IN VITRO AND IN VIVO ASSESSMENT OF SEMECARPUS ANACARDIUM SEEDS FOR NOOTROPIC & HALLUCINOGEN ACTIVITY

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Abstract

The study's main objective is to assess whether Seme carpus anacardium seeds may enhance wistar rats' memory. Materials and Techniques Utilizing the Morris water test and a raised in addition to labyrinth contraption to gauge a property called move dormancy, the seeds of Seme carpus anacardium were separated utilizing a consecutive dissolvable extraction strategy. As a result, transfer latency was reduced dose dependently when using Seme carpus anacardium seeds extract in comparison to the control group. Conclusion: Its viability against neurodegeneration and backing for its nootropic characteristics were shown by the reduction in move idleness, which was portion subordinate.

Keywords: Seme Carpus, Hallucinogen Activity, Anacardium Seeds, Nootropic.

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1. Introduction

The impact of chemicals on biological systems can be studied using both in vitro and in vivo tests. These evaluations can be applied to Seme carpus anacardium seeds to determine their potential as a nootropic (cognitive-enhancing) and hallucinogenic substance. Let's examine each evaluation technique in more detail:

In Vitro Assessment: In vitro investigations entail carrying out tests away from a living thing, typically in a lab. These evaluations seek to comprehend how the material behaves in isolated cells, tissues, or biochemical systems. The following in vitro evaluations can be carried out on Seme carpus anacardium seeds:

Cell Viability Assays: These studies assess how Seme carpus anacardium extracts or chemicals affect various cell types' viability and proliferation. Different amounts of the seed extracts can be applied to various cell lines, such as neuronal cells or cell cultures generated from the brain. Using methods like the MTT assay, which assesses metabolic activity, or fluorescent dyes that signal cell death, the viability and possible harmful consequences can be evaluated.

Neurotransmitter Release Studies: Seme carpus anacardium may interact with neurotransmitter systems to affect cognition and hallucinations. Studies performed in vitro can look into how seed extracts affect neurotransmitter release, absorption, or receptor binding. For instance, the potential of the extracts to increase acetylcholine release or decrease monoamine oxidase (MAO) enzymes, which control neurotransmitter breakdown, can be examined.

Receptor Binding Assays: These tests assist in determining whether substances from Seme carpus anacardium interact with particular brain receptors. Researchers can evaluate the affinity and efficacy of the seed extracts for receptors linked to cognitive function or hallucinogenic activity using methods like radioligand binding or fluorescence-based tests. Examining interactions with serotonin receptors (5-HT2A) for the possibility of hallucinogenic effects or acetylcholine receptors for cognitive impacts are two examples.

In Vivo Assessment: In vivo studies entail performing tests on living things, such animals, to see how a drug affects a biological system. In vivo analyses can shed light on the impact of Seme carpus anacardium seeds on behavior, cognition, and physiological functions. The techniques listed below can be used:

Animal Behavioural Studies: These tests examine how Seme carpus anacardium seeds affect animal behaviour, thought processes, and memory. Creatures treated with seed concentrates can be tried utilizing different conduct standards, for example, the Morris water labyrinth, Y-labyrinth, or outspread arm labyrinth, to evaluate their spatial learning, memory, and mental capacities. Open-field tests or elevated plus mazes can also be used to investigate changes in locomotor activity, anxiety, and exploratory behavior.

EEG and Neurophysiological Recordings: Animals given Seme carpus anacardium extracts can be monitored for brain activity using electrophysiological methods like electroencephalography (EEG). EEG can shed light on how nootropic or hallucinogenic substances may affect brain wave patterns, sleep-wake cycles, or neuronal synchronization.

Pharmacokinetic Studies: These research look at how Seme carpus anacardium components are absorbed, distributed, metabolized, and excreted by living things. Researchers can ascertain the bioavailability, metabolism, and pharmacokinetic properties of the active ingredients by giving seed extracts to animals and analyzing blood or tissue samples. This knowledge aids in understanding how the substances interact with the body and get to their intended brain targets.

Figure 1: Seme Carpus Anacardium Seed

In Vitro Assessment

The term "in vitro assessment" describes the conduct of studies in a carefully monitored lab setting without the use of a living creature. It enables scientists to examine how chemicals affect distinct cells, tissues, or biochemical systems. Several in vitro tests can be carried out to determine the nootropic and hallucinogenic potential of Seme carpus anacardium seeds.

To assess the effects of Seme carpus anacardium extracts or compounds on the development and viability of various cell types, cell viability assays are frequently used. For instance, the viability of neuronal cells or brain-derived cell cultures can be evaluated after exposure to various seed extract concentrations using methods such as the MTT assay or fluorescent dyes that indicate cell death.

In Vivo Assessment

In vivo testing entails performing studies inside a living organism, usually an animal, to watch how a drug affects a biological system all at once. In vivo analyses offer a more thorough understanding of their effects on behaviour, cognitive, and physiological processes when assessing Seme carpus anacardium seeds for their potential as a nootropic and hallucinogenic drug. These assessments can be conducted using a variety of techniques.

An important part of assessing the impact of Seme carpus anacardium seeds is animal behavioural research. Different behavioural paradigms can be used by researchers to evaluate the cognitive, memory, and spatial learning abilities of animals given seed extracts. For example, navigational abilities and memory arrangement can be surveyed utilizing the Morris water labyrinth, Y-labyrinth, or spiral arm labyrinth. Tests like the elevated plus maze or open-field tests can also be used to look at alterations in anxiety levels and exploratory behaviour.

The effects of Seme carpus anacardium seeds on brain activity can be better understood by using electrophysiological methods like electroencephalography (EEG). Researchers can evaluate changes in neuronal synchronization, sleep-wake cycles, and other neurophysiological characteristics by observing electrical brain wave patterns. These metrics can be used to link the effects of the seed extracts to mental acuity improvement or hallucinogenic activity.

2. Literature Review

Kothari, S. L., S. Kachhwaha, and S. Vyas (2019). This overview provides the startling AD statistics, a list of FDA-approved medications, a description of each one's restrictions, treatment targets, and synergistic drug development approaches. The utilization of restorative plants and their ethnopharmacological reasonableness as a substitute technique for the review and improvement of Promotion treatments, which is featured in this survey, has been upheld by various examinations. The meaning of normalization and metabolite profiling of

restorative plants in the domain of pharmacognosy is additionally examined in this article. Also, the specific advances that should be taken to move translational medication improvement from the degree of lab examination to patient treatment are featured.

A. K. A. Raut, N. S. Sawant, A. S. Badre, A. J. Amonkar, & A. D. Vaidya (2007). The goal of this review is to gain a deeper understanding of S. anacardium Linn's activity and its limited therapeutic window. It is crucial to comprehend the relevance of the Ayurveda-inspired research on this widely respected medicinal plant. Bhallatak cannot be produced on a large scale, especially as medication, due to its toxicity. However, bhallatak continues to be used in a variety of ways by conventional healers and doctors in Indian Systems of Medicine. Diverse in vitro and in vivo models have been used for a number of experimental research. These studies, as described in the recent literature, continue to place a strong emphasis on their anticancer and antiarthritic efficacy.

(2010) Ramadan, M. F., Kinni, S. G., Seshagiri, M., and Piece In this review, the rough seed oil from S. anacardium was investigated utilizing methods from section, gas, dainty layer, and fluid chromatography to decide the lipid classes, unsaturated fats, and fat-dissolvable bioactives. Most of the rough seed oil was comprised of unbiased lipids, trailed by glycolipids and phospholipids. The vitally unsaturated fats were oleic, palmitic, and linoleic. In contrast with polar lipids, unbiased lipid classes had bigger proportions of unsaturated to immersed unsaturated fats. The three essential sterols were stigmasterol, camp sterol, and - sitosterol. The two essential tocopherols were - tocopherol and - tocopherol. By utilizing electron turn reverberation spectrometry, the revolutionary rummaging activity of S. anacardium seed oil and additional virgin olive oil was tried against galvinoxyl and 1,1-diphenyl-2-picrylhydrazyl extremists. S. anacardium seed oil showed a more grounded RSA.

Ahmed, B. A., Kumar, T. S., Rao, M. V., and T. Gouthaman (2008) The distribution, phytochemical, and pharmacological features of S. anacardium are covered in the current review. Additionally, the Siddha formulation of S. anacardium nut extract's safety assessment has been mentioned. Also covered are S. anacardium plant enhancement experiments (seed germination and in vitro propagation).

It is 2022. In a paper co-authored by R. Sundaram, K. Muthu, P. Shanthi, and P. Sachdanandam. The purpose of this review was to examine the effects of a high-fat diet on mice and to determine whether or not catechol subordinates I-IV and a bioflavonoid isolated from Seme carpus anacardium seeds could strengthen cells and reduce hyper lipidemia. After 30 days on a high-fat diet, hypercholesterolemic rats were given 50 milligrams per kilogram of body weight (mg/kg b.wt.) of biflavonoid and oral administration of catechol subordinates I-IV. The medications significantly reduced lipid profiles, weight increase, and organ weight. However, hypercholesterolemic animals treated with biflavonoid were found to have more profound effects across the board than those treated with all catechol subordinates (I-IV). The effect of biflavonoid on a variety of metrics was consistent with that of the reference medication simvastatin. In addition, these five combinations were employed to perform in vitro cell reinforcement exercises, where biflavonoid demonstrated much higher cell reinforcing potential at a convergence of 1000 g/ml compared to catechol subordinates (I-IV).

3. Research Methodology

The anacardium seeds obtained from the nearby market. Senior botanists classified and verified the seeds according to taxonomy.A voucher specimen is retained in the division for reference in the future.

Sequential Solvent Extraction Technique

The seeds were separated into smidgens, permitted to dry in the shade, and afterward precisely handled into a coarse powder. Petroleum ether was employed in a Soxhlet extraction procedure to entirely eliminate all lipids from the coarse seed powders. After letting the marc dry, a mixture of water, butanol, methanol, and chloroform was used to extract the marc for a total of 72 hours. The concentrations were then separated, concentrated, and dried after undergoing

extensive extraction.Unsaturated lipids, steroids, flavonoids, glycosides, alkaloids, terpenoids, and other complex compounds were all on the table after a comprehensive primer phytochemical analysis of the concentrates.

Laboratory animals

absence of illness A vendor approved by the Committee for the Protection of Animals Used for Experimental Purposes (CPCSEA) supplied 25–35 g male Swiss mice with a generally albino appearance. The Institutional Creature Morals Panel (IAEC) supported the exploratory approach, and the CPCSEA guidelines of the Indian government's Service of Climate and Timberlands were continued in the creature's consideration. The animals were kept in polycarbonate cages, with six to eight individuals per space, and given a 12-hour light and dark cycle.

Acute Toxicity study

The investigation on acute oral toxicity was carried out in accordance with OECD Guidelines-425. Grown-up female Charles Encourage rodents that had abstained the prior night got the test substance orally after the all over methodology. After that, each mouse was observed for an additional 48 hours to search for signs of mortality or damaging effects, as well as social or neurological abnormalities**.**

Preliminary Phytochemical Analysis

Using a pharmacogenetic approach, we looked for the presence of alkaloids, unsaturated lipids, terpenoids, steroids, flavonoids, and glycosides in the semi-carpus anacardium seed focus (SAS).

Laboratory Design:

There were six arrangements of six male wistarrats, each gauging somewhere in the range of 150 and 200g. The trial setups for the two models were utilized

EPM, or elevated plus maze

It is imagined that the Raised In addition to Labyrinth (EPM), which utilizations move dormancy (TL) as a critical standard, offers a reasonable device for assessing learning and memory. (8) Utilizing EPM, the nootropic capability of a few plants was assessed. The constructed EPM has two outstretched arms that are about 50 by 10 cm in size and are connected to two enclosed arms that have walls that are about 40 cm in height. The gadget's arms were associated by a concentrate square (10X10) that gave it an or more clue appearance. The labyrinth was kept in a faintly lit space that was 50 cm off the floor. (9) Each mouse was placed in the middle of the stage, facing away from the audience, at the end of the open arm immediately after the last measurement. Movement laziness (TL) is the amount of time (in seconds) it takes a four-legged animal to go from an open position to a closed position. The TL was captured at the massively educational convention for all species. This showed that task (memory) maintenance was evaluated 24 hours after the primary primer day, 29th day, or last seven-day stretch of the four-week time period. One and a half hours after the previous measurements, EPM was used to test all guinea pigs' spatial memory. Memory improvement is seen by a significant decrease in TL retention.

Water Maze Morris (MWM)

Rodent spatial learning and memory are often studied using the Morris water maze (MWM) test. Using the above procedure and settings, mice were tested in the Morris water maze, a memory and learning test.

In exploratory 1-month-old male Wistar rodents, learning and memory are assessed utilizing this method. Each animal was put through four days of procurement preliminary testing over the course of a month's time, with the final day of testing (stage elimination) occurring on day five. Water was placed within a circular plastic swimming pool that had a 117 cm diameter and a height of 60 cm. The water was made opaque by adding 200 milliliters of evaporated milk, which also made it challenging to view the stage. The pool's perimeter was divided into four sections, one each to the north (N), south (S), east (E), and west (W). A 8x8 cm Plexiglas platform submerged 1 cm in water served as the focal point of one of the quadrants, from which the rat could launch itself to a more secure location. Each mouse had access to the pool for 60 seconds the day before the test so that it could grow accustomed to the training setting. Each preliminary's latency (TL) was tracked from the time it entered the water until the time it emerged onto the stage. If the rodent had not discovered the stage after 120 seconds, it was physically placed there for a brief break. On day three, 30 days and 96

hours after the conclusion of the four-week summit, the stage was dismantled. For assessment, the distinctions in boundaries like Exchange Idleness (TL) were recorded during the rat's 60-second free swim.

Statistical Analysis:
Post hoc Tukey's test for pairwise comparisons was performed in Graph Pad Crystal. 0.05 was significant. The average and the standard deviation of the results are reported.

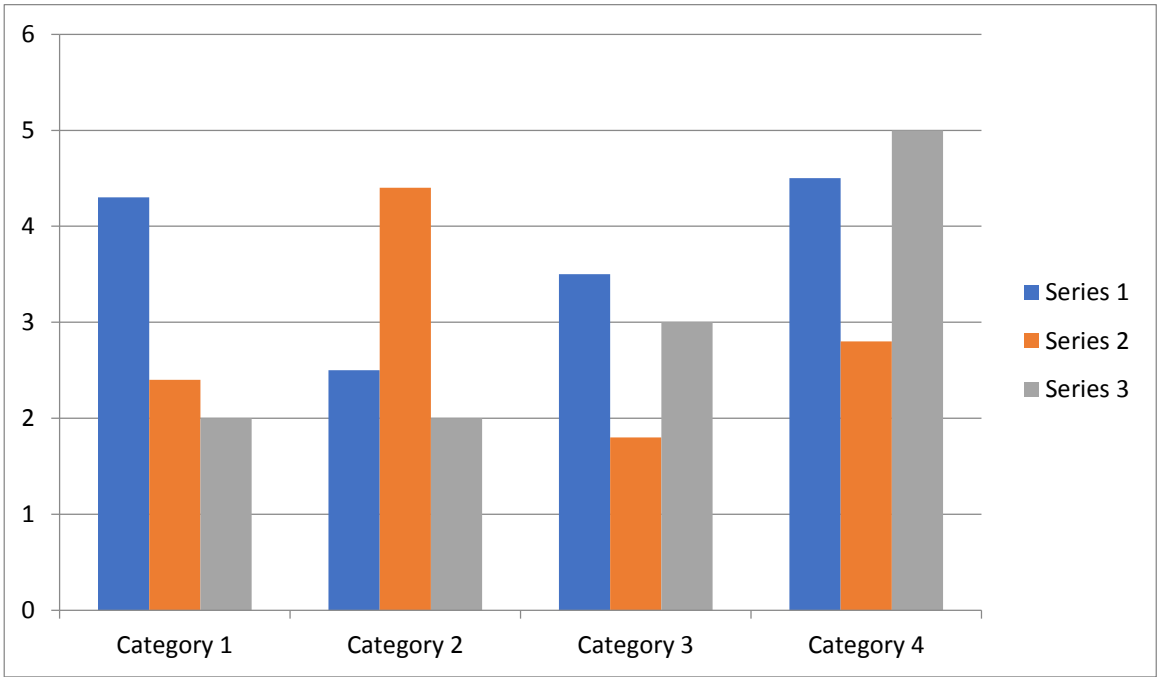
4. Result And Discussion

Phyto-chemical testing of semi carpus anacardium seeds
Preliminary phyto-examination indicated many active components. These comprised amino acids, lipids, carbohydrates, proteins, oils, glycosides, alkaloids, steroids, terpenoids, tannins, and phenolic compounds.

Using EPM, the impact of semi-carpus anacardium seeds:
The TL is the time it takes the creature to use all four legs to go from open to covered arms. The significant decrease in TL value reflected enhanced recall. Semi-carpus anacardium seeds were cared for over the course of four consecutive weeks, and by day 29, they had significantly reduced TL in comparison to the same benchmark groups, demonstrating a significant increase in memory. As shown in Table 1, the TL was increased on day 29 thanks to contributions from the semi-carpus anacardium seeds and benzodiazepine in bunch VI.

Table 1: result of impact of semi carpous using EPM

Treated Groups	TL after 24 hours	TL after 28 days
Control group automobile	49.59 ± 2.24	53.09 ± 2.86
toxic group: benzodiazepines (7mg/kg/i.p.) alone	73.65 ± 1.63***	62.10 ± 1.17***
Low SAS dosage (100 mg/kg/p.o)	43.20 ± 1.29***	44.31 ± 0.81***
Medium SAS dosage (200 mg/kg/p.o)	21.55 ± 0.85***	13.77 ± 0.8***
High SAS dosage (400 mg/kg/p.o)	38.57 ± 1.19***	35.08 ± 2.74***
Medium SAS dosage (200 mg/kg/p.o) + Diazepam (7mg/kg/i.p.) alone	20.75 ± 0.91***	1.25***



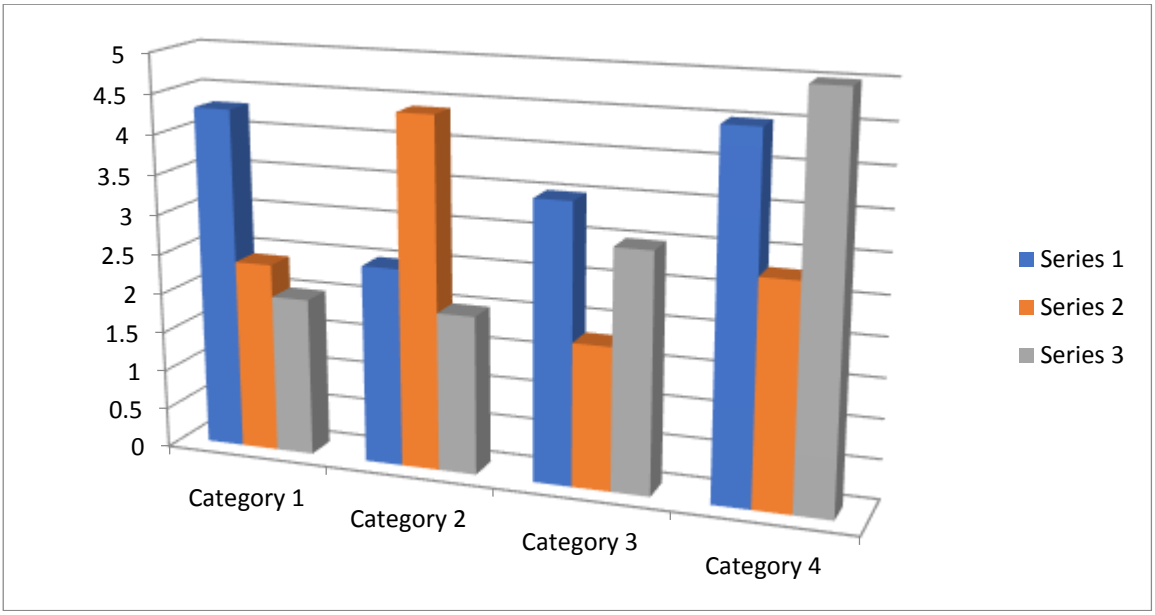
The results of employing MWM with semi-carpus anacardium seeds:

The results, provided in Table No. 2, suggest that a link exists between learning and memory and a state of dormancy. The decline in TL in MWM observed in rodents is

indicative of enhanced memory and learning. After long-term administration of diazepam (7 mg/kg, i.e.) and Semi carpus anacardium seeds (in varying doses), the asrats' EL levels were evaluated on Days 1, 15, and 30. When compared to the controls, they significantly decreased, but learning and memory significantly improved. The maximum dose of 300 mg/kg/p.o. had a significant effect on TL compared to the vehicle-treated control group.

Table 2: employing MWM with semi-carpus anacardium seeds

Groups	**TL- Day 1**	**TL- Day 15**	**TL- Day 20**
Control group automobile	66.50 ± 2.82	27.22 ± 0.58	25.08 ± 0.59
toxic group: benzodiazepines (7mg/kg/i.p.) alone	75.02 ±2.81***	20.33 ± 2.25***	18.22 ± 0.97***
Low SAS dosage (100 mg/kg/p.o)	51.42 ± 2.37***	25.43 ± 1.24	23.08 ± 2.56
Medium SAS dosage (200 mg/kg/p.o)	28.51 ± 1.64***	24.15 ± 0.98	21.66 ± 1.94*
High SAS dosage (400 mg/kg/p.o)	37.55 ± 2.78***	21.23 ± 1.89**	19.09 ± 0.64***
Medium SAS dosage (200 mg/kg/p.o) + Diazepam (7mg/kg/i.p.) alone	25.71± 1.17***	19.91 ± 3.24*	20.05 ± 2.84*



In significant Exteroceptive social creature models, the ongoing review demonstrates the memory-further developing ability of different dosages of Semicarpus anacardium seeds. All exploratory creatures got changing dosages of the concentrate, and the impacts were assessed as per move inactivity. The memory-improving properties of the concentrate were similar to those of the benzodiazepine anxiolytic diazepam. Memory and learning surveys were conducted using a social model based on the MWM and EPM. As per the concentrate, TL fundamentally diminished during preparing and trial and error, showing improved learning and memory.

Biflavonoids, and more especially biflavones A, C, A1, and A2, served as the study's foundation because of their efficacy in reducing oxidative stress and inflammation.

As per an immunohistochemistry study, patients with Alzheimer's illness show determined aggravation specifically parts of their minds.

Since irritation can harm have tissue, calming drugs were accepted to forestall both the beginning and movement of Alzheimer's infection. The calming exercises of Semicarpus anacardium might be fundamental for neuroprotection.

Triterpenoids, phenols, and flavonoids were discovered as a result of the phytochemical analysis. Dementia and cognitive decline result

from neuronal death, therefore these compounds and the other necessary components present played a protective role in the management of oxidative pressure.

It has been exhibited that mental brokenness is related with both a lessening in cholinergic transmission and a feeling of focal cholinergic transmission, the two of which are associated with memory disability. Cognitive deficits in Alzheimer's disease are closely correlated with cortical cholinergic cell loss and dysfunction. Dementia that is causally linked to Alzheimer's disease can be treated with drugs that boost the brain's cholinergic capacity.

Studies show that acetylcholine is the most important neurotransmitter in the regulation of cognitive functions. The particular loss of cholinergic neurons or decreased acetylcholine union has been perceived as a trait of dementia of the Alzheimer's infection type. Flavonoids known as biflavones A, C, A1, and A2 are key phytoconstituents that have been ranked for their cancer-preventative efficacy.
In light of all these factors and the results, we can categorize semi-carpus anacardium seeds as a nootropic and a neuro-nutrient because they are widely ingested without the risk of any negative side effects.

5. Conclusion

This study validates the claims made by Ayurveda and other medical systems regarding the memory-improving benefits of semi carpus anacardium seeds. Through move dormancy, the GABA-benzodiazepine pathway, Throb restraint, and calming activities, rodents' learning and memory were fundamentally improved. To get familiar with the numerous possible pathways for treating mental sicknesses and their utility in the therapy of neurodegenerative and mental ailments, extra top to bottom exploration is required. In addition, semi carpus anacardium seeds can be used to medicines for Alzheimer's disease as nutritional supplements.

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