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Original Article

DETERMINATION OF NOOTROPIC ACTIVITY AND ANTI BACTERIAL ACTIVITY OF FICUS CARICA

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ABSTRACT

Objective: *To evaluate the Nootropic and anti bacterial activity of Ficus Carica (F.Carica)*

Materials and Methods*: Ethanolic extract of F. Carica was utilized to assess nootropic activity, result of extract on studying as well as remembrance in mice was assessed by utilizing the elevated plus maze model and In-vitro anti bacterial activitywascarriedoutbycupplatemethodsforestimationofzoneofinhibitionataconcentrationof50,100,150and200µg/ml.*

Results: *The obtained ethanolic extract of F. Carica in the elevated plus maze model, resulted in decreasing intransmit dormancy, which is designative of perception development and anti bacterial property against E. coli and E. faecal is at 150 & 200µg/ml.*

Conclusion: *The results suggested that the ethanolic extract o f F.Carica enhances memory in mice and antibacterial properties.*

Keywords: *F. Carica, Nootropic activity, Anti Bacterial activity.*

INTRODUCTION

As stated by WHO, 450 million individuals world wide tolerate mental or behaviouraldisorder[1]. Dementia is one of the age-factor psychological issues and an indication of Alzheimer's disease (AD)[2-4]. Alzheimer's disease is a Cerebrovascular and neurodegenerative disease that progresses over time.[2, 5] It causes memory issues and unusual behavior by destroying brain cells[6], thinking, personality changes[7], and, eventually, death[8–10]. There are a few nootropic pharmaceuticals used in the therapy of Alzheimer's disease, which are classified as psychotropic agents[11]. In 1972 giurgea developed the term nootropic, combining the Greek words tropos (turn) and noon (thought) [12]. Nootropics, often known as smart medicines, boost mental functions like memory while also increasing blood circulation and oxygen delivery to the brain[13].

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Ficuscarica Linn.Is a member of the Moraceae family, it is generally known as "Fig" (in Arabic Tin, in latin Ficus). It may be found in India's tropical and subtropical areas. It has five tribes and roughly 750 species, all of which are distinguished by unisexual blooms, achene, an atropousovules, and milky-latex. Ficusis one of the 35 genera and it has a wealth of nutrients that are beneficial to one's health. Its importance is such that it is mentioned in holy literature such as the Holy Quran and the Bible.[14,15] The roots are used to cure leucoderma and ring worms in traditional medicine, while the delicious fruits have antipyretic, purgative, and aphrodisiac effects, as well as being effective in paralysis and inflammations.[16,17]

Different bioactive compounds were found in F. Carica such as campesterol, β-setosterols, stigmasterol, bergapten, fattyacids, β-carotines, arabinose, glycosides, and xanthotoxol psoralen, fucosterol, 9,19-cycloarlane triterpenoid, 6-(2- methoxy-Z-vinyl) -7-methylpyranocoumarin,β-amyrins, umbelliferone, lupeol ace tate,6-Oacyl-β-Dglucosyl–βsitosterol and calotropenyl acetate.[18]

Furthermore, many therapeutic effects for various components of F. Carica have been demonstrated, including anthelmintic, hypoglycemia, hypotriglyceridemia, and hypocholestrolemia.[19-22] As a result, we propose to test the memory improvement and

anti bacterial properties of an ethanolic extract of F. Carica fruits in albino mice.

II.MATERIALSANDMETHODS

Collection of plant material

Fresh fruits of F.Carica were procured from local vendor, Hyderabad, Telangana, India. Fruits are authenticated by Dr. Rafiuddin Naser, Associated Professor, Department of Botany, Moulana Azad College of, Aurangabad, (M.S) (PCOG.H-219/12).

Preparation of extraction

3 kg fresh fruits are collected from local area of Hyderabad and shade dried for 15days. The fruits material was powdered using mixer grinder and passed through sieve no 85. About The dried 150gm powder was subjected to soxhlets apparatus extraction using methanol solvent for 72hrs. The extract were concentrated in rotary flash evaporators and stored in refrigerator.

Phyto chemical Evaluation

Phyto constituents were detected in extracts of F. Carica using a variety of chemical techniques.[23]

Culture medium for bacteria

E. coli and E. faecal is micro organism provided by Owaisi Hospital and Research Center, department of microbiology, Hyderabad, Mueller--Hinton agar (Himedia, Lot0000333943, Code M173) NaCl, Beef Extract procured by Himedia Pvt.Ltd., India.

Antibacterial Testing by Agar Well Diffusion Method

The antibacterial activity of F. Carica extracts was tested using the specified agar well diffusion technique. Using sterile swabs, inoculums of E. coli and E. faecal is bacterial strains were plated into Petri plates containing roughly 25 ml of Nutrient agar media, where 6 mm wells were created and filled with varying concentrations of concentrate(50,100,150,and 200 g/ml).The Petri dishes were pre-incubated at room temperature for 3 hours to allow the samples to fully diffuse before being incubated at 371°C for 24hours.The zone of inhibition millimeters (mm) of the afore mentioned compounds was measured according to conventional clinical standards to assess their antibacterialactivity.[24,25]

Pharmacological studies Experimental Animals

Mice that are albino Sanzyme lab Pvt. Ltd. Provided 20-25 gm of both sexes weighing. The National Institute of Animal Nutrition and Physiology in Hyderabad provided the animal feed. The animals were kept at 25°C in a suitable laboratory setting with a 12-hourlight-dark cycle. All of the investigational animals had unlimited access to water and food. IAEC/DSOP/Dec-2020/03)gave their approval to the study protocol.

Elevated plus maze

The raised plus maze was used to test mice's memory retention. Mice weighing 20-25grammes were placed into four groups of six mice each.

Group 1: received distilled water to serve as control.

Group 2: EVM induced

Groups 3: EVM+MFC300mg/kgp.o and

Group 4: EVM+MFC 500mg/kg p.o were administered the extract respectively for 30 successive days.

Experiment A-mice were tested on the raised plus maze over the course of four sessions, which were held twice weekly and started around 3 hours into the light phase. All of the tests were carried out in the light phase .Each session stand up for 15minutes and was held below regular lights-on settings, by a significant difference in open and closed arms transfer latency (TL) noted on day 1.The EPM consisted of 4tingedofplasticshield (Height:50cm; breadth:10cm) in a "plus" arrangement, raised 80 cm over the platform which was present in another chamber in the housing chamber. Shutarms had barrier 40cm in length and open arms had no barrier. Every test started by put in the mice cladding the meeting of the intricacy. The EPM was washed instantly after every test to reduce the chance of initiating pheromonal cues. Investigational behavior on the maze is quantified using a automated scientific EPM software and tracking of photo beam. Fundamental moments, complete space progressed, open/closed armentries, open/closed arm distance, and open/closed arm time were used as the dependent transfer latency(TL) recorded.

In Experiment –B mice were evaluated on the EPM for 2 test, every lasting 300 seconds, utilizing a crossover study design. Trial started nearly 180 minutes in the light phase; every trial was managed in the light phase cycle. The 1st test was started in conditions of low lighting and standard lights as above described conditions for mice. For the 2nd test, conditions for each group were reversed. The EPM equipment and dependent transfer latency (TL) recorded. [26,27]

Statistical Analysis

SPSS Version 19.0 was used to statistically assess the findings of the pharmacological studies. The data is provided as a mean with standard deviation (SEM). ANOVA was performed to compare the results and determine the significance, and the P value was provided as mean SEM. *ap 0.001, *bp 0.01, and *cp 0.05, respectively.

III. RESULTS

Primilanary phytochemical study shows F. carria extract existence of Glycoside, Alakloids, Flavonoids, Phytosteroids, Vitamins, Tannins and Terpinoids.

The In Vitro antimicrobial activity of extracts F. carria was studied in different concentrations (50,100,150and200µg/ml) against Gram-negative Escherichia coli and E. faecal is pathogenic bacterial strains in zone of inhibition. The extract shows that varying degree of antimicrobial activity 150 and 200 µg/ml as shown in (figure 1).

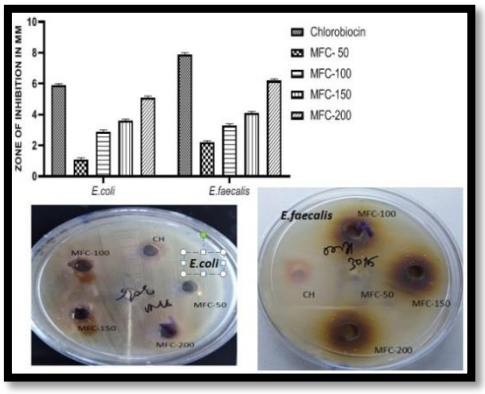

Figure no: 1 showing the anti-bacterial effect of F.carria different concentrations against E.Coli and E.faecalis Elevated Plus Maze Test

Ethanolic extricate of F. Carica notably improved numerous approaches and period consumed by mice in unlocked arms of increased asset maze equipment around dose of 300 at 500mg/kg as regards to manage as well as exhibiting in lowering period consumed and significant decline ($p < 0.0001$) in the numerous approaches in locked arm was seen when differentiated to the control, consequently bring about anti-anxiety activity as in table (1& 2).

Table.1: Effect of extract on enteries in open arm of the plus maze test

Groups	Number of entries in open arm					
	0Day OA	3rdDay OA	7thDay OA	14thDay OA	21stDay OA	28thDay OA
Normal	1.11±0.21	0.47±0.29	0.56±0.18	0.58±0.26	0.74±0.69	0.66±0.38
EPM	1.58±0.32	3.48±0.31b	4.87±1.85c	3.43±0.87a	3.18±0.40a	4.72±1.14a
F.carica300	1.35±0.31	1.64±0.59ns	1.82±0.21ns	1.63±0.48**	0.42±0.39***	0.52±0.64***
F.carica500	1.31±0.63	2.04±0.40ns	1.47±0.42ns	1.40±0.28***	0.81±0.48***	0.61±0.32***

All results are mean standard error of the mean (SEM), n=8, ns=not significant, one-way analysis of variance (ANOVA) with multiple comparisons. *p0.05, **p0.01 vs.controlgroup (OVX),andbp0.01,cp0.05versusnormalgroup(Tukey'stest).

Table.2:Effect of extract on closed arm of the plus maze test

Groups	Number of entries in open arm					
	0Day OA	3rdDay OA	7thDay OA	14thDay OA	21stDay OA	28thDay OA
Normal	4.57±0.31	4.12±0.88	4.32±0.44	5.14±0.56	5.74±0.31	4.71±0.53
EPM	7.14±0.28	3.14±0.55ns	4.11±0.12ns	1.18±0.45c	1.31±0.11b	1.51±0.14b
F.carica300	4.21±0.10	2.85±0.26ns	3.31±0.31ns	4.84±1.31ns	4.61±0.35ns	4.22±0.28ns
F.carica500	3.43±0.20	3.71±0.47ns	3.61±0.21ns	4.51±0.27ns	6.21±1.41**	6.51±1.18**

All results are mean standard error of the mean (SEM), n=8, ns=not significant, one way analysis of variance (ANOVA) with multiple comparisons.*p0.05,p0.01vs.control group (OVX), and bp 0.01, cp 0.05 versus normal group (Tukey's test).**

IV. DISCUSSION

Antibiotic resistance has now become a worldwide issue. Multiple resistances has become more wide spread in human pathogenic bacteria in recent years, owing partly to the indiscriminate use of commercial anti microbial medications routinely used to treat infectious disorders. This has compelled scientists to look for novel anti bacterial compounds in unexpected places, such as medicinal plants. Since the beginning of time, nature has been a source of enormous medical value. Plants have served as a source of inspiration for new pharmacological molecules, with plant derived medications contributing significantly to human health. Furthermore, the active ingredients in herbal treatments have the benefit of being mixed with a variety of different, seemingly inactive compounds. These complimentary components, on the other hand, provide the plant as a whole with far greater safety and efficiency than its separate and pure active components. Anti bacterial compounds have long been known to exist in higher plants.[28, 29]

The number of individuals suffering from Alzheimer's disease is constantly increasing across the world[30]. Alzheimer's disease is characterized by degenerative changes in the brain that are followed by memory loss[31,32].The loss of cholinergic neurons in the basal forebrain region is the primary cause of Alzheimer's disease (AD)30, which leads in an acetylcholine (Ach) deficiency. It impairs learning and short-term memory because it promotes depression in the cerebral cortex, particularly in the motarareas[33].Piracetam is a commonly prescribed medication for forgetfulness, dementia, and other health issues such as brain stroke, Alzheimer's disease, Huntington disease, vascular dementia and DLB. Piracetam binds to receptors and raises the amount of Ach in the brain. It enhances the production of Ach by acting on cholinergic receptors. It improves the brain's oxygen supply. It has a beneficial therapeutic impact in the treatment of clotting, coagulation, and thrombosis. It's also an antioxidant and a neurotonic. In the uncorrected elevated plus maze technique, mice were given methanolic extract of F. Carica at dosages of 300mg/kg and 500mg/kg orally for 28days, which dramatically enhanced learning and memory.

The neuro transmitter acetylcholine is thought to be the most significant in the control of cognitive functioning. Cholinergic neurons are involved in cognitive deficits associated with Alzheimer's disease and other neurodegenerative diseases[34]. It has been proven that changes in the cholinergic system produce at least some of the learning, memory, and behaviour problems seen in dementia patients. Nootropics are clever medications that help the brain learn and remember things better.

V. CONCLUSION

Nootropics are clever medications that help the brain learn and remember things better. In the presence of various secondary metabolites bioactive chemicals, such as phenolic compounds, phytosterols, organic acids, anthocyanin composition, triterpenoids, coumarins, and volatile compounds such as hydrocarbons, aliphatic alcohols, Phenolic acids such as ferulic acid, 3-O- and 5-O-caffeoylquinic acids,quercetin-3-O-rutinoside, quercetin-3-O-glucoside,bergapten, psoralen and organic acids (citric, oxalic, quinic, malic, fumaric and shikimic acids) F.carica plays a role in nootropic activity and anti bacterial characteristics.

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