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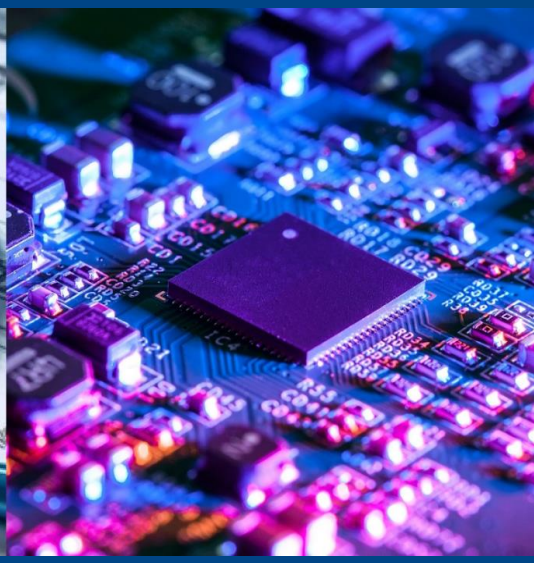

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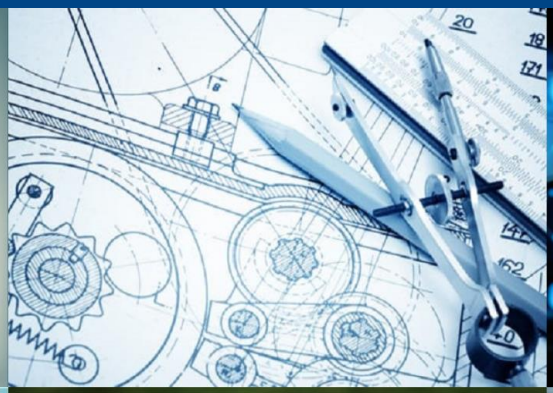

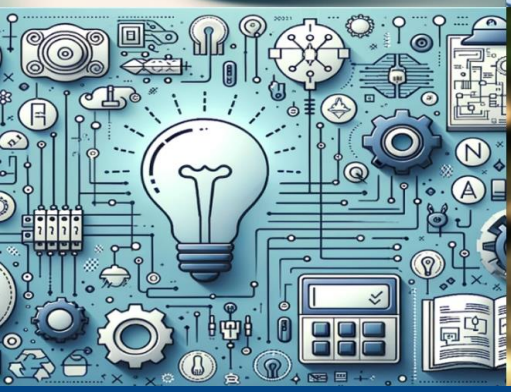

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Formulation and Evaluation of Herbal Powder for the Treatment of Dementia

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ABSTRACT: Alzheimer's disease, its pathophysiology, current treatment options, and potential therapeutic strategies, including the use of neuroprotective herbs. The discussion covers various hypotheses related to Alzheimer's disease, such as the amyloid cascade hypothesis, tau hypothesis, cholinergic hypothesis, excitotoxicity, and neuroinflammation.Several herbs are highlighted for their potential in managing Alzheimer's disease, including:Ashwagandha (Withania somnifera): An Indian medicinal plant with antioxidant, anti-inflammatory, and neuroprotective properties. Curcuma longa (Turmeric): A spice with anti-inflammatory, antioxidant, and neuroprotective effects, which may help in reducing amyloid-β and tau protein accumulation.Ginkgo biloba: An ancient tree species with neuroprotective properties, which may improve cognitive function and memory.Sage (Salvia officinalis): A herb with cholinesterase inhibitory activity, antioxidant, and anti-inflammatory properties, which may benefit patients with Alzheimer's disease.Ginseng: A traditional herbal medicine with cognitive-enhancing properties, which may improve memory and cognitive function.Gotu Kola (Centella asiatica): A plant with neuroprotective and cognitive-enhancing properties, which may help in reducing amyloid-β accumulation and improving memory. Lemon balm (Melissa officinalis): A herb with anticholinesterase activity, antioxidant properties, and potential benefits in managing Alzheimer's disease symptoms.These herbs have been studied for their potential therapeutic effects on Alzheimer's disease, and some have shown promise in preclinical and clinical trials. However, more research is needed to fully understand their efficacy and safety in managing this complex condition.

KEYWORDS: Ashwagandha,Ginseng,Ginkgobiloba,Gotu.kola,Lemon.balm,Sage,Curcuma longa,Herbal Powder for the treatment of Dementia

I. INTRODUCTION

Dementia can be defined as a syndrome characterized by a cluster symptoms and signs many fasted by difficulties in memory ,disturbances in language and other cognitive functions, changes in behaviors, and impairment in activities of daily living. Alzheimer disease(AD)which named after the German psychiatrist Alois Alzheimer, who first described this disorder more than one century ago, is the most common cause of dementia, accounting for up 75 % of all dementia cases, Alzheimer disease is a progressive.neurodegenerative.disorder. Dementia is caused by many different diseases or injuries that directly and indirectly damage the brain. Alzheimer disease is the most common form and may contribute to 60–70% of cases. Other forms include vascular dementia, dementia with Lewy bodies (abnormal deposits of protein inside nerve cells), and a group of diseases that contribute to frontotemporal dementia. degeneration.of.the.frontal.lobe.of.the.brain). Currently more than 55 million people have dementia worldwide, over 60% of whom live in low-and middle-income countries. Every year,there are nearly 10 million new cases. Dementia results from a variety of diseases and injuries that affect the brain. Alzheimer disease is the most common form of dementia and may contribute to 60–70% of cases. Dementia is currently the seventh leading cause of death and one of the major causes of disability and dependency among older people globally.Neurodegenerative pathways implicated in Alzheimer disease.Several overlapping mechanism have been proposed to explain future treatment are based on modification of these pathways.

Alzheimer:

Alzheimer disease (AD) was officially listed as the sixth leading cause of death in the united states in 2019 and is the fifth leading cause of death among Americans aged 65 and older. It has Impacted the lives of the elderly around the world, it is now more important than ever to develop an effective treatment not only to slow the progression of this disease but also to creat a.preventive.approach. Alzheimer's disease (AD) is the most common type of dementia, accounting for 60% to 80% of all cases. It is estimated that this debilitating neurodegenerative disorder currently affects 50 million patients worldwide and indirectly impacts the lives of tens of millions who deal with many years of

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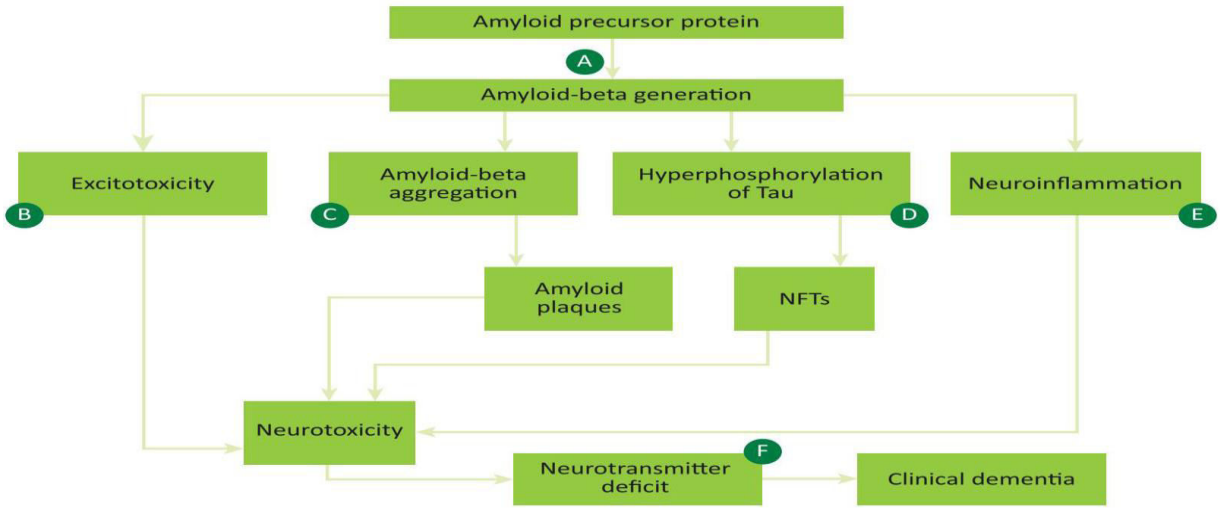
cognitive decline in their loved ones. A small percentage of all AD cases are linked to dominant genetic mutations in three genes codifying for APP (amyloid precursor protein), PSEN1 (presenilin 1), and PSEN2 (presenilin 2) and are typically associated with early-onset forms of the disease in which clinical symptoms appear before the age of 65. The majority of the patients exhibit lateonset Alzheimer's disease (LOAD), which appears later in life and is sporadic in nature. Although in these cases the disease is not hereditary and shows no single genetic cause, current evidence supports the existence of a number of genetic risk factors, among which the presence of the E4 allele in the ApoE (apolipoprotein E) geneoccurring in about 16% of the population--is the most significant.

Lifestyle behaviors such as poor diet and reduced physical activity, as well as environmental and metabolic risk factors including diabetes, cerebrovascular disease, head injury, and stress, are typically linked with an increased risk for the disease. The deposition of amyloidß (AB) in the brain parenchyma and the cerebral vascula ture, together with the presence of intraneuronal neurofibrillary tangles and the gradual loss of synapses, are central neuropathological hallmarks of AD, although, to this day, it remains unclear what primarily triggers and drives the progression of the disease. Inspite of the more than 100 years that have passed since the discovery of the disease, the complex molecular mechanisms leading to the pathophysiology of AD have still not been fully elucidated. Among the different multifactorial pathways affected by the disease, vascular abnormalities, mitochondrial detrimental changes, oxidative stress, reduced brain glucose utilization, and neuroinflammation are currently being considered as important players in the initiation and/or progression of the disease.

(Fig1.Plaque.formation.in.brain)



(Figure.No.2.Causes.of.dementia)

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Amyloid.cascade.hypothesis:
The amyloid hypothesis of AD began to gain traction in the 1990s,and centres on abnormal processing of the amyloid precursore protein (APP), leading to production of amyloid beta (AB).secretase enzymes cleave APP and aberrancy of this process, specifically mutation in gamma and beta secretase, can lead to the abnormal production of AB. Amyloid beta can then trigger a cascade leading to synaptic damage and neuron loss, and ultimately to the pathological hallmarks of AD: amyloid plaques and neurofibrillary tangles(NFTs) composed of hyper hosphorylated.ttau.protein,with.resulting.neurodegeneration.

Tau.hypoyhesis:
Tau is aprotein expressed in neurons that normally functions in the stabilization of microtubules .the.cell.cytoskeleton.

Hyperphosphorylation causes it to accumulate into these NFT masses inside nerve cell bodies. These tangles then aberrantly interect with cellular proteins, preventing them from execting their normal functions. Hyperphosphorylation occurs downstream of AB,with research suggesting that accumulation of AB may initiate this process. Additionally there is evidence that toxic.tau.can.enhance.AB.production.via.a.feedback.loop.mechanism.

Cholinergic.hypothesis:
An initial breakthrough in Alzheimer disease came in the 1970s with the demonstration of a cholinergic deficit in the enzyme cholin acetyltranserase.this along with the recognition of the role of acetylcholine in memory and learning, led to the cholinergic hypothesis of AD and stimulated attempts to the therapeutically increase cholinergic activity. Cholinergic depletion is a late feature of the neurodegenerative cascade.potentiating cholinergic transmission.

Excitotoxicity:
Excitotoxity defined as overexposure to the neurotransmitter glutamate,or overstimulation of its N-methyl-D-aspartate(NMDA) receptor, playsan important role in the progressive neuronal loss of cholinergic neyons is affected by this process, resulting in excessive influx.of.calcium.into.cells.

Neuroinflammation:
Neuroinflammation an inflammatoryresponse in the CNS characterized by accumulation of glial cells,appears to be a central event in AD pathophysiology. The brain was traditionally considered an ‘immune-privileged organ, isolated from the immune system by factors such as the blood –brain barrier and apparent inability of brain immune cells to mount an innate immune response, but opinion on this has subsequently shifted dramatically.in the 1990s, seminal epidemiological evidence suggested that anti-inflammatory drugs may have a protective effect in AD and neuroinflammatory cascades are now considerd an important target for treatment in Alzheimer disease, and both amyloid plaques and NFTs may act as drivers for this.immune.response. unfortunately, meta-analysis have demonstrated no benefit of non-steroidal anti-inflammatory drugs, asprin or steroids over placebo in patients with already symptomatic AD, some evidence suggests that naproxen may have a role in prevention of AD in healthy older people. It may be that the therapeutic window for such treatment occurs early in the disease process and as such by the time symptoms emerge,this opportunity.has.been.lost.

Neuroprotective.herbs.for.the.management.of.Alzheimer.disease:
While herbs and herbal remedies have a long history of traditional use and appear to be safe and effective they have unfortunately received little scientific attention. numerous plants and their constituents are recommended in traditional practices of of medicine to enhance cognitive function and to alleviate other symptoms of AD , including poor cognition, memory loss, and depression. A single herb or a mixture of herbs is normally recommended depending upon the complexity of the condition. The rationale is that the bioactive principles present in the herb not only act synergistically but may also modulate the activity of other constituents from the same plant or other plant species. This approachas been in Ayurveda, traditional Chinese medicine (TCM), and native Americans system of medicine , where a single herb or a combination of two or more herbs is commonly prescribed for any specific disease. In this manuscript, we review a subset of herbs useful for AD based on their properties, functional characteristics, and mechanistic action. The rationale for memory related disorders including AD, the identification of phytochemicals from these plants sources for their potential in Alzheimer disease therapy, determination of the neuropharmacological activities of this herbs.

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Ashwagandha.(Withania.Somnifera):

Ayurveda a popular Indian system of medicine has a well developed line of action for managing and treating brain associated disorders. A list of about 450 ayurvedic medicinal plant, 56 popular plants, or their active metabolites is available for neurological disorders in ayurvedic prescription. One of the traditional, well known Indian medicinal plants is withania somnifera which is marketed as acommon ingredient in several ayurvedic formulation for the treatment of neurological disorders. withania somnifera properly known as ashwagandha in Sanskrit has been used extensively in herbal medicine since its introduction in 600 BC; it is an evergreen woody shrub of the solanaceae family and has been given several names with different meanings, such as ''Indian winter cherry'' or ''Indian ginseng'' in english ''punir'' or ''Asgandha'' in hindi and ''asgand' in urdu. The species name ''somnifera'' means ''sleep inducer'' in latin, due to its amazing anti-stress properties, while the popular name ''Ashwagandha'' comes from ''ashwa'' (horse) and ''gandha'' (smell), as the root have a characteristic ''wet horse'' smell. In ayurvedic literature,it is classified as a rejuvenating agent,since it promotes both physical and mental health, revitalizes the body in an incapacited state and maintains longetivty.W.somnifera is a potentially useful for many neurological disorder such as epilepsy, Alzheimer disease, Parkinson disease cerebral ischemia and tardive dyskinasia.in additionto its neurological effects, W.somnifera possesses several other pharmacological properties,such as anti inflammatory,anti diabetic, cardioprotective, anti hepatitis, anti osteoporotic, and anti neoplastic activities. Several investigation have demonstrated that neuronal cells are vulnerable to oxidative damage due totheir high poly unsaturated fatty acid content in membranes and the brain elevated oxygen consumption. Higher concentration of reactive oxygen species and lipid peroxidation are associated with oxidative stress, disrurupting the balance between pro-oxidant and anti-oxidant levels and leading toeventual neuronal loss. Withania somnifera extract and its active constituents as shown in the rest of this article, have been demonstrated to possess anti oxidant enzymes, amyloid beta clearance, calciuminfluxe, neurite outgrowth, lipid peroxidation, and inflammation, and similar debilitating processes that are involved in Alzheimer.

Curcuma.longa:

It has been estimated that up to 1.5 billion people worldwide are suffering fromcentral nervous system (CNS) disorders. The most challenging of the CNS diseasesare neurodegenerative diseases, attributed to age-related gradual decline in neurological function, often accompanied by neuronal death. It has been shown thatseveral mechanisms such as protein aggregations, oxidative stress and neuroinflammation are involved in neuronal death and damage. Recently, the use of naturalcompounds such as curcumin have been proposed as an alternative and effectivestrategy in the treatment of neurodegenerative and neurological diseases.4Curcumin is a hydrophobic polyphenol that is derived from the rhizomes of theCurcuma longa. It has been well documented that curcumin possesses a wide variety of important pharmacological activities including anticancer, antimicrobial, anti-inflammatory, anti-amyloid, antioxidant, and neuroprotective effects. Traditionally, turmeric has been used for several aliments and especially it is widely consumed for dietary and medicinal purposes in Southeast Asia, the China, and India. It can also cross the blood-brain barrier (BBB) and due to its pleotropic therapeutic effects, curcumin has been regarded as a potential therapeutic factor for a large number of nervous system diseases. In addition, curcumin has vast application in thetreatment of many other diseases such as cancer, diabetes,cystic fibrosis, malaria, and hypertension. Due to the pleotropic actions of curcumin on the nervous system, it could be regarded as a potent neuroprotective compound in the treatment of CNS-associated diseases. Beneficial effects of curcumin in neuro inflammatory diseases including Alzheimer's disease (AD).

Ginkgo.biloba.

Origin and History of Ginkgo biloba :

Ginkgo biloba is the oldest living tree species in the world.The Ginkgo species dates all the way back to the Permian Pe riod some 286 to 248 million years ago. Today, Ginkgo biloba is the only surviving member of the Ginkgo family. This survival is said to be owed to its extraordinary malleability, resistance to disease, and to Buddhist monks who cultivate d and preserved the trees on sacred grounds . Gingko was a favorite of Frank Lloyd Wright and soon made its approach into city landscapes across the USA [30]. The documented medicinal uses of Ginkgo in China can be tracked back near ly 5000 years, mainly for asthma treatment.

Sage.(Salivia.officinalis.)

The genus Salvia, commonly known as sage, is the largest member of Lamiacea or mint family containing over 900 spe cies throughout the world.The plants are mostly aromatic and peren nial (Figures 1 and 3], with flowers in different col ors Many species of Salvia, including Salvia officinalis (common sage), are native to the Mediterranean region and som e of the Salvia species have been used worldwide as flavoring spices as well as traditional herbal medicine.

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Sage tea has been traditionally used for the treatment of digestive and circulation disturbances, bronchitis, cough, asthma, angina, mouth and throat inflammations, depression, excessive sweating, skin diseases, and many other diseases Salvia es sential oils have been used in the treatment of awide range of diseases like those of the nervous system, heart and blood circu lation, respiratory system, digestive system, and metabolic and endocrine diseases. In addition, sage ess ential oil has been shown to have carminative, antispasmodic, antiseptic, and astringent properties.

II.COMMON NAMES

S. officinalis has numerous common names. Some of thebest known names include sage, common sage, garden sage, g olden sage, kitchen sage, true sage, culinary sage, dalmatian sage, and broadleaf sage. Cultivated forms include purple s age and red sage. In Turkey, S. officinalis is widely known as adaçayı, meaning "island tea." In the Levant, it is called maramia.

III. MEMORY

Amongst many herbal extracts, Salvia species are known for the beneficial effects on memory disorders, depressi, and c erebral ischemia.S. officinalis (common sage, Salvia lavan dulaefolia (Spanish sage), and Salvia miltiorrhiza (Chinese s age) have been used for centuries as restoratives of lost or declining mental functions such as in Alzheimer's disease. In AD, the enzyme acetyl cholinesterase (AChE) is responsible for degradeing and inactivating acetylcholine, which is a neurotransmitter substance involved in the signal transferring between the synapses. AChE inhibitor drugs act by count eracting the acetylcholine deficit and enhancing the acetylcholine in the brain Essential oil of S. officinalis has been sho wn to inhibit 46% of AChE activity at a concentration of 0.5 mg/ml.A study shows that S. officinalis improves the mem ory and cognition, and with increasing dosage, the mood gets elevated as well as alertness, calmness, and contentedness increase. A randomized, doubleblind clinical study has shown that an ethanolic extract from common sage (S. officinal is) as well as Spanish sage (S. lavandulaefolia) is effective in the management of mild to moderate AD, and study on pa tients did not show any adverse effect on them on taking sage. Administration of S. lavandulaefolia (Spanish sage) has been reported to be effective in improving the speed of memory and mood. Salvia essential oil also has been reported to improve immediate word recall.

Anumber of studies have investigated the effects of the aromas of plant essential oils on cognition and mood. The arom a of S. officinalis produced significant enhancement effect in the quality of memory factor derived from Cognitive Dru g Research (CDR) system. The findings suggest that the aromas of essential oils of Salvia species have some, but not al l the effects found fol lowing the oral consumption of the.herb.

The antioxidant and antiinflammatory properties of the S. officinalis or S. lavandu laefolia may offer a longterm protect ion in the pathogenesis of dementia.Pl Also, the moodenhancing properties of the herb may have applications in the tre atment of advanced dementia, in which disturbed mood and agitation feature as a major problem. There is no report of negative side effects associated with S. officinalis or S. lavandulaefolia despite many years of usage, The cytoprotective effect of sage against Aß (amyloid beta plaques) toxicity in neuronal cells has also been proven by the data presented in a study which provides the pharmacological basis for the traditional use of sage in the treatment of AD, Rosmarinic aci d as a component of sage has shown neuroprotec tive, antioxidative, and antiapoptotic effects against Aß toxicity, and t his could contribute, at least in part, to the neuroprotective effect of sage. Therefore, it is possible that rosmarinic acid, t he very low toxic natural compound, could be used as a therapeutic agent in the treatment of Alzheimer.disease.

Clinical Studies on Salvia Species against AD.

Salvia officinalis L. Preclinical and clinical studies have so far indicated that the extracts and essential oils of Salvia of ficinalis L., which have been used in European folk medicine for memory enhancement, have been favorable for acute memory and attention in healthy young and old participants.

Researchers have largely agreedthat the observed effects for the Salvia species have resulted from their cholinesterase i nhibitory effect. In this context, Akhondzadeh et al. clinically tested

Saliva officinalis, which has been used in European folk medicine for centurie, in Alzheimer's patients that were diagno sed using the National Institute of Neurological and Communicative Disorders and Stroke and Alzheimer's Disease and Related Disorders Association (NINCDS/ADRDA) criteria. The stage of the disease in the patients was established thr

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ough the ognitive subscale scores of the Alzheimer's Disease Assessment Scale (ADAScog) and Clinical Dementia Rati ng Scale (CDR); based on this, the authors suggested that S. officinalis could potentially provide an option for AD thera py based on its in vitro cholinergic binding properties with modulation of mood and its ernhancing effect on cognitive p erformance in humans. For instance, a randomized study was conducted by comparing the placebo group in thre centers in Tehran (Iran) over a period of four months. Te authors evaluated the efficacy and safety of a hydroalcoholic (45%) e xtract of S. officinalis cultivated in Iran at a fixed dose (60 drops/day) in patients with mild to moderate AD, whose age s ranged between 65 and 80 years (average of 71 years). The study revealed that the efficacy of S. officinalis extract in t he treatment of mild to moderate A was remarkable. The authors also noted that S. officinalis extract may reduce the ag itation of patients. Only six patients were recorded to have simple side effects such as vomiting and dizziness. Although it was found to be effective in patients with mild to moderate types of AD, the limitations of the study were concluded as a small number of patients and short followup time. On the other hand, no infornmation was available on the phytoc hemical content of the extract, which is quite indispensable for assessing the pharmacological effect as well as the ratio nal dosing and quality control of herbal medicines (phytotherapeutics). In another doubleblind, placebocontrolled, and c rossover study using ethanol extract (53%) prepared from the dried sage leaves of S. officinalis, 30 healthy participants (average age: 24.4 years; 17 males and 13 females) attended the laboratoryon 3 separate days (7 days apart as the wash out period) and were administered with doses of 300 and600 mg of the extract in opaque capsules each time in balance d mode. Daily mood was assessed 1h before and 4h after.

Ginseng

Ginseng is a traditional herbal medicine used for prevention and treatment of various diseases as a tonic. Recent scientif ic cohort studies on life prolongation with ginseng consumption support this record, as those who consumed ginseng fo r more than 5 years had reduced mortality and cognitive decline compared to those who did not. Clinical studies have al so shown that acute or longterm intake of ginseng total extract improves acute working memory performance or cogniti ve function in healthy individuals and those with subjective memory impairment (SMI), mild cognitive impairment (M CI), or early Alzheimer's disease (AD) dementia who are taking AD medication(s). Ginseng contains various compone nts ranging from classical ginsenosides and polysaccharides to more recently described intonin. However, it is unclear which ginseng component(s) might be the main candidate that contribute to memory or cognitive improvements or prev ent cognitive decline in older in dividuals. This review describes recent clinical contributors to ginseng components in c linical tests and in troduces emerging evidence that ginseng components could be novel candidates for cognitive impro vement in older individuals, as ginseng components improve SMI cognition and exhibits addon effects when co admini stered with early AD dementia drugs. The mechanism behind the beneficial effects of ginseng compo nents and how it i mproves cognition are presented. Additionally, this review shows how ginseng components can contribute to SMI, MC I, or early AD dementia when used as a supplementary food and/or medicine, and proposes a novel combination therap y of current AD medicines with ginseng component(s).

Ginseng (Panax ginseng Meyer) root has been traditionally used as a tonic in China, Japan, and Korea for over 2000 ye ars. The traditional tonic effects of ginseng extract include energizing the body, clearing brain and mood elevation, and finally brain health and longevity. Currently, ginseng is used as a functional food or alternative and/or a complementary medicine for health worldwide. There are several ginseng components, which are reponsible for tonic such as ginseno sides, ginseng polysaccharides andgintonin.Accumulating evidences show that ginseng components exhibit beneficial e ffects against cognitive impairments. On the other hand, dementia is a brain disease including AD, in which normal cog nitive functions are maintained during the growth period, but cognitive dysfunctions with accompanying personality ch anges occur in old age. Besides cognitive decline, other common symptoms of AD include apathy (reduced interest in o thers), emotional changes (e.g., becoming easily angered), behavioral changes (e.g., repeating questions, leaving the ho useunconditionally), difficulties with language fluency, and weak will. But dementia does notaffect the patient's consci ousness. AD dementia has various causes.Recent studies have identified that it is caused by a decrease in the ability to r emove neurotoxic waste products [e.g., Bamyloid (Aß) and tau protein] that accumulate in the brain with aging. If the waste product called Aß is efficiently removed from the brain, there is no problem. Otherwise, Aß molecules form aggr egates and become waterinsoluble Aß polymers. Thus, Aß polymers can lead to AD through brain inflammation and ox idative stresses. As these AB polymers spread to other brain areas, they cause toxicity to neurons, resulting in the death of nerve cells around Bamyloid plaques, which are large Aß polymer aggregates. In addition, Bamyloid plaques.induce d neuron deaths, observed in most patients with AD dementia, are closely asso ciated with the brain acetylcholine defici ency. Bamyloid (Aß) and tau protein also induce glutamatemediated excitatory neurotoxicity via NMDA receptor overa ctivation, which results in neurodegeneration.

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Goto.kola.(Centella.asiatica)

The accumulation of Bamyloid (AB) is a hallmark of Alzheimer's disease and is known to result in neurotoxicity both i n vivo and in vitro. We previously demonstrated that treatment with the water extract of Centella asiatica (CAW) impro ves learning and memory deficits in Tg2576 mice, an animal model of Aß accumulation. However the active compound s in CAW remain unknown.

Here we used two in vitro models of Aß toxicity to confim this neuroprotective effect, and identify several active consti tuents of the CAW extract. CAW reduced (Aß)induced cell death and attenuated Aß_induced changes in tau expression and phosphorylation in both the MC65 and SHSY5Y neuroblastoma cell lines. We confirmed and quantified the prese nce of several mono and dicaffeoylquinic acids (CQAs) in CAW using chromatographic separation coupled to mass spe ctrometry and ultraviolet spectroscopy. Multiple dicaffeoylquinic acids showed efficacy in protecting MC65 cells again st Aß_induced cytotoxicity. Isochlorogenic acid A and 1,5 dicaffeoylquinic acid were found to be the most abundant C QAs in CAW, and the most active in protecting MC65 cells from Aß_induced cell death. Both compounds showed neur oprotectiveactivity in MC65 and SHSY5Y cells at concentrations comparable to their levels in CAW. Each compound not only mitigated Aß_induced celldeath, but was able to attenuate Aß_induced alterations in tau expression and phosp horylation in both cell lines, as seen with CAW. These data suggest that CQAs are active neuroprotective components n CAW, and therefore are important markers for future studies on CAW standardization, bioavailability and dosing.

Centella asiatica (L.) Urban, (Apiaceae), known in the United States as Gotu Kola, is an edible plant that has been used for centuries in the Indian medical system of Ayurveda to boost memory, improve cognitive function and reverse cogni tive impairments. Extracts of Centella asiatica have been shown to be neuroprotective or neurotropic in a number of pre clinical models. A great deal of variability exists in the chemical composition, and consequently biological properties, o f different Centella asiatica extracts. In addition to variability due to diverse growing conditions of the source Centella a siatica plant material, the method of extraction has a substantial effect on the types of chemical compounds present in a n extract. We have previously demonstrated that the chemical profile of an ethanol extract from Centella asiatica is quit e different from that of a water extract of the same batch of plant material. In rodents, extracts of Centella asiatica have attenuated neurobehavioral and neurochemical effects of stroke, accelerated nerve regeneration. protected against oxida tive neurotoxicit and showed anti_inflammatory and antioxidant effects. In addition to these effects, the cognitive enha ncing action of water extracts of Centella asiatica has also been demonstrated in multiple animal models and in limited human studies. An extract of Centella asiatica was also shown to decrease Aß plaque burden in a transgenic mouse mod el of AD, however the extraction method was not described making it difficult to speculate which compounds may be responsible for that effect.

Centella asiatica (C. asiatica), also known as Indian Pennywort, is a member of the plant family Apiaceae. It is well known as an enhancer of cognitive functions. Several studies have demonstrated CA's effect on antidepression, anticonvulsant, neuroprotection, and anti-inflammation. In vitro and in vivo studies showed that C. asiatica effectively improves memory impairment in AD models. C. asiaticaextracted with water attenuated the behavioral deficit in AD mouse models. Prolonged treatment of C. asiaticasignificantly alters Nicotinamide, glycerophospholipid, and purine metabolism associated with AD. C. asiatica's antioxidative property was explored in attenuating AD symptoms and normal aging. C. asiaticatreatment lowered the lipid peroxidation , ROS levels, rescued mitochondrial dysfunction A randomized control study using C. asiatica on healthy elderly population showed improvement in age-related cognitive deficit and mood. Similarly, another study showed improvement in MCI, depression, insomnia, and loss of appetite the results are yet to be analyzed ved as a nutritional supplement for AD prevention.

IV. LEMON.BALM.(Mellissa.officinals)

Melissa officinalis (M. officinalis, lemon balm) is a medicinal plant from the Lamiaceae family. In Iran, this plant has been used as a folk medicine for numerous years. Medicinal preparations of this herb were used for treatment of indigestion, anemia, palpitations and mood disorders. M. officinalis impacts nervous disorders including reductions in excitability, anxiety and stress, and sleep disturbances. The total extract of M. officinalis and its different fractions have anticholinesterase activity. M. officinalis extract displays potent antioxidant activity and plant extracts can protect cells against oxidative damage induced by different pro-oxidant agents which eventually leads to lipid peroxidation. Administration of M. officinalis extract in AD patients can improve disease symptoms. The extract has been shown to alleviate scopolamine-induced amnesia in rats as an animal model of AD. However, the mechanism and constituents involved in these neuroprotective properties are not well known. In our previous study, we have reported that the acidic

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fraction of M. officinalis extract was more protective of PC12 cells against Aβ-induced toxicity compared to the total extract. It has been postulated that M. officinalis extract contains compounds with affinity for the nicotinic receptor. Several studies reported the role of the nicotinic receptor in Aβ-induced toxicity and nicotine attenuated Aβ-induced toxicity in cultured neuron. In the current study we intended to investigate the neuroprotective effect of the acidic fraction of M. officinalis extract against Aβ-induced oxidative stress and apoptosis in cultured cerebellar granule neurons (CGN). In addition, the role of the nicotinic receptor was investigated.

V. METHOD

Collection of Material

All the ingredient are collected from local market and purches from online

Preformulation :- Preformulation is the stage of development during which the physieo chemical properties of the drug substance are characterized and established.

Figure no. 4.3.1 Angle of repose

Figure no. 4.3.2 Bulk & Tapped density

Figure no. 4.3.3 Moisture content

Figure no. 4.3.4 Solubility test

Flow property of powder :-

The flow of powder is a complex phenomenon that is sensitive to properties of the powder itself and external factors such as humidity.within the powder many parameters affect flow properties. The main influencing factors are particle size and particle shape and width of particle size distribution.

Bulk density:- Bulk density measurement carried out by using flat round measuring cylinder with a volume of 50 ml. the measuring cylinder was half filled the 5 gm of powder and reading was observed to the nearest millimeter.

Bulk density = w/vo

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Tapped density:- After 50 ml and 100 tapsthe corresponding reading was observed to the nearest milliters. The taped volume was recorded when the difference between the two volume was smaller than 1 ml.

Tapped density: **After 50 tapping =W/V1**
After 100 tapping =W/V2

Angle of repose :- It was determined by fixed funnel method on to a bottom graph paper. The funnel was fixed on a height and moved according to the height of the conical heap in order to keep a constant distance between the top of the heap and funnel. The angle of repose was determined by measuring the height of cone of powder with the help of the formula.

Tan (A)= height/base

Hausner's ratio :- Flow property was defined according to the hausner ratio =(Tapped density)(Bulk density) Flow of powder was measured using a standerd funnel. In a dry funnel,whose bottom opening has been blocked,the sample was introduced without compacting. After removing the blockage from the bottom opening of the funnel,the time taken for the entire sample to flow out through the funnel was measured.

Hausner ratio = (Tapped density / Bulk density)

Figure no. 4.4.2.1 Extraction

Figure no. 4.4.2.2 Extaction

Figure no 4.4.2.3 Test

Figure no.4.4.2.4 Test & Maceration

Phytochemical Screening of Drugs

Phyto chemical screening is identification of different classes of phyto constituents present in various parts of a plant. Phyto chemical are the chemicals that are present naturally in plant

Test for Alkaloids

Mayer's test: 5 gm of Ashwagandha powder was dissolved in 20 ml of ethanol.Then the mixter was treated with few drops of wagner's reagent yellow ppt obtained.

Wagner's test: 5gm of Turmeric powder was dissolved in 15 ml of methanol.then extract was treated with few drops of wagner's reagent brownish red ppt obtained.

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Flavonoids test:

Alkaline reagent test: **10 gm** of lemon balm powder was dissolved in20 ml of ethanol and 80 ml water added then heated 45 min. filtered the extract and treated few drops of NaoH solution yellow colour ppt obtained.

Sulphuric acid test: **2gm** of Ginkgo biloba powder was dissolved in 20 ml of ethanol stand for 24 hours.then extract was treated 2ml of sulphuric acid red colour show.

Zinc hydro chloride test: 5 gm of Ginseng powder was dissolved in 20 ml of ethanol stand for 2 days. Then extract was treated mixture of of zinc dust & conc.HCl deep red to magenta colour obtained.

Triterpenoid test:

Libermann-burchard test: 5 gm of sage powder dissolved in 50 ml of water then heated 45 min.extract was screet out then treated few drops of acidic anhydride and heated with sulphuric acid Green coloure obtained.

Salcowski test: 5 gm of Gotu kola powder dissolved in 50 ml of water then heated 30 min extract was screet out then treated few drops of Sulphuric acid red coloure show.

Phenolic test:

Feric chloride test: 2ml extracted solution of sage react with fecl3 solution and added few drops of NaoH solution blue colour obtained.

Preparation of Powder

Every herb selected with goog quality by making sure its cleanness.All leaf and root were collected from near by sources and grained with the help of grinding tool to get fine particles and the powder was sieved by the IS standerd size of 90 micron then powder is dried and its ready to be utilized as a fine powder was collected and store in air tight container to keep away from moisture.

Formula for preparation According to European Jounal of Pharmaceuticals & Medicle Research the formulation has been divided into 3 groups powder for the treatment of Dementia. **S. NO**	**Ingredient**	**F1**	**F2**	**F3**
1	**Ashwagandha**	**2gm**	**3 gm**	**4gm**
2	**Curcuma Longa**	**2gm**	**3 gm**	**4gm**
3	**Ginseng**	**2gm**	**3 gm**	**4gm**
4	**Ginkgo Biloba**	**2gm**	**3 gm**	**4gm**

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5	Sage	2gm	3 gm	4gm
6	Lemon Balm	2gm	3 gm	4gm
7	Gotu Kola	2gm	3 gm	4gm

Table: Formula for Preparation

VI. RESULT AND DISCUSSION

Result:

The active ingredient tested in this paper exhibit the consider able properties as mentioned below .

Organoleptic Properties:

S.NO	Organoleptic Properties	Observation
1	State	Solid fine powder
2	Color	Yellowish black
3	Odor	Mint flavoure
4	Texture	Amorphous nature

Table: Organoleptic properties of API

Solubility

As per the method following result obtain

S.NO	Solvent	Observation
1	Water	Soluble
2	Ethanol	Soluble
3	Chloroforme	Slightly Soluble
4	Methanol	Soluble

Table: Solibility Test

Flow Property:

As per the method given 4.4.1 following result obtain.

- The Bulk density of the preparation was 0.6 g/ml.
- Tapped density of preparation after 100 tapping =0.75 g/ml.

Angle of Repose :

As per the method the method given 4.4.1 the following result obtaine that angle of repose19.29 which is fair (aid not needed).

Hausner' s Ratio :

As per the method given result obtains that Hausner's ratio of the API was 1.25 g/m

Carr's Index :

As per the method given result obtain that carr's index is 20 .

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VII. CONCLUISION

Alzheimer's disease (AD) is a progressive, irreversible, and debilitating neurodegenerative disorder that affects millions of people worldwide. The disease is characterized by cognitive decline, memory loss, and behavioral changes, ultimately leading to complete dependence on caregivers.

1. Immunotherapies: Targeting Aβ and tau proteins with antibodies or vaccines.
2. Tau-targeting therapies: Modulating tau protein phosphorylation and aggregation.
3. Neuroprotection and neuroregeneration: Promoting neuronal survival and regeneration.
4. Personalized medicine: Tailoring treatments to individual patient needs genetic profiles and herbs and herbal remedies have a long history of traditional use and appear to be safe and effective they have unfortunately received little scientific attention. numerous plants and their constituents are recommended in traditional practices of of medicine to enhance cognitive function and to alleviate other symptoms of AD. While conventional medications are available, many people explore herbal remedies to complement or alternative to traditional treatments. Here are some herbs that have been studied for their potential in Alzheimer's disease management:

1. Ginkgo biloba:Improves cognitive function, memory, and blood flow to the brain.
2. Panax ginseng:Improves cognitive function, memory, and reduces oxidative stress.
3. Curcuma longa (Turmeric):Reduces inflammation, oxidative stress, and improves cognitive function.
4. . Melissa officinalis (Lemon balm):Improves cognitive function, memory, and reduces stress and anxiety.
5. Salvia officinalis (Sage):Improves cognitive function, memory, and reduces oxidative stress.
6. Centella asiatica (Gotu kola):Improves cognitive function, memory, and reduces oxidative stress
7. 7.Ashwagandha (Withania somnifera): Neuroprotection and neuroregeneration: Ashwagandha may promote neuronal survival and regeneration, potentially slowing disease progression.

REFERENCES

(1) Lee R., Kim hun J.,Emerging evidence that ginseng componenets improve cognition in subjective memory impairment mild cognitive impairment and early Alzheimer disease dementia(2024),page no.245-252.[journal of ginseng research]
(2) Milella L.,Lela L.,et al.,Withania somnifera (L.)dunal,a potential source of phtochemicals for treating neurodegenerative disease A systemic review (2024),page no.1-41 [MDPI]
(3) Orhan erdogen I.,Ertas A.,A focused review on cognitive improvement by the genus salvia L. (sage) from ethnopharmacology to clinical evidence,(2023) page no.1-18.[]MDPI]
(4)Li H.,Wang Z.,Panax ginseng in the treatment of Alzheimer disease and vascular dementia(2023) page no.506-514[journal of ginseng research]
(5). Laurindo L.,Carvalho G. et al.Curcumin based Nanomedication in the treatment of Inflammatory and Immunomodulated diseases An evidence based Comprehensive Review.(2023) Page no 1-33. [MDPI]
(6).Agueda A. Rostagno, Pathogenesis of Alzheimer disease,(2023) page no.1-4. [MDPI]
(7).Rao V. ,subhramaiam G., Rational for a multi-factoral Approach for the reversal of cognitive decline in Alzheimer disease and MCI: A review(2023) page no.1-23.[MDPI]
(8)Hossein M.,Sahraei R.,The Ameliorative impact of centella asiativa on the working Memory deficit in streptozotocin induced rat model of Alzheimer disease,(2022),vol.13, page no. 1-10.[Neuro science]
(9)Craciun L.,Ficai A.,et al., Melissa officinaliscomposition,pharmacological effects and derived release system A review (2022) page no.1-25.[MDPI]
(10) Gregory J., Rao V. , et al .Neuro protective herbs for the management of Alzheimer disease, (2021) page no. 1-19.[MDPI]
(11)Paul S.,Ananad U.,et al., withania somnifera (L.)Dunal (Ashwagandha): A comprehensive review on ethnopharmacology, pharmacotherapeutics, biochemical and toxicological aspects,(2021)page no.1-40.[bio medicine & pharmacotherapy]
(12)Singh S.,Srivastav S.,Neuroprotective and antioxidant effect of Ginko biloba extract against AD and other neurological disorders (2019) page no. 1-9.[Neurotherapeutics]

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