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Phytoconstituents and Pharmacological Activities of Cynodondactylon(L)

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ABSTRACT
Therearevarious types ofgrasses foundintheworldhave someuniquemedicinalproperties.Cynodondactylon(L) belonging to family Graminae/Poacea is a perennial weedy has a prime position in traditional system of medicine and ethno medical practice.The plant is rich in source various metabolites such as proteins,carbohydrates,flavonoids,alkaloids,glycosides, saponins, terpenoids, volatile oils, steroids,tannins,resins,phytosterols,reducingsugars,andfixedoils. Cynodondactylon(L.) is extensively usedinclinical practice but it has various pharmacological activities have been reported such as antioxidant, immunological, analgesic, antipyretic, diuretic, antimicrobial, cardiovascular and antidiabetic properties etc.The present reviews represent the updated information about different pharmacological activities and medicinal properties of Cynodon dactylon.

Keywords: Cynodon dactylon, pharmacology, medicinal properties.

I. INTRODUCTION

Indiahastremendouswealthofmedicinalplantsandits resourceswhichareofdifferent kinds they grow in different climatic and ecological conditions. Many weeds of our surroundings are often very powerfulmedicinal plant to address many of our today's major healthproblems[1]. According to an estimation of the World HealthOrganization,about80percentoftheworld's populationdependsonherbsforitsPrimaryhealthcareneeds[2].In ancient time India was not so advancedintherapeuticvaluesofmedicinalplants.The earliest mentionoftheuseofmedicinal plant is found in Rig-Veda (4500-1600B.C). The numberof drugs in the olden days was not large and hence no elaborated descriptions were given with regard to their identification. AyurvedaandSiddhainIndia,theChinesemedicinesinChina,theUnanimedicinesinIslamiccountriesare TraditionalKnowledgeSystemsthatuseherbsorplantproducts for therapeutics on large scales. Many potent andpowerfuldrugs arepreparedfrommedicinalplants [3]. Severalphytochemicalconstituentsareobtainedfrom various parts such as root, stem, leaf, fruit, seed, barketc.Variousbiologicallyactivecompoundsofmedicinalplants play an important role in drug discovery. In addition,extracts of medicinal plants are useful in the treatment ofseveralhealth problems[4].C. dactylon (L.) Pers. is a perennial grass having a variety ofmedicinalproperties[5]. Itiscultivatedthroughoutthetropicsand subtropics. Entire plant and its root stalk are used formedicinal use [6].In the course of time more herbs growing in the different parts of country were gradually included in India Materia Medica but unfortunately their variation in the identity of various plant drugs, extorted in the Ayurvedic and Unani system of medicine. Considerablework has been carried out on medicinal plant and many new drugs have been brought to the light along with the screening of their Phytoconstituents and their biological importance. The genus name Cynodon was derived from the Greek kuon, dog and odous, a tooth. The specific epithet dactylon is derived from the Greek daktulos, a finger, and refers to the inflorescence which is digitate (arranged like fingers on the hand). Eight species of Cynodon are found in southern Africa. Cynodon dactylon is hardy, perennial grass, very variable, with long rapid growing, creeping runner or stolons, rooting at nodes, forming a dense tuft on the surface of the soil, runners sometimes 20m long, 2-6mm broad, flat or sometimes folded or convolute; inflorescence on clums 15cm to 1m tall consisting of 2-12 spikes arranged star like at apex of stem; spikes 2.5-10cm long with numerous spikelets, arranged in 2 rows on one side of spike; spikelets

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flat, 2-2.5mm long, awnless, with 1 floret; glumes unequal, the upper longer and one third to three fourth length of floret.The grassgrowsthroughout India ascendingup to aheight above sea level of 8000ft. A hardy perennial grass with creeping clums, rooting at nodes and forming spreading mats on the surface of the soil. It is abundant on road sides and paths, and readily takes possession of any uncultivated area. It flowers nearly throughout the year [7-9]. Cynodon dactylon occurs on almost all soil types especially in fertile soil. e.g. loamy soil. It is widely distributed in southern African countries, in biomes such as grassland, Savanna, Nama-Karoo and Fynbos[10-12]. It can be a serious weed, rapidly invading cultivated lands, and it is difficult to eradicate. Cynodon dactylon plays an important role in conservation, because it prevents soil erosion. It provides good grazing, is very useful as a lawn grass and is recommended for the protection of waterways [10]. In traditional medicine it is used for indigestion and the treatment of wounds. According to an old Venda tradition, it is used in the fermentationprocesstomakebeer sour[11].Itisreportedtobealterative,antiseptic,aperients, astringent, cyanogenetic, demulcent,depurative,diuretic, emollient, sudorific, and vulnerary; it is reported to be photosensitizing in animals, to cause contact dermatitis, and hay fever. It is folk remedy for calculus, cancer, carbuncles, convulsions, cough, cramps, cystitis, diarrhea, dropsy, dysentery, epilepsy, headache, hemorrhage, hypertension, hysteria, insanity, laxative, measles, rubella, snakebite, sore stones, tumors, urogenital disorders, warts, and wounds [13-15].

II. CLASSIFICATION

Kingdom- Plantae (Plants), **Subkingdom** - Tracheobionta –(Vascular plants), **Super division**- Spermatophyta – (seed plants) , **Division**- Magnoliophyta –(Flowering plants) , **Class**- Liliopsida (Monocotyledons), **Subclass**- Commelinidae, **Order**- Cyperales, **Family**- Poaceae (Grass family), **Genus**- Cynodon, **Species**- Cynodon dactylon (L.) Pers. – Bermuda grass.

VernacularNames (India)

Hindi- Doob, Dub, Dubra, Khabbal, Kaligas, Neelee Doob. **English**- Creeping panic grass, Couch grass, Bahama grass, Bermuda grass,Dun grass, Devil's grass, Doab grass, Doorwa, Dog's teeth grass.**Sanskrit**-Sataparva,Satavalli,Niladurva. **Bengali**-Durva,Dub,Dubla,Durba,Doorva,Neel Doorva. **Gujrati**- Khadadhro, Lilidhro, Dhro, Dhrokad, Gharo. **Marathi** - Doorva, Harali, Dhurva, Karala. **Kannad**- Garikehullu, Kudigarike, Kudigarikai.**Punjabi**- Dubada, Daurva, Dun, Dubra, Khabbal,Tilla,Talla,Dhub. **Tamil**- Aruvampillu,Hariali,Muyalphul,ArugamPullu.**Telgu**-Garika, Pacchgaddi, Ghericha, Garicagaddi, Gerike, Harvali. **Urdu**- Doob ghas, Doob.

Naturalhabitat

The plant C. dactylon grows well in light sandy, mediumloam and heavy clay soils. It can even grow in very acidic,alkaline and saline soils but cannot grow in shady places. Itneeds moisture in soil. Many workers reported that this plantisusedprimarilyasalawngrassorasaforagegrassthroughout the warm-temperate and the sub-tropical worldespeciallyinsalinehabitats[17,18,19].

Parts used

Theentireplantcanbeused.

Properties

AccordingtotheAyurvedicPharmacopoeia,theplantispungent and bitter in nature with characteristic fragrance andhas cold potency. According to Unani system of medicine,theplant possessessharphottastewithgoododor[20,28]

ChemicalConstituents

The chemical constituents present in Cynodon dactylon are – β- sitosterol, β- carotene, vitamin C, palmitic acid, triterpenoids, arundoin, friedelin, selenium, alkaloids- ergonovine and ergonovinine,Ferulic,syringic,p-coumaric,vanilic,phydroxybenzoicando-hyroxyphenylacetic acids, Cyanogenic hyperoside, Cyanogenic glucoside- triglochinin, furfural, furfural alcohol, phenyl acetaldehyde, acetic acid, phytol, β- ionone; mono and oligosaccharides, lignin (whole plant); hydrocarbons (tritriacontane) esters, eicosanoic and docosanoic acids,[14-18]free alcohol, free aldehydes (hexadecanal) and free acids (hexadecanoic acid) (surface cuticular wax); flavone – apigenin, luteolin, flavone glycosides – orientin (8-C-β-D-glycosylluteolin), vitexin (8-C-β-D-glycosylapigenin), iso –orientin (6-C-β-D-glycosylluteolin) and iso- vitexin (6-C- β-D-glycosylapigenin) (aerial parts)**[**29-33].

Traditional uses

Decoctionoftheentireplantusedasdiuretic

- Crushedleaveusedasstypticinminorwoundstostopbleeding.Alsousedforinflammatoryconditions

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- Infusionofroottostopbleedingfor piles
- Pasteofplantappliedtoforeheadinheadaches
- Usedfortoothaches
- Juiceofplantappliedtofreshcutsandwounds
- Folkremedyforcancer,epilepsy,cough, dysentery,warts, snakebites, bronchitis, anasarca, calculus, dropsy,hemorrhage, urogenital disorders, cough, sores, cancer,carbuncles,convulsions,cramps,cystitis,dysentery,hemorrhoids, leucoderma, hypertension, hysteria, asthma,tumors,measles,rubella,tumors,warts, wounds,eyedisordersweak visionand Dandruff, fever.
- A decoction of C.dactylon mixed with sugar is useful intheproblemof urineretention.

PHARMACOLOGICALACTIVITIES

Cns activity

Pal Dilip Kumaret al,worked on the, Evaluation of the CNS activities of aerial parts of Cynodon dactylon (L.) Pers. in mice. The dried extracts of aerial parts of Cynodon dactylon (L.) Pers. (Graminae) was evaluated for CNS activities in mice. The ethanolic extract of aerial partsof C. dactylon (EECD) was found to cause significant depression in general behavioral profiles in mice. EECD significantly potentiated the sleeping time in mice induced by standard hypnotics' viz. pentobarbitone sodium, diazepam and meprobamate in a dose dependent manner [34].

Antiarrhythmic activity: NajafiM et. al., studied the, Effect of the hydroalcoholic extract of Cynodon dactylon on ischemia/reperfusion-induced arrhythmias. During ischemia, the extract produced marked reduction in the number, duration and incidences of ventricular tachycardia (VT) at 25 and 50µg/ml ($p<0.001$ and $p<0.01$, respectively). Total number of ischchemic ventricular ectopic beats(VEBs) were lowered by 25-100 µg/ml ($p<0.001$ and $p<0.05$, respectively). At the reperfusion phase, Cynodon dactylon (25 and 50 µg/ml) decreased incidence of VT from 100% (control) to 13 and 33% ($p<0,001$ and $p<0.05$) respectively. Duration and number of VT andtotal VF incidence were also reduced at the same concentration ($p<0.05$ for all). Perfusion ofthe extract (25 –100 µg/ml) was markedly lowered reversible VF duration from 218± 99 sec to 0sec, 0sec and 10 ± 5 sec ($p<0.01$, $p<0.01$ and $p<0.05$) respectively. Moreover, Cynodondactylon (25 and 50 µg/ml) decreased number of total VEBs from 349±73 to 35±17 ($p<0.001$) and 66±26 ($p<0.01$) [35-36].

Antidiabetic activity

Singh SK. et. al., worked for the, Assessment of antidiabatic potential of Cynodon dactylon extract in streptozotocin diabetic rats. The effect of repeated oral administration of aqueous extract on serum lipid profile in diabetic rats was also examined. A range of doses viz. 250,500,1000 mg/kg body weight of aqueous extract ofCynodon dactylonwere evaluated and the dose of 500 mg/kg body weight was identified as the most effective dose. It lowers blood glucose level around 31% after 4hr. of administration in normal rats. The same dose of 500 mg/kg body weight produced a fall of 23% in glucose level with in 1hr. during glucose tolerance test (GTT) of the mild diabetic rats. This dose has almost similar effect as that of standard drug tolbutamide(250mg/kgbw).Severelydiabeticratswer ealsotreateddailywith500mg/kg b.wt for 14 days and a significant reduction of 59% was observed in fasting blood glucose level [37].

Diuretic activity

ShivalingeGowda KP.et.al.,studied the,DiureticActivityof Cynodondactylon root stalk extract in albino rats. The present study was carried out to evaluate the diuretic activity of aqueous extract of Cynodon dactylon which is used as traditional folk medicine in India for the treatment of various diseases and disorders. On oral administration of the aqueous extract of root stalk of Cynodon dactylon at a dose of 100mg, 250mg, 500mg, 750 mg/kg body weight shows diuretic activity which can be quantified in experimental rats[38].

Chemopreventive effect

Baskar AA. et. al., worked on the, Chemo preventive effect of Cynodon dactylon (L.)Pers. extract against DMH-induced colon carcinogenesis in experimental animals. The present study was aimed at evaluating the chemo preventive property of Cynodon dactylon. The antioxidant, antiproliferative and apoptotic potentials of the plant were investigated by 1,1- diphenyl-2-picrylhydrazyl (DPPH) assay, nitric oxide radical scavenging activity (NO^-) and MTT assayon four cancer cell lines (COLO320 DM,MCH-7, AGS,A549)and anormalcell line (VERO). In vivo chemo preventive property of the plant extract was studied in DMH-induced colon carcinogenesis. The methanolic extract of Cynodon dactylon was found

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to be antiproliferative and antioxidative at lower concentrations and induced apoptotic cell death in COLO 320 DM cells [39].

Anticonvulsive property

OdenigboGO.et.al.,worked on the, Determination of brain biogenic amines in Cynodon dactylon and Cyperus rotundus treated mice. The ethanol extract of aerial parts of Cynodon dactylon (EECD) and roots & rhizomes of Cyperus rotundus (EECR) showed marked protection against convulsions induced by chemo convulsive agents in mice. The catecholamines contained were significantly increased in the processed extract treated mice. Results of the present study revealed that both the processed extract showed a significant anticonvulsive property by altering the level of catecholamine and brain amino acids in mice [40].

Hepatoprotective effect

Singh SK. et. al., studied the, Protective effect of Cynodon dactylon against STZ induced hepatic injury in rats. The present study was designed to investigate the hepatoprotectiveeffect of aqueous extract of Cynodon dactylon, widely used in India as a traditionaltreatment for diabetes mellitus. Male Albino Wister rats (180-220 g) were administered with streptozotocin (STZ, 50 mg/kg) intraperitoneally to induce experimental diabetes. Alkaline phosphatase (ALKP), serum glutamate oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT), creatinine (CRTN) and total protein (TP), urine sugar (US) and total haemoglobin (Hb) were estimated at the beginning and after 14 days of treatment. Daily oral administration of aqueous extract of Cynodon dactylon suspended in distilled water at 500 mg/kg dose almost normalized various biochemical parameters. This suggests that Cynodon dactylon can be used as a hepatoprotective agent [5].

Anti-inflammatory activity

Cynodon dactylon is one of the 10 auspicious herbs that constitute the group Dasapushpam in Ayurveda. Traditionally Cynodon dactylon L. is used against many chronic inflammatory diseases in India. The present finding was to evaluate the protective effect of Cynodon dactylon against rats with adjuvant- induced arthritis. Arthritis was induced by intradermal injection of complete Freund's adjuvant into the right hind paw produce inflammation of the joint. A significant increase in the levels of inflammatory mediators, myeloperoxidase, nitrite, C-reactive protein, ceruloplasmin was observed. This was associated with oxidative stress with a marked reduction in the activity of catalase, superoxide dismutase, glutathione peroxidase and the levels of glutathione, vitamins C and E and an increase in the lipid peroxidation as indicated by the higher levels of thiobarbituric acid reactive substances. Cynodon dactylon (20mg/kg) body weight was orally administered to arthritic rats afteradjuvant injection produced a significant attenuation in the inflammatory response, oxidative stress and ameliorated the arthritic changes to near normal conditions. Hence, findings clearly indicate that Cynodon dactylon extract has a promising protective role against arthritis [41].

Immunomodulatory and DNA protective activities

MangathayaruaK.et.al.,workedonthe, EvaluationoftheimmunomodulatoryandDNA protectiveactivitiesoftheshootsofCynodondactylon. FreshjuiceofCynodondactylonof1.46% (w/w) solid content had a phenolic content of 47±0.33 mg/kg GAE. At doses equivalentto 50, 100 and 200mg total solids/kg body weight the juice protected human DNA against doxorubicin-induced DNA damage as demonstrated in DNA spectral studies, where the ratio of absorbanceofDNAat260and280nminsamplespretreatedwiththejuicewas1.66,1.53and1.63respectively,whileitwas1.37forDNAtreatedwithdoxorubicinonly.Thisindicatesnucleic acid purityin the Cynodondactylon treatedsamples. Oraladministration of the juiceat 250 and 500 mg/kg in mice increased humoral antibody response upon antigen challenge, as evidenced via dose-dependent, statistically significant increase in antibody titer in the haemagglutination antibody assay and plaque forming cell assay [42-43].

Snakebite therapy

Selvanayagam ZE. et. al., survey of the medicinal plants with antisnake venom activity in Chengapattu district, Tamilnadu, India. The survey in Chengapattu district, Tamilnadu shows that the Cynodon dactylon is very effective in snakebite therapy and the antisnake venom from the plant extract is very effective in the treatment of snakebite [44].

Antiulcer activity

Patil MB. et. al., studied the, Antiulcer

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properties of alcoholic extract of Cynodon dactylon in rats. Alcoholic extract of Cynodon dactylon was evaluated for preliminary identification of Phytoconstituents and screened at 200, 400, and 600 mg/kg body weight given orallyforpylorusligatedandIndomethacininducedgastriculcermodelsinalbinorats.Results showed the presence of flavonoids and proteins. Alcoholic extracts at 400 mg/kg and 600mg/kg showed significant (>0.001) antiulcer activity, comparable to the standard drug ranitidine, which may be due to the presence of flavonoids [45].

Analgesicandanti-pyretic activity

Garg VK., Khosa RL., studied the, Analgesic and Anti-Pyretic activity of aqueous extractof Cynodon dactylon. Whole plant of Cynodon dactylon is traditionally used to treat painful and inflammatory conditions. Analgesic and anti-pyretic activities of aqueous extract of Cynodon dactylon at different doses was studied using hot plate, acetic acid induced writhing and yeast induced hyperthermia method. Cynodon dactylon showed significant analgesic and anti-pyretic in all models studied. It was found that the aqueous extract at the dose of 600 mg/kg showed a significant decrease in rectal temperature similartothat shown by standard drug,paracetamol. Analgesic activity of aqueous extract of the plant was evaluated using hot plate method and writhing test in mice. Acetic acid, which is used as an inducer for writhing syndrome, causes algesia by libration of endogenous substances, which then excite the pain nerve endings. The fact that aqueous extract of Cynodon dactylon showed analgesic activity in both modelsstudied, indicate that this effect could be due to the presence of two components; one acting centrally and the other via peripheral route[46].

Diureticandantimicrobial activity

Artizzu N. et. al., studied the, Diuretic and Antimicrobial activity of Cynodon dactylon essential oil. The essential oil of Cynodon dactylon shows significant diuretic activity in rats at a dose of 150 mg/kg body weight as compared to the standard drug and increases the urine volume secretion in rats [47].

Woundhealingactivity

Thewoundhealingpropertyofdruvagritha wasevaluatedbyincisionandexcisionwoundmodel inmaleWisterratpromotes wound contraction and reduces the time for closureshowinghealingpotentialcomparabletoFramycetinsulphate1%cream[45]. WoundsdressedwithAzadirachtaindicaandC.dactylonextractwithhoneyformulations,astopicalapplicationofwoundssignificantlyacceleratetherateofwound healing process. The most effective concentration ofaqueous C. dactylon extracts was found to be 6.0%, for deadspace,excision andincisionwoundmodels[48].

AnticancerActivity

The anticancer activity of C. dactylon was evaluated in SwissalbinomiceinoculatedwithEAC(EhrlichAscitesCarcinoma) cells. Treatment showed significant anticanceractivities in the tested animal models, with enhancement oflife span and restoration ofhematological parameters[49].Antitumoractivity ofmethanolicextracts of leavesofC.dactylon against ascitic lymphoma (ELA) in Swiss albinomice was evaluated[50], and tumor was induced in mice byintraperitoneal injection of EAC (1 × 106 cells/mouse). Theresult revealed that methanolic extract of C.dactylon wasfound to possess significant antitumor and hepatoprotectiveeffect [50].

Anti-diarrhealactivity

In an investigation hexane, dichloromethane, ethyl acetateand methanol extracts of C. dactylon whole plant were testedforanti-diarrhealactivityoncastoroilinduceddiarrhea,gastro intestinal motility by charcoal meal and entero poolingmodelsinalbinorats.Methanolicextractexhibitedconsiderablereductionininhibitionofcastoroilinduceddiarrheaandalsoshowedasignificantdecreaseingastrointestinalmotilitybycharcoalmealanddecreasedweight on intestinal contents in enter pooling models . Theseresultsindicatethattheplantpossessgoodanti-diarrhealactivity[51].

Anti-Nephrolithiatic activity

A Study investigates the preventive effects of hydro alcoholicextract of C. dactylon roots on calcium oxalate calculi in rats.Urine oxalate level decreased in nephrolithiatic rats treatedwiththeextract.ThisstudyshowedthattheC. dactylonextract was able to reduce the growth of urinary stones inrat[52].

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Anti-Arthritic activity

C. dactylon showed significant antiarthritic activity againstFreund'scompleteadjuvantinducedarthritis inrats.TheethanolicextractofC.dactylonwasfoundt obesafeatallthedose levels (100, 200 and 400 mg/kg, orally) and there wasno mortality up to the dose of 5000 mg/kg of extract whenadministered orally. The ethanolic extract of C. dactylon at adoseof400mg/kgismoreeffectiveinimprovinghae matological level, CRP and reducing TNF alpha level.Study evaluated the effect of C. dactylon against rats withadjuvant-induced arthritis. Orally administered C. dactylonproducedsignificantattenuationintheinfla mmatoryresponse,oxidativestressandamelioratedt hearthriticchangestonear normalcondition[53].

Antiviral activity

Antiviral activity of C. dactylon was found against WhiteSpot Syndrome Virus (WSSV) and it also possesses antiviralactivityagainst humanvacciniavirus[54]. TheplantextractofC.dactylonwasincorporatedwit hartificial pellet feed at a concentration of 1% or 2% to theexperimental challenge black tiger shrimp (P. monodon) thatwere fed with WSSV-infected shrimp meat. PCR technique,bioassayandWesternblotanalysisatthee ndoftheexperiment were performed to confirm the WSSV-infection.The results of the study showed that the plant extract of C.dactylonwasfoundtobehighlyeffectiveinprevent ingWSSV infection with no mortality and no signs of WSD inblacktiger shrimp (P.monodon**)**[55].

Bronchodilatory effect

The bronchodilatory effect of C. dactylon was investigatedby in vitro and in vivo models. Acetylcholine (Ach)-inducedbronchospasm was conducted in guinea pig while isolated rattracheal strip was suspended in organ bath to measure theconcentrationresponsecurveusingmultichannel dataacquisition system. The chloroform extract of C. dactylon(CECD)protectedagainstAch-inducedbronchospasminguineapigs,similartoatro pine.Inthein-vitrostudies,CECDrelaxed carbachol(CCh)andhigh K^+-induced contractionof rattrachealstrip,similartoatropineandverapamil,su ggestingantimuscarinicandcalciumchannelblocki ng(CCB)activities,whichwereconfirmedbyrightw ardshiftingofCChandCa^{+2}concentrationresponsec urve(CRC). The phosphodiestrase (PDE) inhibitory activity wasconfirmed by potentiation of isoprenaline-induced inhibitoryresponse, similar to papaverine. Densitometry analyses led totheidentificationofscopoletinasanactiveingredie nt.Itsignificantly inhibited high K^+, and Ca^{+2} induced contractileresponse,similartoverapamil.Thephosp hodiestraseinhibitoryactivitywasconfirmedbydire ctevidenceofpotentiationofisoprenaline-inducedinhibitoryresponse,similartopapaverine.T heresultsrevealedthatthebronchodilator activity of CECD was partly due to presenceof scopoletin, and mediated possibly through CCB and PDEinhibition[56].

Reproductive effect

The effect of administration of aqueous extract of entire plantof C. dactylon for thirty days on reproductive hormones andreproductive organ weight of female was studied in Wistarrats.Administrationoftheextract producedsignificantincrease($p<0.001$)intheserum estradiolconcentrationwhereas, follicle stimulating and luteinizing hormones weresignificantly ($p<0.001$) reduced. Furthermore, a significantincrease ($p<0.001$) in the weight of the uterus and significantdecrease in the weight of the ovaries ($p<0.001$) was observedin the treated group when compared to the control group. Inaddition, the estrouscyclewas foundto beirregular anddisturbed[57].

III. CONCLUSION

Fromthebeginningofcivilization,medicin alplantshaveprovidedenormousleadstocombatdis eases.C.dactylon is a weed and has been found to possess variouspotentialmedicinalwithdiversepharmacolo gicalactivity.This review article provided updated informationaboutmedicinal, phytoconstituents, andpharmacological activities of this plant. In the near future it may be used as anoveldrugtotreat manydiseases,

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