on their use in traditional systems of medicine.

Materials:

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Animal:

Healthy adult rats of Wister strain of either sex, weighing 180-200gms were selected for the study. The experimental protocol was subjected to the scrutiny of the Institutional Animals Ethics Committee, and was cleared by same before beginning the experiment

Maintenance of animals:

The animal were housed was well ventilated; animals and the temperature was kept between 20°-25°c. The animals were housed in large spacious hygienic cages during the course of the experimental period. The animals were fed with rat pellets feed and purified filter water.

Acute oral toxicity studies:

Poly herbal formulations were administered orally at 100-200mg/kg to different group of rats comprised of six rats in each group. Mortality was observed after 72 hours. Acute toxicity was determined according to the method of Litchfield and Wilcoxon.

PLANT PROFILE:

Bacopa monnieri (BRAHMI):

- ✓ Kingdom: Plantae
- ✓ Class: Magnoliopsida
- ✓ Order: Lamiales
- ✓ Family: plantaginaceae
- ✓ Genus: Bacopa
- ✓ Species: monnieri
- ✓ Chemical constituents: Nicotine,Herpestine,Bacoside A,B

Withania somnifera (Ashwagandha):

- ✓ Kingdom: Plantae
- ✓ Class: Magnoliopsida
- ✓ Order: Solanales
- ✓ Family: Solanaceae
- ✓ Genus: Withania
- ✓ Species: Somnifera
- ✓ Chemical Constituents: Cuscohygrine,Anahygrine

Glycyrrhiza glabra (Liquorice):

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- ✓ Kingdom: Plantae
- ✓ Phylum: Tracheophytes
- ✓ Class: Magnoliopsida
- ✓ Order: Fabales
- ✓ Family: Leguminosae
- ✓ Genus: Glycyrrhiza
- ✓ Species: glabra
- ✓ Chemical Constituents:Glycyrrhizin,Chalcone

Piper nigrum (Long peppar):

- ✓ Kingdom: Plantae
- ✓ Class: Magnoliopsida
- ✓ Order: Piperales
- ✓ Family: Piperacea
- ✓ Genus: Piper
- ✓ Species: longum
- ✓ Chemical Constituents: Piperine, Starch

Agropyron cristatum (Wheat grass):

- ✓ Kingdom: Plantae
- ✓ Class: liliopsida
- ✓ Order: Cyperales

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- ✓ Family: Poaceae
- ✓ Genus: Agropyron
- ✓ Species: cristatum
- ✓ Chemical Constituents: Vitamin A,B,C and E

TRADITIONAL USES:

BACOPA MONNIERI:

Bacopa Monnieri plant is traditionally used for various ailments, but is best known as a neural tonic and memory enhancer. Numerous animal and in vitro studies have been conducted, with many evidencing potential medicinal properties. Several randomized, double-blind, placebo-controlled trials have substantiated BM's nootropic utility in humans. There is also evidence for potential attenuation of dementia, Parkinson's disease, and epilepsy. Current evidence suggests BM acts via the following mechanisms—anti-oxidant neuroprotection (via redox and enzyme induction), acetylcholinesterase inhibition and/or choline acetyltransferase activation, β-amyloid reduction, increased cerebral blood flow, and neurotransmitter modulation (acetylcholine [ACh], 5-hydroxytryptamine [5-HT], dopamine [DA]). BM appears to exhibit low toxicity in model organisms and humans; however, long-term studies of toxicity in humans have yet to be conducted.[(30)]

WITHANIA SOMNIFERA:

Ayurveda, the traditional system of medicine practiced in India can be traced back to 6000 BC (Charak Samhita, 1949). For most of these 6000 years Ashwagandha has been used as a Rasayana. The root of Ashwagandha is regarded as tonic, aphrodisiac, narcotic, diuretic, anthelmintic, astringent, thermogenic and stimulant. The root smells like horse ("ashwa"), that is why it is called Ashwagandha (on consuming it gives the power of a horse). It is commonly used in emaciation of children (when given with milk, it is the best tonic for children), debility from old age, rheumatism, vitiated conditions of vata, leucoderma, constipation, insomnia, nervous breakdown, goiter etc. (Sharma, 1999). The paste formed when roots are crushed with water is applied to reduce the inflammation at the joints (Bhandari, 1970). It is also locally applied in carbuncles, ulcers and painful swellings (Kritikar and Basu, 1935). The root in combination with other drugs is prescribed for snake venom as well as in scorpion-sting. It also helps in leucorrhoea, boils, pimples, flatulent colic, worms and piles (Misra, 2004). The Nagori Ashwagandha is the supreme among all Ashwagandha varieties. Maximum benefit appears when fresh Ashwagandha powder is used (Singh, 1983).

The leaves are bitter and are recommended in fever, painful swellings. The flowers are astringent, depurative, diuretic and aphrodisiac. The seeds are anthelmintic and combined with astringent and rock salt remove white spots from the cornea. Ashwagandharishta prepared from it is used in hysteria, anxiety, memory loss, syncope, etc. It also acts as a stimulant and increases the sperm count (Sharma, 1938). (31)

GLYCYRRHIZA GLABRA:

Traditionally, licorice has been reported to treat many diseases, such as asthma, tonsillitis, sore throat, hyperdipsia, flatulence, epilepsy, fever, sexual debility, paralysis, coughs, stomach ulcers, heartburn, colic, swellings, rheumatism, skin diseases, acidity, leucorrhoea, bleeding, hemorrhagic diseases, and jaundice . Moreover, it was traditionally used as an insecticide, laxative, anti-inflammatory, anti-ulcer, antibiotic, anti-arthritic, antiviral, memory stimulant due to its action as a monoamine oxidase (MAO) inhibitor, anti-cholinergic, antitussive, anti-caries, hypolipidemic, anti-mycotic, estrogenic, antioxidant, anticancer, and anti-diuretic agent . It is used in the confection industry, such as in soft drinks, sweets, and alcohol as well as in the tobacco industry. [(32)]

PIPER NIGRUM:

Medicinal plants are very popular in different traditional systems of medicines due to their diverse pharmacological potentials and lesser side effects in biological systems. Piper nigrum L. (Family Piperaceae) is a well known spice considered as ''The King of spices'' among various spices. It contains a pungent alkaloid ''piperine'' which is known to possess many pharmacological actions. Piperine increases bioavailability of many drugs and nutrients by inhibiting various metabolising enzymes. Piper nigrum L and its active constituent ''Piperine''exhibits diverse pharmacological activities like antihypertensive, antiplatelet, antioxidant, antitumor, anti-asthmatics, analgesic, anti-inflammatory, anti-diarrheal, antispasmodic, antidepressants, immunomodulatory, anticonvulsant, anti-thyroids, antibacterial, antifungal, hepato-protective, insecticidal and larvicidal activities etc. [(33)]

Agropyron cristatum:

Herbs and Medicinal plants have been the most important system of traditional Medicinal system and Nature cure since olden times. Such therapy system support the fact that the treatment of any disease aim at removing

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the basic cause of the ailment through rational use of elements freely available in nature. It basically involves healing and revitalizing mechanisms. One of such medicinal herbs that is considered as "Miracle medicine" is Wheat Grass. Its intake in form of sprouts and juices is one of the best herbal remedies in healing and treating of many diseases. The rich contents of wheat grass, such as chlorophyll, antioxidants, amino acids, vitamins, minerals, phytochemicals contribute immensely to health and beauty through their healing properties. **(34)**

PHARMACOLOGICAL ACTIVITIES:

BACOPA MONNIERI:

The pharmacological studies showed that Bacopa monniera possessed many pharmacological effects included central nervous effects (memory enhancement , antidepressant , anxiolytic , anticonvulsant and antiparkinsonian) , antioxidant gastrointestinal , endocrine , antimicrobial , anti-inflammatory , analgesic , cardiovascular and smooth muscle relaxant effects. **(35)**

WITHANIA SOMNIFERA:

The root has been used most frequently for therapeutic uses and is a constituent of over 200 formulations in Ayurveda, Siddha and Unani medicines. There are several reports to establish its immunomodulatory, anti-inflammatory, antistress, memory enhancing, antiparkinsonian, hypolipidemic, antibacterial, cardiovascular, antioxidant, antitumor and adaptogenic properties. (36)

GLYCYRRHIZA GLABRA:

These derivatives have been reported for several pharmacological activities like, expectorant, antidemulcent, antiulcer, anticancer, anti-inflammatory, antidiabetic, etc. These phytochemicals hold strong promise for designing new herbal drugs, and derivatives of these compounds are being generated to evaluate their pharmacological purposes for future drug use. Natural products have been a prime source for the treatment of many forms of ailments, many of which are consumed daily with the diet. They provide significant protection against various diseases and disorders.**(37)**

PIPER NIGRUM:

It contains a pungent alkaloid ‘‘piperine’’ which is known to possess many pharmacological actions. Piperine increases bioavailability of many drugs and nutrients by inhibiting various metabolising enzymes. Piper nigrum L and its active constituent ‘’Piperine’’exhibits diverse pharmacological activities like antihypertensive, antiplatelet, antioxidant, antitumor, anti-asthmatics, analgesic, anti-inflammatory, anti-diarrheal, antispasmodic, antidepressants, immunomodulatory, anticonvulsant, anti-thyroids, antibacterial, antifungal, hepato-protective, insecticidal and larvicidal activities etc.**(38)**

LITERATURE REVIEW:

Dhuley JN et,al.(39)

Ashwagandha (Withania somnifera L.) root extract (50,100 and 200 mg/kg; orally) improvedretentionof a passive avoidance task in a step-down paradigm in mice. Ashwagandha(50,100 and 200 mg/kg; orally) also reversed the scopolamine (0.3 mmg/kg) induced disruption of acquisition and retention and attenuated the amnesia produced by acute treatment with electroconvulsive shock (ECS), immediately after training. Chronic treatment with ECS, for 6 successive days at 24 hr intervals, disrupted memory consolidation on day 7. Daily administration of ashwagandha for 6 days significantly improved memory consolidation in mice receiving chronic ECS treatment. Ashwagandha, administered on day 7, also attenuated the disruption of memory consolidation produced by chronic treatment with ECS. On the elevated plus-maze, ashwagandha reversed the scopolamine (0.3 mg/kg)-induced delay in transfer latency on day 1. On the basis of these findings, it is suggested that ashwagandha exhibits anootropiclike effect in naive and amnesic mice.

Shinomol GK,Muralidhara,Bharat MMet,al.(40)

It has been envisaged that in this century, disorders of the central nervous system will have a significant bearing on the healthcare concerns of the human population worldwide. Such neurological and psychiatric

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disorders are generally associated with loss of memory, cognitive deficits, impaired mental function etc. Due to the multi-factorial nature of these diseases, modern medicine based psychiatric drugs have met with limited success. Therefore, there is a growing demand for novel products that could targeted multiple pathways and improve the mental capabilities either independently or in combination with conventional drugs. In the recent times, herbal products based on traditional knowledge have been increasingly used both in developed and developing countries.

Dhingra D,Parle m,Kulkarni SK et,al.(41)

In the traditional system of medicine, the roots and rhizomes of Glycyrrhiza glabra (family: Leguminosae) have been employed centuries for their anti-inflammatory, antiulcer,expectorant,anti-microbial and anxiolytic properties. The present study was undertaken to investigate the effects of Glycyrrhiza glabra (popularly known as liquorice) for learning and memory in mice. Elevated plus-maze and passive avoidance paradigm were employed to test learning and memory. Three doses (75,150 and 300 mg/kg; p.o.) of aqueous extract of Glycyrrhiza glabra were administered for 7 successive days in separate groups of animals. The dose of 150 mg/kg of the aqueous extract of liquorice significantly improved learning and memory of mice. Furthermore, this dose significantly reversed the amnesia induced by diazepam (1 mg/kg; i.p.) and scopolamine (0.4 mg/kg; i.p.). Anti-inflammatory and anti-oxidant properties of liquorice may be contributing favourably to the memory enhancement effect. Since scopolamine-induced amnesia was reversed by liquorice, it is possible that the beneficial effect on learning and memory was due to the facilitation of cholinergic – transmission in mouse brain. However, further studies are necessitated to identify the exact mechanism of action. In the present investigation, Glycyrrhiza glabra has shown promise as a memory enhancing agent in all the laboratory models employed.

Reena Kulkarni, K.J.Girish, et,al.(42)

Medhya Rasayanasare group of medicinal plants described in Ayurvedha (Indian system) with multi-fold benefits, specifically to improve memory and intellect by Prabhava (specific action). Medha means intellect and/or retention and Rasayana means therapeutic procedure or preparation that on regular practice will boost nourishment, health, intellect, immunity and hence longevity. Medha Rasayana is a group of 4 medicinal plants that can be used singly or in combinations. They are Mandukaparni(Centella asiatica Linn.), Yastimandhu and (Glycyrrhiza glabra Linn.), Guduchi (Tinospora cordifolia (Wild) Miers) and Shankhapushpi (Convovolus pleuricaulis Chois), specially mentioned with wide range of application on different systems. Yet in practice few more handful drugs used with same aim are mentioned else where in the Ayurvedha classical textbooks. They are Aindri (Bacopa monnieri), Jyothishmati (Celastruspanniculata), Kushmanda (Benincasa hispida),Vacha (Acorus calamus) and Jatamamsi (Nardostachys jatamamsi).Medhya Rasayana are used either in polyherbal preparations or alone.

Bacopa monnieri (43)

Bacopa monneri has been referred in Ayurveda since centuries as a “Medhya Rasayana”. The effect of Bacopa on scopolamine-induced amnesia is assessed by employing Morris water maze scale to test the amnesic effect of scopolamine and its reversal by B.monniera . Bacopa monniera extract attenuates both scopolamine induced anterograde and retrograde amnesia. So B.monniera’s effects on cholinergic system may be helpful for developing alternative therapeutic approaches for the treatment of learning and memory disorders.(35). Brahmi Rasayana significantly improved learning and memory in young mice and reversed the amnesia induced by both scopolamine (0.4 mg/kg; i.p.) and natural ageing.

Withania somnifera(44)

Ashwagandha (Withania somnifera :solanaceae) also known as Indian Ginseng is one of the widely used herbs in the Indian traditional system of medicines. Ashwagandha is also used as an “adaptogen” to help the body cope with daily stress and as a general tonics. Biologically active constituents of Ashwagandha leaves contains alkaloids, saponins, steroidal lactones that posses immune modulatory, anti stress, anti-oxidant, analgesic, adaptogenic and immunostimulant properties.

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Glycyrrhiza glabra [45]

The effect of Glycyrrhiza glabra on learning and memory was investigated on rats. Elevated Plus maze is used to test the learning and memory. The study was conducted for 7 successive days in separate groups of animals. Significant improvement in learning and memory of rats were reported.

Piper longum[46]

Earlier studies showed that long pepper have been used as nerves stimulants. It shows the CNS activity in various experimental animals. The research concludes that long pepper is responsible for the analeptic activity which may expressed through due to its effect on nerve impulse transmission in the brain stem.

Plant Collection:

Plant material used in this study includes leaves of Saraswati and Brahmi, root of Aswagandha, bark of cinnamon, wood of asparagus, twinning branches of thipa teega,aerial parts of thurbo and Huperzia serrata.

Development of poly herbal formulation:

The plants parts that are showing the pharmacological action were dried under shade and powdered. The powder of individual plant parts were undergone alcoholic extraction using soxhlet apparatus. The extracts were mixed well using mortar and pestle.Therefore the polyherbal formulation is developed.

Preliminary Phytochemical Analysis:

The polyherbal formulation developed is subjected to preliminary phytochemical analysis.

S.NO	Name of the plant	Alkaloids	Gums	Flavonoids	Tannins	Saponins	Terpenoids	Phenols	Steroids	Reducing sugars
1	Bacopa monnieri	+	-	+	-	+	-	-	+	+
2	Withania somnifera	+	-	+	+	+	+	+	-	-
3	Glycyrrhiza Glabra	+	-	+	+	+	-	-	+	-
4	Piper nigrum	+	-	+	+	+	+	-	+	+
5	Agropyron cristatum	+	-	+	+	+	+	-	-	-

Drug protocol:

The animals were divided into 5 groups .Each group comprised of a minimum of 6 animal. In the present investigation, the dose selection was based on our pilot study and earlier reports.

GROUP I: Animals treated with normal saline served as control group.

GROUP II: Animals treated with Scopolamine (1 mg/kg/i.p) served as negative control.

GROUP III: Animals injected by Scopolamine and treated with PHF (100 mg/kg.)

GROUP IV: Animals injected by Scopolamine and treated with PHF (200 mg/kg.)

GROUP V: Animals treated with Piracetam (150 mg/kg/i.p.) served as standard group

LABORATORY MODELS:

Memory enhancement activity needed to be studied for the poly herbal formulation using neuro-pharmacological techniques.

a. Elevated plus maze method

b. Y-maze method

SCOPOLAMINE INDUCED AMNESIA IN RATS USING ELEVATED PLUS MAZE METHOD:

Elevated plus-maze apparatus consists of two open arms (16 × 5 cm) and two covered arms (16 × 5 × 12cm). The arms extended from a central platform (5 × 5cm) and the maze was elevated to a height of 25cm from the floor. Elevated plus maze is used for the assessment of aqusition and retention memory process. Group III & IV rats were treated with poly herbal formulation 100mg/kg and 200mg/kg respectively for 7 days continuously. Transfer latency and duration of closed arm visits are measured on 7th day served as parameter for acquisition.

PROCEDURE:

The rats were trained for one week. Each animal received four trails for the first day and followed by eight trails per day for the rest of the days with 5 min interval between each trail. In the EPM model, animals were dosed once in a day with respect to their doses, 60 minutes prior to the trail for 7 days. Group-I is kept as

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control, group-V given the standard drug (piracetam 150mg/kg), Group III and IV given their respective doses for 7 days and were given scopolamine on 8th day 30 minutes prior to the treatment with their daily doses. After one hour all the animals were subjected to EPM and the results were noted. Both the open arm and closed arm exposures are recorded. The decrease in the open arm exposure and increase in closed arm exposure shows the increased cognitive effect

RESULTS:

PHYTOCHEMICAL SCREENING:

S.N0	PHYTO –CHEMICAL CONSTITUENTS	TEST RESULTS OF POLY HERBAL FORMULATION
1.	**Alkaloids**	_
2.	Amino acids	+
3.	Saponins	+
4.	Flavonoids	+
5.	Glycerides	+
6.	Steroids	+
7.	Carbohydrates	+
8.	Tannins	+
9.	sterols	+
10.	phenols	+

PHARMACOLOGICAL SCREENING:

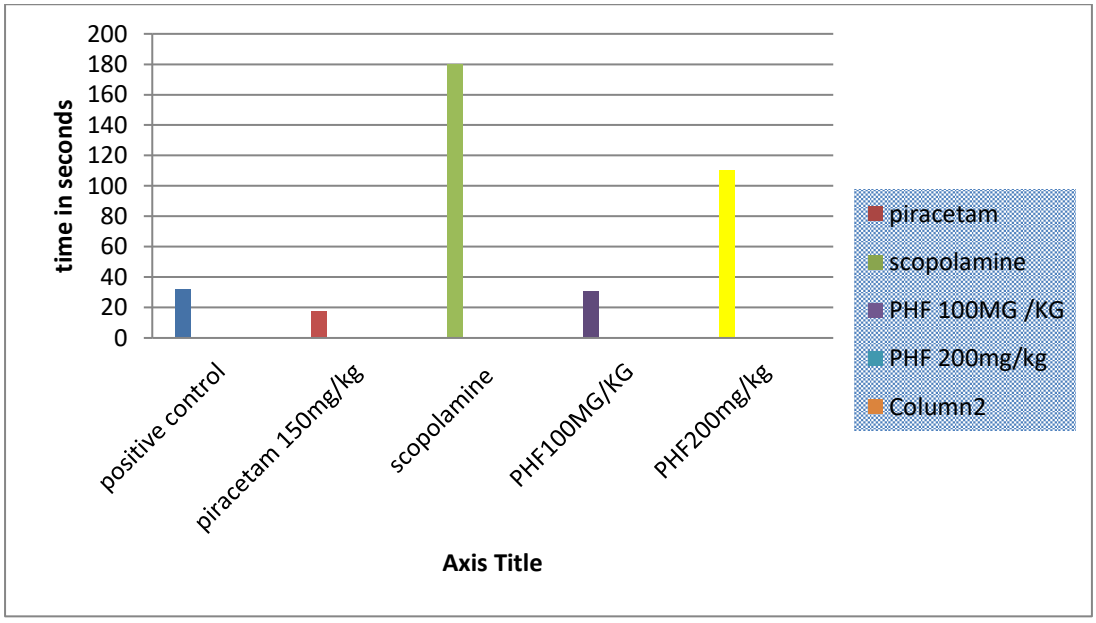
TABLE NO -1 : SCOPOLAMINE INDUSEDAMENSIA IN RATS USING ELEVATED PLUS MAZE METHOD

S.NO	TREATMENT	OPEN ARM EXPOSURE (MEAN TIME IN SEC)	CLOSED ARM EXPOSURE (MEAN TIME IN SEC)
1.	Positive control	32	398
2.	Scopolamine	180	300
3.	PHF(100mg/kg)	30.50	291.1
4.	PHF(200mg/kg)	110	645.75
5.	Piracetam(150mg/kg)	17.5	406

GRAPH -1

***SCOPILAMINE* INDUCED AMENSIA IN RATS USING ELEVATED PLUSE MAZE**

Open Arm Exposure



GRAPH 2:

***SCOPOLAMINE* INDUCED AMNESIA IN RATS USING ELEVATED PLUS MAZE METHOD**

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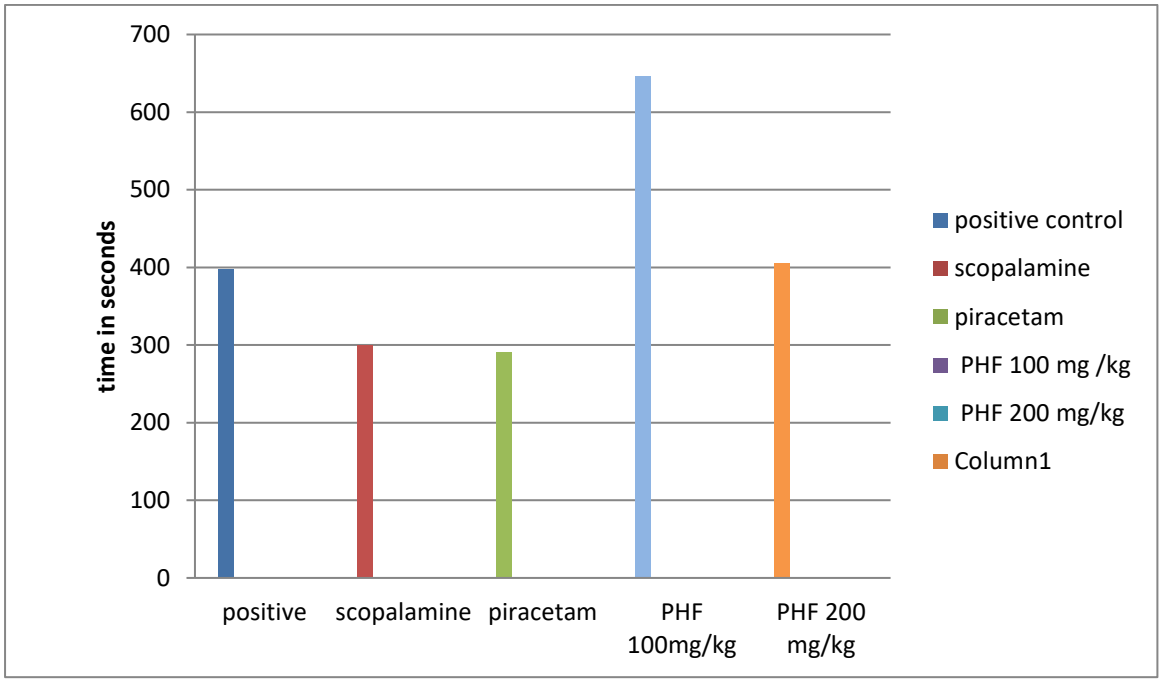
Closed Arm Exposure



Discussion:

Normal ageing is known to deteriorate memory in human beings.In the presence study aged animals showed impaired learning and memory due to ageing process.Oxygen free radicals are implicated in the process of ageing and may be responsible for the development of alzheimers disease in elderly persons.Poly herbs improved memory of both young and aged animals in both the exteroceptive models employed in the presence study.This effect was pronounced in aged animals ,probably because aged animals were already suffering from memory impairment due to ageing.Scopolamine –induced amnesia of memory is due to cholinergic –deficits in certain brain areas and appears to be and releated to oxygen free radicle.Piracetam , the first representative of a class of nootropic agents,has been shown to improve memory defeicts in children and geriatric individuals.Pirectam(150mg/kg,ip),injected for 7successive days to young and aged mice improved learning and memory significantly and also reversed the memory impairing effect of scopolamine in the present study.This finding substantiated the earlier reports where in repeated injections of piracetam had improved learning abilities and memory capacities of laboratory animals.Poly herbal formulation enhanced memory of whrister rats in all experimental models (exteroceptive as well as interoceptive models) used in the present study.Althrough poly herbal formulation did not penetrate the blood brain barrier,oxidised form readily entered the brain by means of facilitative transport.The facilitative glucose transporter (GLUTI) present on endothelial cells at the blood brain barrier is the responsible transport of glucose in to the brain.Oxygen free radicle and other products of oxidative metabolism have been shown to be neuro toxic and anti-oxidant rich diets improved cellular psychology and mortor learning in aged rats.The protective effect of poly herbal formulation may be attributed to its anti-oxidant property by virtue of which susceptible brain cells at exposed to less oxidative stress resulting in reduced brain damage and improved neuronal function,there by enhancing the memory.Since poly herbal formulation elicited or pronounced neuro protective action in aged rats,it may prove to be a usefull memory enhancing agent to treat dementia seen in elderly individuals.Herbal drugs have shown the promising effect in the treatment of memory loss. Nootropics popularly referred as smart drugs to improve memory such as piracetam, Amiracetam, Cholinesterase etc., will improve the memory. However these drugs have severe adverse effects. So to overcome to this effect there is vast experience of traditional drugs to enhance the memory activity.

CONCLUSION:

Thus poly herb formulation treatment for 7 days continuously offered protection to animals against imapairment of learning and memory by piracetam according to this observation it can be used as a preventive measure to overcome dementia.

From this study, it was concluded that herbal drugs plays a vital role in improving memory. The memory improving activity is probably due to the presence of flavonoids in all most all these plants. Throwing light over on development of poly herbal formulations gives promising beneficial results in Pharma industry.

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