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Original Article

Phytochemical Profiling of Mahapaisachika Ghrita Using GC-MS and its Potential Neuroprotective Pathways in ADHD

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ABSTRACT

Background: *Ghrita* is one of the most commonly used vehicles of medicine administration in *Ayurveda*. It owes its widespread usage to its capability to spread and target all organs and tissues within a short duration without altering the primary drug itself. Based on LBDDS (Lipid-Based-Drug-Delivery-Systems), *ghrita* facilitates enhanced bioavailability and solubilisation for both water and lipid soluble components. Classically in *Ayurveda samhitas Mahapaisachika Ghrita* is indicated in *Unmada, Apasmara, Graha rogas* and comprises herbal components such as *Jatamansi, Haritaki, shankhapushpi, kapikacchu, vacha* among others. **Objectives:** This article aims to explore the biochemical and neuropharmacological effects of *Mahapaisachika Ghrita* and to highlight its possible key role in Ayurveda by way of management of conditions like ADHD. **Materials and Methods:** Gas Chromatography-Mass Spectrometry of the drug *Mahapaisachika Ghrita* was conducted to separate, identify and quantify the constituents present in the sample to be used for further interpretation of mode of action of the drug. **Results:** 30 major Phytochemicals along with their Peaks, R. times, area%, CAS and Names were identified through GCMS study of *Mahapaisachika Ghrita*. **Conclusion:** Chemical constituents found in *Mahapaisachika ghrita* by GCMS study showed significant effect on reducing neuroinflammation and improved neuroprotection through various neural pathways. If given orally, it may be absorbed and distributed by altering the electrolyte-based transport systems, drug uptake, efflux and disposition and if administered as *nasya*, could act through lipid-mediated free diffusion directly across the blood brain barrier.

Keywords: ADHD, Ayurveda, GCMS, Ghrita, Mahapaisachika ghrita, Nasya, Unmada.

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INTRODUCTION

ADHD is a neurobehavioral condition affecting both children and adults characterized by Attention deficit, motor overactivity and motor restlessness and impulsivity. In *Ayurveda* it is often correlated with *Unmada*, a condition of the *manovaha srotas*. *Mahapaisachika Ghrita* has been mentioned in *Caraka Samhita Chikitsasthana Adhyaya 9 Sloka 45-48* (Cakrapanidatta, 2008) with its use in conditions like *Unmada, Apasmara* and *Graha rogas* among others. It has also been mentioned in *Sahasrayoga Ghrita prakarana* 44 (Nishteshwar, 2008).

It contains a total of 23 drugs processed in *Go Ghrita*. Those *are Jatamansi, Haritaki, Shankhapushpi, Charati, Kapikacchu, Vacha, Trayamana, Agnimantha, Kshriakakoli, Coraka, Katurohini, Vayastha, Varahi, Shatapushpa, Mishreya, Guggulu, Shatavari, Amalaki, Rasna, Gandha Nakuli, Shyonaka, Shalaparni and Vruschikali*. It has also been hailed as *Buddhi* and *Smruti Karam* as well as *Anga Vardhana* especially in children (*Bala*).

GC-MS is a potent analytical method employed to detect volatile and semi-volatile components in complex herbal formulations. It facilitates possible correlation between chemical compounds and pharmacological effects offering scientific basis for *Ayurveda* formulations.

In the present study, The GC-MS analysis of *Mahapaisachika Ghrita* revealed the presence of various compounds exhibiting neuropharmacological effects by modulating neurotransmitter systems, showing anti-oxidant and anti-inflammatory properties or govern neuronal signalling pathways which are significant in attention and executive function.

When *ghrita* is administered orally, gastric lipases start the digestion of the triglycerides into monoglycerides and eventually free fatty acid (Aeri and Tripathi, 2022). The embedded active constituents are dissolved and absorbed better due to *ghrita* being a lipid-based formulation thereby improving solubility (Jadhav and Tare, 2025). A solubilised solid solution containing microionized particles (Aeri and Tripathi, 2022). The lipid-based

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drug formulation is thus absorbed and distributed by altering the electrolyte-based transport systems, drug uptake, efflux and disposition (Jadhav and Tare, 2025).

Ghrita acts like a trojan horse. It transports the active therapeutic constituents beyond the blood brain barrier by one of three mechanisms such as lipid mediated diffusion, rapid carrier-or-receptor mediated transport or crossing the blood brain barrier as a complex to provide restorative and protective effects on the nervous tissue by cleansing the damage through its antioxidant and anti-inflammatory effects and enhancing prime neural signalling molecules (acetylcholine modulation) (Satapathy *et al.*, n.d.).

Nasya karma facilitates a more targeted absorption of active components when compared with other modes of administration. When *ghrita* is the solvent administered through the nose, due to its characteristic as a lipophilic compound it is likely absorbed either by the olfactory pathway through the olfactory epithelium at the roof of the nasal cavity (Xinchen *et al.*, 2023). It can then enter the olfactory Sensory neurons or it can diffuse through gaps between cells (Koo *et al.*, 2024). The other pathway involved is the Trigeminal Pathway where the compounds are absorbed along its branches providing a direct path to deeper cerebral regions (Xinchen *et al.*, 2023).

MATERIALS AND METHODS

Preparation and Procurement

The *Mahapaisachika Ghrita* was prepared and procured from GMP Certified Nagarjuna Pharmacy, Bengaluru.

Analytical Study

Mahapaisachika Ghrita was analyzed for its organoleptic parameters such as organoleptic characters and physicochemical standards, preliminary Microbiological testing was carried out in were analysed in AYUSH approved ASU Drug Testing Laboratory of Nagarjuna Pharmacy.

Gas Chromatography Mass Spectrometry

Gas Chromatography Mass Spectrometry is a technique used to identify and measure chemicals within a sample. Gas Chromatography separates the different chemicals present in a sample whereas Mass Spectrometry identifies and quantifies chemicals by measuring their weights (mass-to-charge ratios). The entire process includes sample introduction, separation by gas chromatography, detection by Mass Spectrometry and Data Detection.

Initially the provided sample is introduced by placing it in the instrument. If it is a liquid, it is aptly vaporized. Then the vaporised sample is pushed through a thin tube through which chemicals travel at different speeds based on their specific properties. As each chemical pass through the tube, they all enter the Mass Spectrometer. There they are broken into charged fragments which are then measured. These measurements result in the formation of a pattern which is unique for each chemical. Finally, a graph is produced which shows what chemicals are present and along with each of their quantities.

The GCMS Study of *Mahapaisachika Ghrita* was conducted under the following Laboratory Conditions:

1 g sample was extracted with 10 mL of Acetone and 1 µL extract was injected and the instrument conditions are as follows

The analysis was done with the instrument Shimadzu, Model-GCMS-QP 2010SE with Helium gas as carrier, capillary column with internal diameter of 0.22 mm and length 40 m.wColumn oven temperature was 80.0°C and injection temperature was 280.00°C. Injection mode was Split and flow control mode was linear velocity. Pressure used was 24.2 kPa and total flow 19.5 mL/min with column flow 1.50 mL/min and linear velocity 45.1 cm/sec. Purge flow was 3.0 mL/min and split ratio 10.0. High Pressure Injection, carrier gas saver and splitter hold were off. The column temperature program with an initial temperature of 80.0°C for 2.00 min the raised to 280.0°C at 10.00°C/min and maintained for 10.00 min with a further increase to 330.0°C at a rate of 5.00°C/min and held for 3.00 min. The Ion source temperature was 200.0°C and interface temperature was 300.0°C. Solvent cut time was 1.40 min. Detector Gain mode was relative to the tuning result. Detector gain was 0.95 kV +0.00 kV and Threshold was 0.

For Mass Spectrometry, the start time was 2.00 min and end time was 33.00 min. the ACQ mode was on scan with event time of 0.30 sec and scan speed of 1666. Start m/z was 35.00 and End m/z was 500.00. Sample Inlet Unit used was the GC-MS System.

RESULTS

Mahapaisachika Ghrita was analysed for its organoleptic parameters such as organoleptic characters, Physicochemical standards, and preliminary Microbiological testing.

Physicochemical Parameters

The sample was analysed for organoleptic parameters like Colour, odour and physical parameters like specific gravity and refractive index. It was also tested for its saponification value, Iodine value and Maximum Acid Value.

Organoleptic Characters and Physicochemical standards are mentioned in Table 1.

Preliminary Microbiological Tests are mentioned in Table 2.

The GC-MS analysis of *Mahapaisachika Ghrita* identified 30 major Phytochemicals along with their Peaks, R. times, area%, CAS and Names. They are listed out in Table 3.

The peak report TIC is shown in Figure 1.

The following phytochemicals were identified - Cyclotetrasiloxane, octamethyl-;Cyclobutane, 1-butyl-2-ethyl-; Octanoic acid, methyl ester;3-Ethoxy-1,1,1,7,7,7-hexamethyl-3,5,5-tris(tri);Dodecanoic acid, methyl ester; 6-Dodecenol; cis-7-Tetradecen-1-ol; 2-(2',4',4',6',6',8',8'-Heptamethyltetrasiloxan-2'; Methyl tetradecanoate; 2-Ethyl-1-dodecanol; Hexadecanoic acid, methyl ester; 2,6,10-Trimethylundeca-1,3-diene; 3,7,11-Trimethyldodec-1-yn-3-yl 2,2,2-trifluor; 1-Eicosanol; (9E,11E)-Octadecadienoic acid; 9-Octadecenoic acid (Z)-, methyl ester; Methyl stearate; 9,11-Octadecadienoic acid, methyl ester, (E,E); 9,11-Octadecadienoic acid, methyl ester, (E,E); 9,11-Octadecadienoic acid, methyl ester, (E,E); beta.-Sitosterol acetate; Glutaric acid, di(2-propylpentyl) ester; Pentadecanoic acid, 14-methyl-, methyl ester; Octanoic acid, 2-ethylhexyl ester; Octadecane; 6-Methylheptyl palmitate; Oxalic acid, monoamide, N-(4-methoxybenzyl); 1,3,5-Cycloheptatriene, 2,4-di-t-butyl-7,7-dim; 2-Methyltetracosane, Tetracosane.

DISCUSSION

The blood brain barrier is selectively permeable to lipid soluble substances. *Ghrita* is a complex fat with herbal constituents which are lipid soluble. Hence, they diffuse directly through the blood brain barrier's lipid layers and facilitate CNS access. This process is known as Lipid mediated free diffusion

This study identified the presence of antioxidant, anti-inflammatory and neuroprotective constituents in *Mahapaisachika Ghrita* which may help in reducing the severity of ADHD symptoms.

Oleic Acid

Oleic acid is necessary for the proper development and functioning of the brain. It is used to synthesize myelin phospholipids and acts as a neurotrophic factor by promoting axonal and dendritic growth, enhancing neuronal growth and aggregation alongside the facilitation of synapse formation.

PET imaging shows evidence of microglial activation in the dorsolateral prefrontal cortex and orbitofrontal cortex in adults with ADHD (Schnorr *et al.*, 2024). Activated microglia release pro-inflammatory cytokines like IL-1β and TNF-α, glutamate and other mediators that can impair neuronal development, myelination and synaptic functioning (Anand *et al.*, 2017). These potentially contribute to ADHD symptoms such as inattention and hyperactivity. Oleic acid is an endogenous agonist of Peroxisome-Activated Receptor Gamma (PPAR-γ) (Honda *et al.*, 2025), a ligand-activated transcription factor belonging to the nuclear receptor superfamily. PPAR-γ agonists are broadly neuroprotective and anti-inflammatory, with the ability to inhibit microglial activation and downregulate pro-inflammatory cytokines such as IL-6 and TNF-α (Priya *et al.*, 2024). Therefore, it addresses the neuroimmune dysregulation in ADHD pathophysiology by limiting neuroinflammation and improving oxidative resilience.

Docosahexaenoic Acid

DHA is the main omega-3 fatty acid in the brain and a principal component of neuronal membrane structure required in high concentrations for optimal neuronal functioning (Rodríguez *et al.*, 2019). Supplementation with DHA has been shown to maintain and improve brain functioning by influencing membrane structure, fluidity, signalling pathways, receptor systems, enzyme activities and synaptic plasticity. Several observational studies have suggested that children with ADHD have an abnormal PUFA profile wherein reduced plasma concentrations of DHA and Eicosapentaenoic Acid (EPA) are seen along with lower erythrocyte total n-3 PUFA levels. Greater severity in ADHD symptoms has been linked with low blood levels of DHA and EPA (Chang *et al.*, 2018).

DHA is the precursor of Docosanoids like Resolvins and Protectins (NPD1). Resolvins help promote the resolution of inflammatory processes by down-regulating NF-κB whereas NPD1 protects neuronal cells from oxidative-stress induced apoptosis (Bradbury, 2011). Reduction of DHA in the brain leads to reduction of both dopaminergic as well as serotonergic transmissions. N-3 PUFAs like DHA modulate neuronal signalling. DHA and its precursor EPA help balance immune functions by reducing membrane arachidonic acid and inhibiting PGE2 synthesis thereby reducing pro-inflammatory signalling. They also act as precursors for anti-inflammatory molecules and inhibit free radical generation and oxidative stress leading to an increase in anti-inflammatory action. DHA also helps in the regulation of several dysregulated biological systems like Hypothalamic-Pituitary-Adrenal Axis (HPA) stress response, Autonomic Nervous System activity and Gut Microbiota Axis (GBA) (Chang, 2021).

Table 1: Organoleptic Characters and Physicochemical standards.

Tests	Results
Organoleptic Characters	
Form	Liquid
Colour	Greenish in colour
Odour	Characteristic
Physicochemical Standards	
Specific Gravity	0.917
Saponification Value	232.05
Acid value (Maximum)	1.28
Loss on Drying	0.34%
Refractive Index	1.4540

Table 2: Preliminary Microbiological Tests.

Tests	Results
Aerobic Plate Count	<1
Yeast	<1

Table 3: Phytochemicals identified in GC-MS analysis of Mahapaisachika Ghrita.

Peak#	R. Time	Area	Area%	Height	CAS#	Name
1	6.308	2140932	0.32	939665	556-67-2	Cyclotetrasiloxane, octamethyl-
2	7.002	388309342	57.28	128703283	0-0-0	Cyclobutane, 1-butyl-2-ethyl-
3	8.306	2653272	0.39	1814816	111-11-5	Octanoic acid, methyl ester
4	15.549	3051134	0.45	979885	72439-79-3	3-Ethoxy-1,1,1,7,7,7-hexamethyl-3,5,5-tris(tri
5	16.119	3509665	0.52	1735597	111-82-0	Dodecanoic acid, methyl ester
6	17.538	2794033	0.41	1427537	52957-14-9	6-Dodecenol
7	17.575	1075419	0.16	732093	40642-43-1	cis-7-Tetradecen-1-ol
8	17.892	1597310	0.24	771320	145344-72-5	2-(2',4',4',6',6',8',8'-Heptamethyltetrasiloxan-2'
9	18.591	2553038	0.38	1507767	124-10-7	Methyl tetradecanoate
10	20.098	6268731	0.92	3424797	19780-33-7	2-Ethyl-1-dodecanol
11	20.338	39415615	5.81	24692097	112-39-0	Hexadecanoic acid, methyl ester
12	20.609	7232445	1.07	4049185	0-0-0	2,6,10-Trimethylundeca-1,3-diene
13	21.050	1317404	0.19	684204	0-0-0	3,7,11-Trimethyldodec-1-yn-3-yl 2,2,2-trifluor
14	21.510	1126280	0.17	543645	629-96-9	1-Eicosanol
15	21.604	81425814	12.01	52164856	544-71-8	(9E,11E)-Octadecadienoic acid
16	21.627	76663839	11.31	48810079	112-62-9	9-Octadecenoic acid (Z)-, methyl ester
17	21.769	6070206	0.90	3794157	112-61-8	Methyl stearate
18	21.913	5621718	0.83	2893257	13038-47-6	9,11-Octadecadienoic acid, methyl ester, (E,E)
19	21.961	4930920	0.73	2883451	13038-47-6	9,11-Octadecadienoic acid, methyl ester, (E,E)
20	22.181	5628384	0.83	2493303	13038-47-6	9,11-Octadecadienoic acid, methyl ester, (E,E)
21	22.541	10453944	1.54	1603681	915-5-9	.beta.-Sitosterol acetate
22	22.860	571856	0.08	357924	0-0-0	Glutaric acid, di(2-propylpentyl) ester
23	23.085	854925	0.13	476182	5129-60-2	Pentadecanoic acid, 14-methyl-, methyl ester
24	23.167	2527976	0.37	1088961	63321-70-0	Octanoic acid, 2-ethylhexyl ester
25	24.480	846174	0.12	452785	593-45-3	Octadecane
26	24.565	3031608	0.45	1143237	1341-38-4	6-Methylheptyl palmitate
27	25.559	1523075	0.22	421178	0-0-0	Oxalic acid, monoamide, N-(4-methoxybenzyl
28	26.119	2487875	0.37	699541	0-0-0	1,3,5-Cycloheptatriene, 2,4-di-t-butyl-7,7-dim
29	26.640	9049793	1.34	2234944	1560-78-7	2-Methyltetracosane
30	26.796	3126499	0.46	883056	646-31-1	Tetracosane
		677859226	100.00	294406483		

Beta Sitosterol Acetate

Beta Sitosterol acetate is an esterified derivative of the plant sterol Beta Sitosterol where the hydroxyl group is acetylated increasing the lipophilicity and potentially altering bioavailability. It becomes more fat soluble.

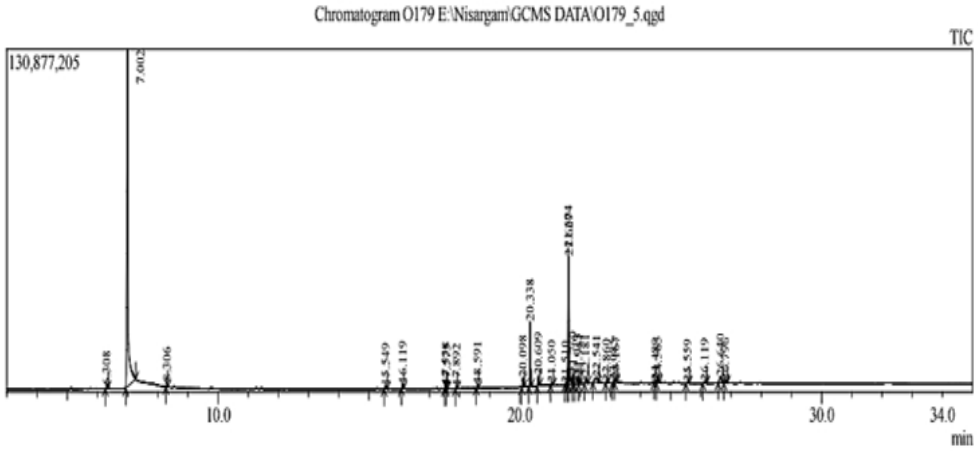
In ADHD models deficits have been found in visual-spatial working memory tasks as well as memory challenges tied to attentional control failures (Luo *et al.*, 2019). It has also been found that there is reduced mitochondrial respiration, lower ATPase activity, depolarized membrane potential, along with elevated superoxide in frontal cortex-relevant cybrid models playing a part in bio-energetic deficits and impaired pre-frontal dopamine/serotonin signalling. These factors affect symptom severity (Verma *et al.*, 2016).

Beta Sitosterol improves Spatial Learning and recognition memory by reducing Aβ plaques and BACE1 expression, indirectly addressing shared synaptic dysfunction (Verma *et al.*, 2016). It has the ability to mitigate oxidative/nitrosative stress and enhance mitochondrial function in the Frontal Cortex (Vafaei *et al.*, 2024).

Lauric Acid, Methyl Ester (Methyl Dodecanoate/ Methyl Laurate)

Methyl Laurate is involved in the inhibition of EGR1 receptor. Early Growth Response 1 is an early gene and transcription factor that plays a key role in synaptic plasticity, neuronal activity, learning, memory, and response to stress and reward. These are the processes often disrupted in ADHD (Duclot and Kabbaj, 2017). EGR1 regulates neuronal plasticity through pathways involving NMDA receptors and Long-Term Potentiation (LTP) in brain regions such as the pre-frontal cortex, hippocampus, striatum, and amygdala, which are implicated in attention, executive function, and dopamine signalling relevant to ADHD (Bristot *et al.*, 2024).

NF-κB is a transcription factor of prime importance in inflammation, oxidative stress, and immune responses. In ADHD, due to neuronal damage, neuro-inflammation and disrupted signalling in prefrontal and cerebellar cortices, it leads to an overactivation of the NF-κB factor (Zheng *et al.*, 2025). Mast cell activation in ADHD may be a trigger for NF-κB via TLR8, MAPKs, and other mediators, leading to glial interactions, Blood-Brain Barrier breakdown, and HPA axis dysregulation (Song *et al.*, 2020). Trans-fatty acids exacerbate ADHD through microbiota-gut-brain axis disruption which indirectly activates NF-κB-linked immune pathways during critical neurodevelopmental windows (He *et al.*, 2025). An inflammatory ADHD biotype correlates with chronic stress and



Peak Report TIC

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Figure 1: Peak report TIC.

heightened NF-κB activity, promoting chemokine signalling and IL-17 pathways (Schnorr *et al.*, 2024).

Methyl Laurate decreases the levels of lipopolysaccharide induced Nuclear Factor κ-B (NF-κB) in murine macrophages found in mice (Sivinski *et al.*, 2020). They have functional similarities with human macrophages in processes like phagocytosis, production of TNF-α and IL-6 as well as the mechanisms of NF-κB pathway activation (Chen *et al.*, 2023).

Octanoic Acid, Methyl Ester (Methyl Caprylate)

It is also known as Caprylic acid which is a medium-Chain (C8) Monocarboxylic Saturated Fatty Acid (MCFA) (PubChem, n.d.). It is a straight chain isomer of valproic acid (Altinoz *et al.*, 2020) that provide an alternative energy source (ketone bodies) for neurons (Norgren *et al.*, 2020), supporting mitochondrial function and synaptic activity, which is of particular relevance in conditions with impaired glucose metabolism, as seen in neurodevelopmental disorders like ADHD and Alzheimer's disease (Chung *et al.*, 2021). Under the conditions of low glucose availability, by the incomplete oxidation of fatty acids ketone bodies are produced which are metabolized by the brain to act as an alternative to glucose (Farah, 2014).

The small molecular size and high lipophilicity of caprylic acid facilitate its ready penetration across biological membranes, contributing to its high absorption and CNS delivery if administered intranasally as *Nasya* (Taléns-Visconti *et al.*, 2023). Unlike Long-chain fatty acids, MCFAs can quickly cross the Blood-Brain Barrier, directly penetrate the mitochondrial matrix and have intramitochondrial conversion to Acyl-CoA thioesters and get directly processes by the brain (Fan *et al.*, 2023).

Linalool and Related Terpenoids

When ingested linalool is metabolised in the gastro-intestinal system into geraniol, nerol and α-terpineol (Milanos *et al.*, 2017). In rat models, geraniol is found to have sedative and hypnotic activity (A.L *et al.*, 2018). It lowered the protein levels of neuro-inflammatory markers like IL-1β, iNOS, NF-κBp65 and COX-2 as well as down-regulated inflammatory genes like MCP-1, TNF-α, IL-6, IL-1β and IDO-1 (Eman and Abdulmalek, 2022). It was also seen to have reduced the concentration of oxidative damage indicators like malondialdehyde, nitric oxide and xanthine oxidase and boosted the activity of neuronal antioxidant enzymes (Eman and Abdulmalek, 2022). It increased levels of reduced glutathione, catalase, Glutathione-S-Transferase (GST) and Superoxide Dismutase activities (Eman and Abdulmalek, 2022). It also improved learning and memory in the same model (Eman and Abdulmalek, 2022).

Increased Acetylcholinesterase (AChE) activity leads to hippocampal inflammation ad impaired cholinergic status. Geraniol is found to suppress AChE, thereby improving cognitive abilities (Eman and Abdulmalek, 2022).

Nerol has been found to have neuroprotective, anti-oxidant, memory enhancing properties, especially in models related to neuro-degeneration (Ghashghaie *et al.*, 2019).

CONCLUSION

The identification of compounds such as stearic acid, oleic acid among others through GC-MS analysis emphasizes the therapeutic potential of *Mahapaisachika Ghrita* in the management of ADHD symptoms through anti-inflammatory and anti-oxidant as well as neuroprotective pathways.

ACKNOWLEDGEMENT

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ABBREVIATIONS

ADHD: Attention Deficit Hyperactivity Disorder; **GC-MS:** Gas Chromatography-Mass Spectrometry; **CAS:** Chemical Abstracts Service; **PET:** Positron Emission Tomography; **IL-1β:** Interleukin-1 beta; **TNF-α:** Tumor Necrosis Factor alpha; **IL-6:** Interleukin-6; **PUFA:** Polyunsaturated Fatty Acid; **MCFA:** Medium-Chain Fatty Acid; **NPD1:** Neuroprotectin D1; **PGE_2:** Prostaglandin E2; **BACE1:** Beta-site Amyloid Precursor Protein Cleaving Enzyme 1; **Aβ:** Amyloid beta; **NMDA:** N-methyl-D-aspartate; **TLR8:** Toll-like Receptor 8; **MAPKs:** Mitogen-Activated Protein Kinases; **IL-17:** Interleukin-17; **CNS:** Central Nervous System; **iNOS:** Inducible Nitric Oxide Synthase; **COX-2:** Cyclooxygenase-2; **MCP-1:** Monocyte Chemoattractant Protein-1; **IDO-1:** Indoleamine 2,3-dioxygenase 1; **PPAR-γ:** Peroxisome proliferator-activated receptor gamma; **NF-κB:** Nuclear factor kappa-light-chain enhancer of activated B cells; **NF-κB p65:** 65 kDa protein subunit of NF-κB; **HPA:** Hypothalamo-Pituitary-Adrenal; **GBA:** Gut-Microbiota Axis; **TIC:** Total Ion Chromatogram;

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS

Dr Brihathi Bala: Conceptualization; Data Curation; GCMS analysis and interpretation; Funding Acquisition; Writing - Original Draft.

Dr Azizahmed I Arbar: Methodology; Validation; Resources; Supervision; Writing - Review and Editing.

Dr Anantamati Bammagol: Visualization; Formal Analysis; Writing - Review and Editing.

Dr Tejaswini Yarazharavimath: Visualization; Formal Analysis; Writing - Review and Editing.

SUMMARY

This study elucidates the anti-inflammatory, anti-oxidant and neuroprotective mechanisms of *Mahapaisachika Ghrita* using GC-MS analysis. The formulation is found to comprise constituents with potent capabilities to counteract the effect of neuro-inflammation and is identified to be working through key neurological pathways.

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