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Cyanodon dactylon-A review

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Abstract
Cynodon dactylon (durva) is a perineal grass, one of the most commonly occurring weeds in India. It is considered a sacred grass next to Tulsi by the Hindus. This plant is recognized for its cooling, hemostatic, diuretic and tonic properties since ancient times. According to Ayurveda, Cynodon dactylon plant is pungent, bitter, fragment and it also has heating, anthelmintic, antipyretic and hemostatic properties. Given the alarming incidence of antibiotic resistance in pathogens raises concern among medical practitioners, there is constant need for new and effective therapeutic agents. Hence there is a need to develop alternative antimicrobial drugs for the treatment of infectious disease from medicinal plants.

Keywords: bermuda grass, antioxidant, antidiabetic, antidiuretic, immunomodulatory activity

Introduction

Plant Profile

Many weeds of our surroundings are often very powerful medicinal plants to address many of our today's major health problems. Cynodon dactylon (L.) Pers. (Family- Poaceae, Sub-family- Chloridoideae, Tribe- Cynodonteae), a weedy grass (the generic name is derived from Greek word 'kuon' means dog and 'odous' means tooth, while the specific name from 'daktulos' means finger- refers to digitate inflorescence1) is one of the ten auspicious herbs that constitute the group 'Dasapushpam' in Ayurveda2 (the science of life, prevention and longevity – the oldest and most holistic medical system). It is reported to be the most sacred plant of India next to Ocimum3. It possesses many therapeutic as well as decorative values and other unexplored potentials. Apart from its significant uses, the species is a natural resource and therefore needs to be explored. With the view to it, an overview on Cynadon dactylon is presented providing adequate information which may be an impetus to researchers who can link the traditional knowledge about the species with the experimental (scientific) base enabling universal acceptance [1].

Synonyms

Capriola dactylon (L.) Kuntze, Panicum dactylon L.

Scientific Name

Cynodon dactylon (L.) Pers.

Family

Poaceae (Gramineae)

Similar Species

In eastern Africa there can be frequent confusion between Cynodon dactylon and Cynodon nlemfuensis. This species is similar to C. dactylon in almost all respects but it does not have below-ground rhizomes.

Distribution and Habitat

Cynodon dactylon is a grass native to Africa, widely spread in warm climates all over the world between 45ºS and 45ºN latitude6 and above sea level to 2300 m altitude7; found to grow in open areas where there are frequent disturbances of grazing animals, flood, fire among other calamites6. The species is crowding out most other grasses and invading other habitats and has become hard to eradicate4. Due to its weedy nature it is called as 'devil's grass' [2].

Used Parts

Stem and leaf.

Chemical Constituents

The plant contains crude proteins, carbohydrates and mineral constituents, oxides of magnesium, phosphorous, calcium, sodium and potassium. The whole plant affords sitosterol and carotene. Other compounds like vitamin C, cartone, palmitic acid, triterpenoides, alkaloids ergonovine and ergonovinine etc. 3 are also present.

Ecology

The species tolerates a wide range of soil type and conditions, but growth is greater on heavy clay soil than on light sandy soils of dry regions; tolerates low fertility soil as well10. It can survive long periods of flooding, but little to no growth occurs without adequate soil aeration10. It grows on soils with a wide range (5.0-8.0) of pH values8; however, alkaline soils are tolerated more than acidic ones10. Optimal temperature for growth is 24°C8. It is drought tolerant but shade intolerant.

Pollination

C.dactylon is wind-pollinated, and generally self-incompatible, suffering from inbreeding depression.

Therapeutic Uses

The species possesses immense medicinal value and may be applied both externally as well as internally. Being haemostatic, refrigerant, healer and beneficial for skin complexion, externally it is used in wounds, hemorrhages, burning sensation (like urticaria, erysipelas) and dis pigmentation of skin. Leaf paste is applied in traumatic

wounds and piles, fresh juice of the plant is installed into eyes for catarrhal conditions and when used as nasal drops controls nasal bleeding. Paste of the plant is applied on forehead in headache. The species is also used in traditional cultures for toothache and amibiosis. Decoction of C. dactylon can be used to treat kidney stones, Hyperglycemic and hyperlipidemic properties (plant extract), nitric oxide scavenging activity, protectivity against ischemia (studied in rat heart), CNS depressive activity in rat (ethanol extract of aerial part), improvement in cardiac functions in rat (hydroalcoholic extraction of rhizome), preventive against aluminium induced neurotoxicity and carbofuran induced oxidative stress (aqueous extract), aphrodisiac and male fertility activity were also reported in the species [3].

Literature Review

Avvari sanjeeva kumar *et al*, has published Herbal medicines are products from medicinal plants and these are considered as safe since they are natural products. Herbal medicine is the oldest form of health care to mankind. There are as many as 700 species of medicinal plants used in herbal formulations available in India. Herbal medicines are alternative medicines used throughout the world and in the past herbs are often the original sources of most drugs. Today we are witnessing an increase in herbal remedy use throughout the western world raining the question as to how safe are these preparations. The British Herbal Medicine Association (BHMA) has been founded in 1964 and it engaged the legislation in productive discussion about the controls of herbal medicines. The present study was undertaken to evaluate the anti diabetic activity of ethanolic extract of Cynodon dactylon root stalks in Streptozotocin induced Diabetic Rats as this type of scientific documentation was not filed so far. The whole plant was collected and shade dried, root stalks were separated and grinded to get the root stalk powder. The extraction was carried using soxhlation procedure with petroleum ether and ethanol. This extract was subjected to preliminary Phytochemical screening using standard procedure. The anti diabetic activity of ethanolic extract of Cynodon dactylon root stalks was evaluated in streptozotocin induced diabetic rats using Tolbutamide as standard. The phyto chemical investigation shows the presence of alkaloids, carbohydrates, phytosterols, glycosides, saponins, phenolic compounds, Flavonoids and tri terpenoids. The anti diabetic activity of ethanolic extract of Cynodon dactylon root stalks was comparable with the standard drug. Our results showed a good anti diabetic activity of the extract against the treated model [4].

Sivasangari ramya, *et al*, has reported Antidiabetic activity of various solvent extracts of leaves of Cynodon dactylon in alloxan induced diabetic rats was assessed. Methods: After 21 days of treatment, blood samples were collected and the serum was subjected to estimate different biochemical parameters *viz*. blood glucose, cholesterol, urea and triglycerides level. Results: The solvent extracts were found to exhibit qualitative difference in phytochemical constituents There was a steep decline in blood glucose, cholesterol and triglycerides level when in methanolic extract of C. dactylon was given to experimental animals when compared with negative control. Moreover, petroleum ether and chloroform extracts also reduced the elevated plasma cholesterol and urea level in diabetic rats. Conclusion: It may be concluded that C. dactylon might be used in the treatment of diabetics. However, necessary studies on characterization of active principles and their mode of action are required for effective use of plant based drugs as antihyperglycemic agent [5].

Belvotagi v, *et al*, has published Cynodon dactylon linn. Is a medicinal plant and has high wound healing activity, antioxidant activity, Antidiabetic activity, Antidiarrheal, Immunomodulator, Antiulcer and cardio protective. There are many reports revealing pharmacological potential of Cynodon dactylon Linn. extracts however, only few literature reports highlight the conversion of these extract in to suitable dosage. The objective of the present research work is to formulate and evaluate Herbal Gel for Wound healing Activity. This formulation is made for better patient compliance and to reduce the dose of the drug. The gel was formulated by changing the polymer ratio. Various formulation (F1, F2, F3, F4) were developed by using a suitable polymer (Carbopol 971p and NoveonAA1). The formulation was evaluated for spreadability, extrudability and viscosity *in vitro* drug release study. Viscosity studies of various formulations revealed that formulation F4 was better to compare to others. From among all the developed formulation, F4 shows better drug diffusion, did good Rheological properties. pH of the F4 formulation is sufficient enough to treat the skin infections. Results indicated that the concentration of Carbopol 971p and Noveon AA1 significantly affects drug release and rheological properties of the gel. It was concluded that formulation F4 was the best formulation among this formulation. Hence formulation F4 has shown the better results compared to other batches [6].

Papia khatun *et al*, has published There are many grasses in this world have some unique medicinal properties. Cynodon dactylon (L) pers. (Family: Poacea) a perennial weedy grass has a prime position in ethno medicinal practices and traditional systems of medicine. The plant is rich in various metabolites such as proteins, carbohydrates, mineral, flavanoids, β-sitosterol, alkaloids, tri-terpenoides, glycosides, steroids, saponins, tannins, resins, phytosterols, reducing sugars, volatile oils and fixed oils. The plant shows various biological activities such as antiviral, antimicrobial, wound healing, central nervous, cardiovascular, antidiabetic, gastrointestinal, antioxidant, immunological, antiallergic, antiinflammatory, antipyretic, analgesic, anticancer, diuretic, protective, antimicrobial, antiparasitic properties. The plant is also used to treat various maladies such as cancer, anasarca, convulsions, cough, cramps, diarrhea, dropsy, dysentery, epilepsy, headache, hemorrhage, hypertension, hysteria, measles, rubella, snakebite, sores, stones, tumors, urogenital disorders and warts. This review attempts to gather updated information about pharmacognostic characters, traditional uses, and chemical constituents, summary of various pharmacognostic and pharmacological activities of Cynodon dactylon [7].

Behrooz ilkhanizadeh, *et al*, has published Cynodon dactylon is used in Iranian traditional medicine as a healing agent for reducing the complications of diabetes mellitus. We proposed that Cynodon dactylon may perform its effects through moderating humoral and cellular immune responses. We aimed to determine the possible effects of hydroalcholic extract of Cynodon dactylonon humoral and cellular immune responses following the Rev1 challenge in the mouse model. 20 NMR Imalemice were randomly grouped in two equal groups and immunized with Rev1 [0.1

ml Rev1+0.9 PBS. [Mice in the treatment group orally received 400 mg/kg hydroalcoholic extract of Cynodon dactylon every day from the beginning of the study for 2 weeks. Blood samples were obtained from the animals 5 days after the last injection. Moreover, 48 hr before bleeding time, Rev1 [0.1 ml Rev1+0.9 PBS [was injected into the left hind foot pad of mice. The levels of anti-Rev1 antibody and the specific cellular immune responses were measured by micro hemagglutination test and footpad thickness, respectively. Moreover, susceptibility of macrophages respiratory burst and proliferation of immune cells were measured in order with Nitroblue tetrazolium [NBT] and Microculture Tetrazolium Assay [MTT]. The concentrations of IL-1, TNFα, Il-6, and IL-10 in the serum were determined using commercially available ELISA kits. We found a significant increase in anti-Rev1 antibody levels and simultaneously a significant decrease in the level of cellular immunity [DTH] in the treatment group compared to the control group. Lymphocyte proliferation index in splenocytes was significantly increased in the treatment group. However, the level of respiratory burst in phagocytic population of splenocytes dramatically decreased in the treatment group compared to the control. A significant decrease in IL-6, TNF-α, IL-1 and increaseIl-10 serum levels were also seen in the treatment group. Cynodon dactylon extract could have an anti-inflammatory effect through downregulation of pro-inflammatory cytokines and can be considered as the moderating immune system compound [8]. Madhan kumar sj, *et al*, has published Diabetes mellitus is the world's most common endocrine disorder, characterized by hyper glycaemia and impaired glucose tolerance. The aim of the present study was to evaluate the effect of aqueous extract of Cynodon dactylon on renal function in Streptozotocin induced diabetic rats. STZ induced diabetic male rats showed significant decrease in the levels of serum total protein, which lead to the reduction in their body weight, and significant elevation in the levels of blood urea and serum creatinine were observed, when compared to normal rats. These levels were reverted in the STZ induced diabetic rats, treated with Cynodon dactylon extract and in those treated with glibenclamide, which was also demonstrated and correlated with the histopathological findings of the kidney tissue. According to the results of our study, Cynodon dactylon aqueous extract effectively prevented the nephropathic changes induced by diabetes and this is the first study to report on nephroprotective effect of Cynodon dactylon with histological correlations [9]. Mukesh chandra das, *et al*, has published According to WHO About 347 million people worldwide have diabetes, and is predicted to become the seventh leading cause of death in the world by the year 2030.According to Diabetes Atlas 2012, released by *International Diabetes Federation* India has 63 million people living with diabetes and is only second to China. By 2030, India's diabetes burden is expected to cross the 100 million mark as against 87 million earlier estimated. A Many oral hypoglycemic agents, such as biguanides and sulfonyl urea are available along with insulin for the treatment of diabetes mellitus but they have significant side effects and sometimes they are found to be ineffective in chronic diabetic patients. Â Since ancient times, diabetes has been treated orally with several medicinal plants or their extracts. Phytochemical study shows *the* presences of flavonoids and sterols in Cynodon dactylon (Doob Grass) which exhibit hypoglycemic activity and are also known for their ability of beta cell regeneration of pancreas. Sterols have also shown to decrease blood sugar in experimental animal models [10].

Prof. dr ali esmail al-snafi *et al*, has published The phytochemical analysis showed that Cynodon dactylon contained flavanoids, alkaloids, glycosides, terpenoides, triterpenoids steroids, saponins, tannins, resins, phytosterols, reducing sugars, carbohydrates, proteins, volatile oils and fixed oils. Previous studies showed that Cynodon dactylon possessed central nervous, cardiovascular, antidiabetic, gastrointestinal, antioxidant, immunological, antiallergic, antiinflammatory, antipyretic, analgesic, anticancer, dermatological, diuretic, protective, antimicrobial, antiparasitic, insecticidal and repellent. This review will highlight the chemical constituents, pharmacological and therapeutic effects of Cynodon dactylon [11].

Brindha p1, *et al*, has published Cynodon dactylon occupies a key position in ethno medicinal practices and traditional medical knowledge systems (Ayurveda, Unani, Nepalese, and Chinese). Cynodon dactylon possess immense medicinal value and may be applied both externally as well as internally. The plant possesses antiviral and antimicrobial activity. A group of 36 adult Swiss albino rats weighing 100 – 150g were purchased from Rainbow Institute kattumannargudi and brought to the laboratory in large sized microlon cages. Fresh dry husk was used as bed material. They were fed with commercial pellet diet from Sai Durga feed and foods, Bangalore and tap water ad-libitum. They were maintained at room temperature under standard laboratory conditions. In these medicinal plants, these are present/absent as a steroids, alkaloids, flavonoids, diterpenes, glycosides, tannins and phenols, xanthoproteins, gums and mucilage, fixed oils and fats, saponins, phytosterols, volatile oils, proteins and free amino acids etc. these are easily identified by biochemical analysis (qualitative). Qualitative Photochemical Screening on extracts of Cynodon dactylon gives better result on extract from Albino Rats. We are concluding that, biochemical studies by using Cynodon dactylon on Albino rats are very effective. Further studies are being carried out to characterize and explore the biological activity of the compounds present in the extract [12].

e e jarald, *et al*, has published Petroleum ether (60 degrees-80 degrees C), chloroform, acetone, ethanol, aqueous and crude hot water extracts of the whole plant of C. dactylon and the two fractions of aqueous extract were tested for antihyperglycaemic activity in glucose overloaded hyperglycemic rats and in alloxan induced diabetic model at two-dose levels, 200 and 400 mg/kg (po) respectively. The aqueousextract of C. dactylon and the non polysaccharide fraction of aqueous extract were found to exhibit significant antihyperglycaemic activity and only the non polysaccharide fraction was found to produce hypoglycemia in fasted normal rats.

Treatment of diabetic rats with aqueous extract and non polysaccharide fraction of the plant decreased the elevated biochemical parameters, glucose, urea, creatinine, serum cholesterol, serum triglyceride, high density lipoprotein, low density lipoprotein, haemoglobin and glycosylated haemoglobin significantly. Comparatively, the non polysaccharide fraction of aqueous extract was found to be more effective than the aqueous extract [13].

Deepak bharati, *et al*, has published in recent years, the use and search for drugs and dietary supplements derived from plants have accelerated in the treatment of diabetes and hypertension because of the hazardous adverse effects of the current therapy. A comparison was made between the antidiabetic-antihypertensive activities of aqueous extracts of leaves of Cynodon dactylon and Phyllanthus niruriin rats with simultaneous type 2 diabetic and hypertension. The aq. extracts of leaves of Cynodon dactylon (200mg/kg/day) and Phyllanthus niruri (600mg/kg/day) was administered orally in Diabetic Control (DC), SHR and Diabetic-SHR (D-SHR). Body weight of animals were measured weekly throughout the study (28 days). Blood glucose level and total cholesterol level was measured at day 0 after induction of diabetes and at day 28. Arterial blood pressure of all the groups was measured at day 14 and day 28 by tail cuff method. Serum glutamic oxaloacetic transaminase (SGOT) levels in all the groups were measured at the end of experiment. No loss in the weight of animal was observed in the group treated with the aqueous herbal extracts. The study showed that herbal extracts prevented attenuation of the blood glucose and total cholesterol levels; significant decrease in mean arterial blood pressure (MABP) and decrease in SGOT level. The findings of the study support the traditional use of C. dactylon and P. niruri for the treatment of diabetes and arterial hypertension, and indicate that they may have a beneficial effect in patients with co-existing diabetic hypertension [14].

Kaliyaperumal ashokkumar, *et al*, has published Cynodon dactylon (Bermuda grass) is a perennial grass distributed all over the world, and particularly it is native to the warm temperate and tropical regions. The plant has been rich in metabolites notably proteins, carbohydrates, minerals, flavonoids, carotenoids, alkaloids, glycosides and triterpenoides. Whole plant of C. dactylon keeps several biological activities such as antibacterial, antimicrobial, antiviral and wound healing properties. Furthermore, it has been extensively used in traditional medicines to treat varied ailments such as cough, headache, diarrhea, cramps, epilepsy, dropsy, dysentery, hemorrhage, hypertension, hysteria, measles, snakebite, sores, stones urogenital disorders, tumors, and warts. Therefore, based on the aforementioned consideration, this article reviews the most updated information of the phytochemical properties and pharmacological effects of C. dactylon extract, including its miscellaneous uses of anti diabetics [15].

Karthik d, *et al*, has published Objective To investigate the antidiabetic, antioxidant and hypolipidemic efficacy of Cynodon dactylon in diabetic rats. Methods The experimental rats were randomly divided into three groups: Group I: control; Group II: Alloxan diabetic, untreated; and Group III: Alloxan diabetic treated with ethanolic extract of C. dactylon leaves (450 mg/kg·bw). Experimental diabetes was induced by alloxan in a single dose of 150 mg/kg·bw. Results A Significant diminution of fasting blood sugar level was observed and also significant increase in HDL and decrease ($P<0.05$) in cholesterol, triglyceride, LDL and VLDL were observed after 15 days of treatment. The investigation also revealed, the activities of AST, ALT, ALP, AP, LDH, and CPK ($P<0.05$) were decreased in the extract-supplemented group. The significant decrease in protein content and SOD, CAT, GPx, and GSH ($P<0.05$) activity and increase in LPO in plasma were found to be ameliorated after treatment. Conclusion Our result supports the fact that administration of extract of C. dactylon leave is able to reduce hyperglycemia and hyperlipidemia risk and also reduced the oxidative stress in diabetic rats [16].

Madhan kumar j, *et al*, has published Diabetes mellitus is the world's most common endocrine disorder, characterized by hyper glycaemia and impaired glucose tolerance. The aim of the present study was to evaluate the effect of aqueous extract of Cynodon dactylon on renal function in Streptozotocin induced diabetic rats. STZ induced diabetic male rats showed significant decrease in the levels of serum total protein, which lead to the reduction in their body weight, and significant elevation in the levels of blood urea and serum creatinine were observed, when compared to normal rats. These levels were reverted in the STZ induced diabetic rats, treated with Cynodon dactylon extract and in those treated with glibenclamide, which was also demonstrated and correlated with the histopathological findings of the kidney tissue. According to the results of our study, Cynodon dactylon aqueous extract effectively prevented the nephropathic changes induced by diabetes and this is the first study to report on nephroprotective effect of Cynodon dactylon with histological correlations [17].

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