

Formulation and Evaluation of Herbal Oil for Treatment of Alzheimer's disease

Arun Lagad¹, Shital Pande²

¹Student, ²Vice Principal

Yashodeep Institute of Pharmacy, Chhatrapati Sambhajanagar, Maharashtra, India.

Abstract: Alzheimer's disease is related to cognitive impairment, dementia observed generally in aged population due to neurodegeneration in an ongoing manner. It gradually worsens memory power of the patient. The hallmark diagnosis features includes formation of senile plaques and Neurofibrillary tangles. Too little availability of Acetyl choline a neurotransmitter in the cerebral region due to metabolism by an enzyme Acetyl choline esterase before showing its action and neural death are the primary reasons for Alzheimer's disease. There are many categories of Anti-Alzheimer's drugs available for management of AD in the market but due to lack of patient compliance successful outcomes were not observed. Apart from this including Nutraceuticals in diet daily routine, Aromatherapy, modifications in the regular schedule, relaxes mind and body from tensions, insomnia, blood circulation, detoxification of organs due to rhythmic breathings and reduce frequency of incidence of headache are proven to show best results by relieving stress according to survey. Today, herbal medicine has attracted the attention of researchers due to its more effective therapeutic aspects along with fewer side effects compared with synthetic drugs. Multifunctional effects have introduced them as a therapeutic strategy for the treatment of a wide range of diseases. In this study, we have focused on some medicinal herbs known to be suitable for the treatment of AD.

Keywords : Alzheimer's disease (AD), cognitive impairment, Dementia, Senile plaques, Nutraceuticals Herbal medicine

INTRODUCTION

Alzheimer disease is characterized by progressive cognitive decline usually beginning with impairment in the ability to form recent memories, but inevitably affecting all intellectual functions and leading to complete dependence for basic functions of daily life, and premature death. The pathological manifestations of Alzheimer disease include diffuse and neuritic extracellular amyloid plaques and intracellular neurofibrillary tangles accompanied by reactive microgliosis, dystrophic neurites, and loss of neurons and synapses^[1] The treatments of choice in Alzheimer's disease are cholinesterase inhibitors and NMDA-receptor antagonists, although doubts remain about the therapeutic effectiveness of these drugs. Herbal medicine products have been used in the treatment of Behavioral and Psychological Symptoms of Dementia but with various responses. The objective of this article was to review evidences from controlled studies in order to determine whether herbs can be useful in the treatment of cognitive disorders in the elderly^[2]. The pathological manifestations of Alzheimer disease include diffuse and neuritic extracellular amyloid plaques and intracellular neurofibrillary tangles accompanied by reactive microgliosis, dystrophic neurites, and loss of neurons and synapse^[3] The popularity of herbal medicines is also increasing due to their perceived effectiveness, safety and affordability. In the present article, the experimental and clinical evidence have been reviewed for various Indian herbal medicines such as Ashwagandha, Turmeric, Brahmi and Shankhpushpi, bhingaraj, jatamsi⁴.

PATHOPHYSIOLOGY OF THE DISEASE:

Numerous hypotheses have been put forward on the basis of the various causative factors in order to explain this multifactorial disorder. Some of them included are:

- 1)cholinergic hypothesis
- 2)Amyloid beta hypothesis
- 3)Oxidative stress hypothesis

1) Amyloid beta hypothesis: In recent times it has been shown that the most commonly used Amyloid beta hypotheses, prevailing for the last two decades, does not relate to the complex Pathophysiology of this draining disease. Amyloid beta oligomers in synaptic injury, suggesting that these are first and foremost among several other signals that destroy

the reliability of brain functions. Amyloid plaques formation are develop in the later age, these Amyloid beta oligomers leads to cognitive impairment due neurotoxicity. Amyloid Cascade hypothesis and Cholinergic hypothesis these two has detailed the mechanism of occurrence of AD.

2) Cholinergic hypothesis: Wide spread cell dysfunction & degeneration will lead to neurotransmission defects majorly effected is cholinergic neurons. Loss of cholinergic activity is corrected with AD severity as the disease progresses the cholinergic neurons starts to deplete along with these nicotine receptors in the hippocampus region and cortex are also reduced but the presynaptic nicotine receptors control the release of acetyl choline.

3) Oxidative stress hypothesis: Reactive oxygen species (ROS) and reactive nitrogen species (RNS) are produced in many normal and abnormal processes in humans, they play dual role as both have beneficial functions in cellular signaling pathways and venomous processes that can lead to damage of cellular structures (including cell membrane, lipid, protein, and DNA). The high oxygen consumption of the brain, which utilizes 20% more oxygen than other mitochondrial respiratory tissues, means that the brain is more vulnerable to oxidative stress apoptosis.

4) Amyloid deposition: abnormal levels of this naturally occurring protein clump together to form plaques that collect between neurons and disrupt cell function.

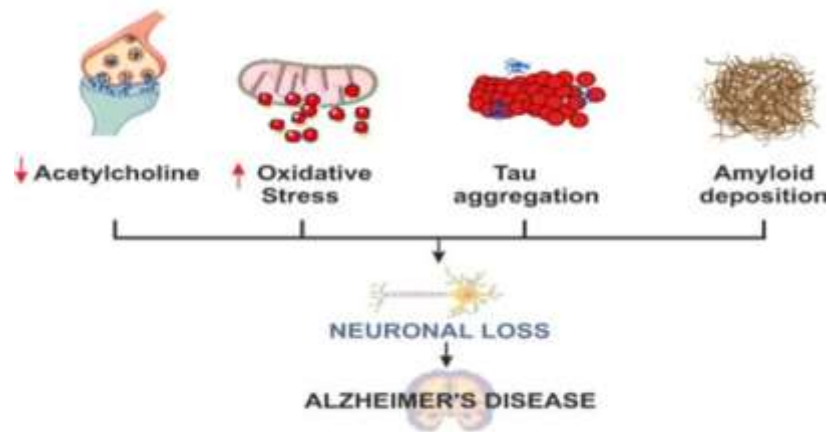


Fig no.1 Pathophysiology of Alzheimer disease

VARIOUS THERAPEUTIC TARGETS TO TREAT AD

- 1) Targeting Amyloid beta protein (Anti-Amyloid approach)
- 2) Targeting Amyloid transport
- 3) Targeting amyloid clearance
- 4) Targeting Tau protein

Stage of AD

- Person may function independently in the early stage. They can do their social activities. person may feel as if they are suffering from memory lapses, such as disremembering commonly used words or the location of ordinary objects.
- Common difficulties faced by them are Problems coming up with the right word or name, be unable to remember material that one has just read
- Misplacing a valuable object. Moderate AD Greater care is needed to the patient As the disease progresses.

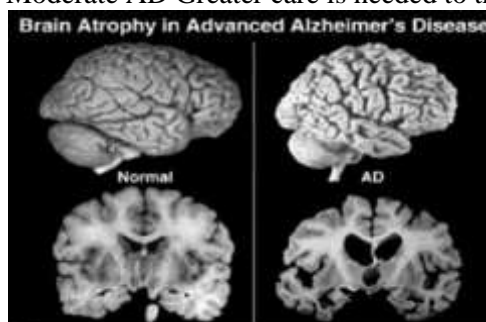


Fig no 2 difference between normal brain and alzheimer disease

SYMPTOMS Cognitive:

- Mental decline, difficulty
- Thinking and Understanding,
- Difficulty concentratin.

Behavioural:

- Aggression, agitation,
- Difficulty with self care.

Psychological:

- Depression,
- Hallucination,

CAUSES

- A combination of age-related changes in the brain, along with
- Genetic, environmental, and lifestyle factors.
- Beta-amyloid, build up.
- AD suspect that proteins damage and kill nerve cells.

GENERAL TREATMENT

- Cholinesterase inhibitors may improve symptoms related to Behavior, such as agitation or depression
- Delivered through a patch on the skin
- Hair oil.

FORMULATION**Herbal hair oil**

1)The oil is extracted from powdered turmeric rhizomes Through Ashwagandha Turmeric, Brahmi, and Shankpushpi bhringaraj jatamsi . The process forming oil Is done by by boiling of hair oil with coconut hair oil relief improving neuron function, reduce stress.

2)Herbal oil can applied on A scalp massage is a head massage designed to relax the mind and encourage circulation. Many times, tension is felt within the head and neck, so scalp massages can be very effective as a stress reducer. Warm oil is massaged throughout the scalp, working to relax tight muscles in the temple and neck regions.

3)Regularly applied hand massage can help decrease agitation in people with dementia, which includes decreasing the frequency and intensity of agitated behaviors such as wandering. Massage therapy can also offset the social isolation that can lead to this agitation and related behaviour

PLANT PROFILE**Medicinal plants used in the treatment of AD****1) Turmeric****Fig no 4.Turmeric**

Biological source : It is obtained from rhizomatous herbaceous perennial plant belonging to the ginger.

Family: Zingiberaceae,

Biological Sources : Turmeric is the rhizomes, which are underground stems that store nutrients and energy for the plant.

Chemical constituent : Major active ingredients of turmeric include three curcuminoids; curcumin (diferuloylmethane, the primary constituent responsible for yellow color of turmeric), dimethoxy curcumin, and bisdemethoxycurcumin.

Therapeutic use in AD : Mechanism of action in which curcumin modifies AD pathology: curcumin inhibits the formation and promotes the disaggregation of amyloid- β plaques.

2) Ashwagandha



Fig no 5 Ashwagandha

Biological source : It is derived from the root of the *Withania somnifera* plant

Family : Solanaceae

Chemical constituent: It contains different types of chemical constituents such as alkaloids, steroidal lactones, saponins.

Therapeutic use in AD : Ashwagandha can improve cognitive behavior in rats subjected to oxidative damage that occurs in AD and can reverse accumulation of β -Amyloid peptides ($A\beta$) implicated in the disease $A\beta$.

3) Jatamansi



Fig no 6 Jatamansi

Biological source: It is obtained from The rhizomes of the plant were used since antiquity in the indigenous systems of medicine.

Family: Valerianaceae.

Chemical constituent: α -Selinene (9.2%), nardol (10%), dihydro- β -ionone (7.9%) were found in *N. jatamansi* from India.

Therapeutic use in AD: acts as a brain tonic and helps to improve memory and brain functions by preventing cell damage due to its antioxidant property categorized as a hypno-sedative drug according to Ayurveda.

4) Bringaraj



Fig no 7 Bringaraj

Biological source: It is obtained from Aerial parts (leaves and stems) of *Eclipta alba*

Family: Caprifoliaceae.

Chemical constituent: (Bhringraj) contains wide range of diverse phytochemical constituents which include coumestans, alkaloids, flavonoids, glycosides, polyacetylenes, and triterpenoids, phenolic acids.

Therapeutic use in AD: improve Alzheimer's related memory loss.

5)Brahmi



Fig no 8 Brahmi

Biological source: Brahmi is the fresh or dried herb of *Centella asiatica*.

Family: Umbelliferae.

Chemical constituent: phytochemicals such as alkaloids, glycosides, flavonoids, saponins etc.

Therapeutic use in AD: It is used as a memory enhancer and brain tonic for kids due to its property to improve cognition.

6)Shankpushpi



Fig no 9 Shankpushpi

Biological source: It is obtained from dried leaves of *Convolvulus pluricaulis*.

Family Convolvulaceae

Chemical constituent: The chemical constituents in Shankhpushpi consist of carbohydrate-D-glucose, rhamnose, maltose, sucrose and starch.

Therapeutic use in AD: Shankhpushpi helps to calm down the brain and relieve stress as well as anxiety. It also improves memory by acting as a brain tonic due to its Medhya (improves intelligence) property promoting brain health, and relieving stress and anxiety.

IDENTIFICATION OF PHYTOCHEMICALS

Sr.no.	Equipments
1	Measuring cylinder
2	Beaker
3	Filter paper
4	Conical flask
5	Funnel
6	Water bath
7	Tripod stand

Sr.no	Materials	Quantity		
		F1	F2	F3
01.	Jatamansi	2gm	2gm	3gm
02.	Bringaraj	3gm	2gm	2gm
03.	Turmeric oil	2gm	1gm	3gm
04.	Brahmi	2gm	2gm	3gm
05.	Ashwagandha oil	3gm	2gm	2gm
06.	Shankhpushpi	3gm	1gm	3gm
	Total	15gm	10gm	17gm

Quantity taken in **F1 F2 F3**

PROCEDURE

Gather Ingredients: Choose a carrier oil like coconut oil, and any essential oils to use for fragrance and therapeutic benefits.

Mixing: In a clean container, combine the carrier oil with a crude drug Jatamansi Bringaraj Turmeric oil Brahmi Ashwagandha Shankhpushpi. The ratio depends on personal preference and the potency of the essential oil. Start with a small amount and adjust to your liking.

Blend: Gently mix the oils together using a clean spoon or stirring rod. Make sure the powder drug of plant part is evenly distributed throughout the carrier oil.

Testing: Before using the massage oil, do a patch test on a small area of skin to ensure you don't have any allergic reactions.

Storage: Store the massage oil in a cool, dark place away from direct sunlight.

Labeling: Label the bottle with the ingredients used and the date it was made. This helps you keep track of what you've created and when it's best to use it by.



Fig no 10



Fig no 11

Identification Tests For Herbal Drugs :

1) Alkaloid Test (Ashwagandha) –

a) Dragendoffs Test :

2ml extract + 2-3 drops dragendoffs reagent.

Observation – Orange red colour.

b) Mayers Test :

2ml extract + 2-3 drops mayers reagent.

Observation – Creamy white ppt.

c) Hagers Test :

Extract + few drops hagers reagent.

Observation – Yellow colour.

d) Wagners Test :

Extract + few drops if wagner reagent.

Observation – reddish brown colour.

2) Polyphenol Test (Turmeric) –

a) Extract + Sulphuric acid

Observation – Brown colour.

b) Extract + Boric acid

Observation – Reddish brown colour

3) Test (Brahmi and Bhringaraj)

a) hydrochloric acid (HCl) + plant material.

Observation- Immediate development of a red colour indicates the presence of flavonoids.

4) Triterpenoids (Shankpushpi }

a) 2.0 ml of chloroform + 5 ml aqueous plant extract evaporated on the water bath and then boiled with 3 ml of H₂SO₄ concentrated.

Observation A grey color formed which showed the entity of terpenoids.

5) Polyphenol Test Jatamsi.

Cholesterol in the presence of concentrated sulphuric acid and acetic anhydride undergo dehydration

Observation producing colored product which is blue-green in color.

FORMULATION

Formulation of massage oil is formulate the mixture of crude drug active ingredient Ashwagandha Turmaric, Brahmi, Shankhpushpi Bhringaraj Jatamsi.

It is use on hair for alzhimer disease.

$$F1+ F2 + F3 = 90 \text{ ML}$$



Fig no 15 formulation F1 F2 F3

Evaluation of herbal hair oil

1)Physical Evaluation:-

- a)Colour:- The colour of the oil was observed by visual examination
- b)Odour:- The odour of oil was found to be characteristics.
- c)State :-The state was oil was examined visually. The oil was liquid in state result.

2)pH :The pH of all formulations were found to be in the range of 5.50 to 6.0 which signifies that formulations will not cause any irritation to skin.

3)Irritancy Test :

Mark an area (1sq.cm) on the left-hand dorsal surface. The oil was applied to the specified area and time was noted. Irritancy are checked.

EXPECTED OUTCOMES:

- 1) It has no side effects.
- 2) It is safe for use.
- 3) It helps to reduced stress .
- 4) Improve neuronal conectivity.
- 5) Improve quality of life by reducing severity of AD Symptoms.
- 6) Sedative and hypnotic action and sleeping inducing.
- 7) Targeting amyloid clearan

RESULT :In this research, we found that by giving herbal plant i.e of Ashwagandha Turmaric, Brahmi, and Shankhpushpi bhringaraj jatamsi the form of medicines we are able to diagnose the AD. Treatment with medicinal plant with AD activity in humans is potentially beneficial option.The following evaluation parameters are conducted after the formulation of herbl oil :

Sr. No	Evaluation Parameters	Result		
		F1	F2	F3
1)	Colour	Yellow	Yellow	Yellow
2)	Odour	Stimulating	Stimulating	Stimulating
3)	State	Liquid	Liquid	Liquid
4)	Spreadability	Good	Good	Good
5)	pH	5.40	6.00	5.49
6)	Irritation Test	No irritation	No irritation	No irritation

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