

A Grass Cynodon Dactylon is used in the treatment of Diabetes Mellitus

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ABSTRACT:-

Herbal medicines are products they are obtained from medicinal plants and they are considered as safe ,efficient, cheap. they are natural products. Herbal medicine is the ancient form of health care to mankind. Whole plant of *C. dactylon* shows several biological activities like **antidiabetic**, antibacterial, antimicrobial, antiviral and wound healing properties. *Cynodondactylon* is a potential source of metabolites such as flavanoids, alkaloids, glycosides and has been traditionally employed to treat diabetes, urinary tract and other microbial infections and dysentery. The present work attempts to established the activity of *C. dactylon* extracts for sugar control. Phytochemical study shows the presences of flavonoids and sterols in *Cynodondactylon* which exhibit hypoglycemic activity and are also known for their ability of beta cell regeneration of pancreas. Aqueous extract of *C. dactylon* analyzed the presence of chemical constituents such as Phlorizin, Dapagliflozin, Luteolin, Apigenin, 6-C-pentosyl-8-C-hexosyl apigenin, 6-C-hexosyl-8-C-pentosyl luteolin. This chemicals shows the anti-diabetic activity. This plant 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.

KEYWORDS:- Herbal medicine, *Cynodondactylon*, Anti-diabetic activity.

I. INTRODUCTION:-

The mother earth is invested with a rich wealth of medicinal plants. *Cynodon dactylon* may be applied both externally as well as internally due to its various medicinal value. *Durva* contains the whole dried plant of *Cynodondactylon* (Lin) Pers.(family: Gramineae) This plant have various synonyms like *Duurvaa*, *niladuurvaa*, *Bhaargavi*, *Shatvalli*, *Shatparvaa*, *Tiktaparvaa*, *Shatvirvaa*,

Sahastravirya, *Shitaa*, *Anantaa*, *Golomi*. Different parts of the plant are used to get different phytochemical components such as leaves, roots, stems, fruits, seeds and plants. The phytochemical analysis showed that *Cynodondactylon* contained alkaloids, glycosides, terpenoides flavonoids, saponins, resins, phytosterols, tannins, reducing sugars, carbohydrates, proteins, triterpenoids steroids, volatile oils and fixed oils. Medicinal plant extracts are used to treat various health problems such as bacterial infections. Plant showed wide range of pharmacological activities including antidiabetic , antimicrobial, antioxidant, anticancer, hypolipidemic, cardiovascular, central nervous, respiratory, immunological, anti-inflammatory, analgesic antipyretic and many other pharmacological effects.

Taxonomical Classification:-

Kingdom: Plantae

Division: Mangeliophyta

Order: Cyperales

Family: Poaceae

Genus: *Cynodon*

Species: *Cynodondactylon*

Class: Liliopsida



Botanical Description:-

C. dactylon is a continuous creeping herb, stem (stalk) lean and stiff and strong like wire. Leaves are 2-10 cm x 1.25-3 mm, narrowly linear or non-subdivided, acute and soft. It contains spikes 2-6, diverging from slender ascending branch, green or purplish. Grains are 1.05 mm long. Flowering and Fruiting time is August-October (also throughout the year). Other characteristics are stated bellow.

Root: The root of *C. dactylon* is fibrous, cylindrical, up to 4 mm thick, minute hair like roots arise from the main roots; cream colored.

Stem: Slender, horizontal, up to 1 mm thick, jointed leafy, very smooth, yellowish green in color.

Leaf: 2 to 10 cm long and 1.25 to 3 mm wide, narrowly linear or un-subdivided, finely acute more or less opaque, usually noticeable opaque in the barren shoots and at the base of the stem; covered light, sometimes bearded, ligule a very fine ciliate rim.

II. MATERIALS AND METHODS:-**Preparation of plant materials and phytochemical analysis**

Collection of plants:-Plants of *Cynodon dactylon* (L.) Pers. were collected from different localities near Madurai and maintained in the herbal garden of Saraswathi Narayanan College, Madurai, Tamil Nadu. The plants were identified and authenticated by referring the standard taxonomic characteristic

features (keys) according to the Flora of Madras Presidency and the Flora of Tamil Nadu Carnatic. The voucher specimens of the plants are kept in the Department of Botany, Saraswathi Narayanan College, Madurai, Tamil Nadu, India for future reference.

Processing of plant materials

The leaves were washed in water and cut into small section to facilitate drying. The pieces of plant material were dried for 12hrs in a hot air oven (Model: HIPL-024A) at 60°C. The dried plant material (leaves) was taken separately and grounded using an electric blender to obtain a fine powder. The powder was passed through a 2mm sieve to obtain fine particles. The powdered samples were stored in a clean glassware container until needed for analysis.

Extraction of the plant

500mg of powdered plant material was separately dispensed in 1000ml of each water and solvents used. The powdered plant material was defatted with petroleum ether for 24 hours at 20°C and extracted with chloroform, ethanol and methanol in a Soxhlet apparatus for 72hrs at 40°C respectively. The thick mass obtained by evaporating the solvent under reduced pressure at room temperature. It obtained a gummy concentrates of chocolate black color. The sticky concentrate was delegated as crude extract. The extract obtained was used for the phytochemical screening.



(A). Size reduction of *Cynodon dactylon*



(B). Defatted with Ether solvent



(C). Soxhelt extraction



D). Extracted product



(E). Evaporated solvent product

CHEMICAL CONSTITUENTS:-

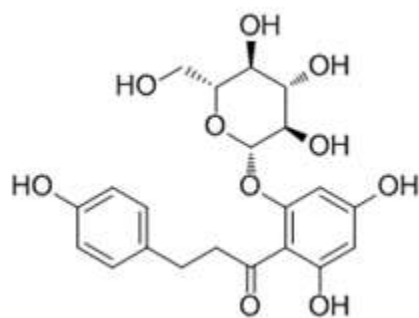
Various phytochemical analyses explored that the plant contained flavanoids, alkaloids, glycosides, terpenoides, triterpenoids steroids,

saponins, tannins, resins, phytosterols, reducing sugars, carbohydrates, proteins, volatile oils and fixed oils.

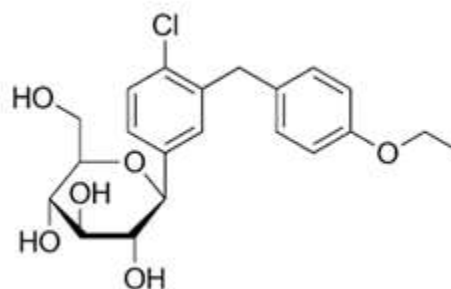
Quantitative estimation of phytoconstituents showed glycosides reached 12.2 %, tannins 6.3%, alkaloids 0.1%, resins 1.0%, free reducing sugar 10% and total reducing sugar 12%

From nutritional analysis it has been explored that each 100 g contained , 11.6 g protein, 2.1 g fat, 75.9 g total carbohydrate, 25.9 g fiber, 10.4 g ash, 530 mg Ca, 220 mg P, 112.0 mg

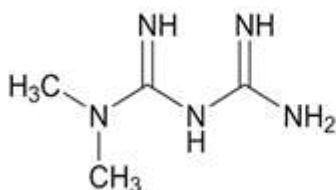
Fe, 1630 mg K, 28 µg betacaroteneequivalent. A total of 20 compounds were identified from the hydroalcoholic extract of the whole parts of *C. dactylon*. Hexadecanoic acid, ethyl ester linolenic acid, ethylester d-mannose were the major components of the hydroalcoholic extract, and hexadecanoic acid ethyl ester was the most abundant one (17.49%).



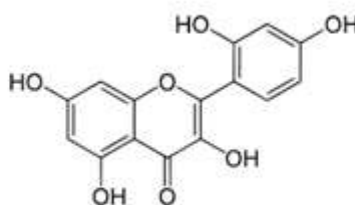
1. Phlorizine



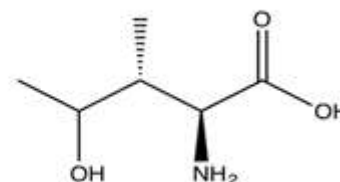
2. Dapagliflozin



3. Metformin



4. Morin



5. 4- hydroxyisoleucine

Isolation compounds:-

Various compounds were isolated from *C. dactylon* leaves using GC-MS analysis, these included: glycerin 38.49%, 4H-pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6methyl- 2.16%, thymol 1.15%, conhydrin 0.79%, 1,2cyclopentenediol, 3-methyl- 1.65%, benzenepropanol, 4hydroxy-à-methyl-, (R)- 0.36%, ethyl à-d-glucopyranoside 8.42%, 3,7,11,15-tetramethyl-2-hexadecen-1-ol 2.01%, nhexadecanoic acid1.01%, hexadecanoic acid, ethyl ester 9.50%, phytol 4.89%, linoleic acid ethyl ester 5.32%, 9,12octadecadienoyl chloride, (Z,Z)- 15.61%, octadecanoic acid, ethyl ester 0.72%, pentanal, 2-methyl- 0.58%, 1(cyclopropyl-nitro-methyl)-cyclopentanol 0.29%, propenamide, N-[2-(dimethylamino)ethyl]- 20.36%, hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl) ethyl ester 0.43%, didodecyl phthalate 0.29%, 13-tetradec-11-yn-1-ol 1.01%, 10-undecyn-1-ol

0.43%, Squalene 1.94%, 9,12octadecadienoic acid (Z,Z)-, phenylmethyl ester 1.15% and diazoprogerone 1.44% . The presence of many flavonoids including apigenin, 6-C-pentosyl-8-Chexosyl, apigenin and 6-C-hexosyl-8-C-pentosyl luteolin have identified.

MECHANISMS OF ACTION:-

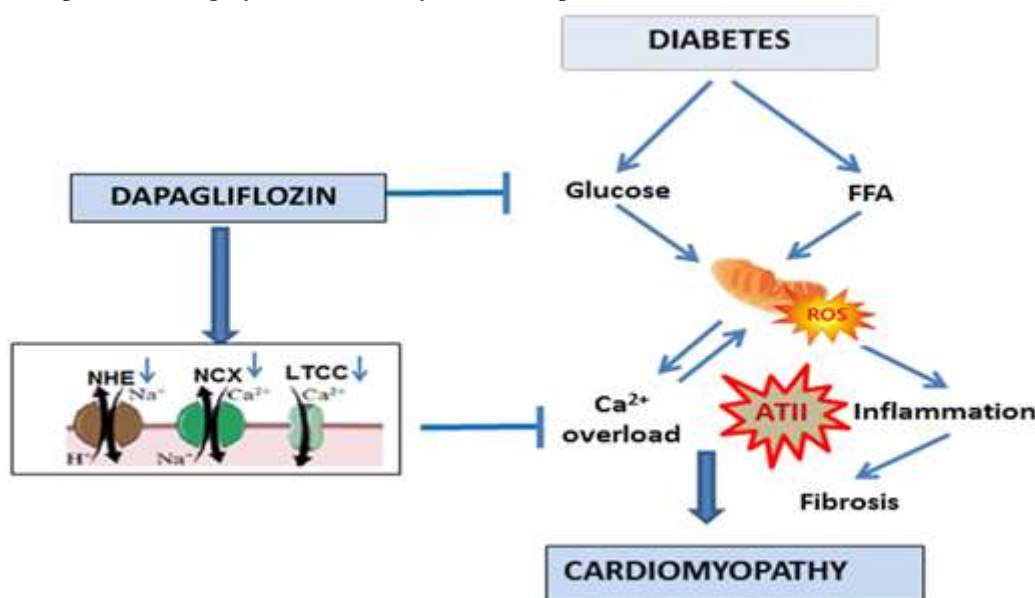
1. Dapagliflozin:-

Sodium-glucose cotransporter-2 (SGLT2) inhibitors are a relatively new class of antihyperglycaemic agents for the treatment of type 2 diabetes. These agents reduce reabsorption of glucose in the kidneys and helps to excretion in the urine by inhibiting the high-capacity glucose transporter SGLT2 located in the proximal convoluted tubule, thereby lowering glucose levels individually of insulin action.

2. Phlorizin:-

Phlorizin's pharmacological action is to produce renal glycosuria and block intestinal glucose absorption through inhibition of the sodium-glucose co-transporters located in the proximal renal tubule and mucosa of the small intestine. The phlorizin has played in the history of

diabetes mellitus and its use as an agent to understand basic concepts in renal physiology as well as outline the physiology of cellular glucose transport and the etiology of renal glycosuria. It assesses the pathobiology of glucose transporters and discusses the medical botany of phlorizin and the possible effects of plant flavonoids, such as phlorizin, on human metabolism.



Versatile uses in different system:-

Traditional:-

1. Decoction of the entire plant used as diuretic.
2. Crushed leave used as styptic in minor wounds to stop bleeding. Also used for inflammatory conditions.
3. Decoction of the root used as diuretic in dropsy and syphilis.
4. The roots are used as a substitute for sarsaparilla.
5. Infusion of root to stop bleeding for piles.
6. Juice of plant applied to fresh cuts and wounds.
7. Paste of plant applied to forehead in headaches.
8. Used for tooth aches.
9. Mixed with clove used as anthelmintic.
10. The paste of the plant mixed with honey is used in epistaxis.
11. A decoction of *C. dactylon* mixed with sugar is useful in the difficulty in urine retention

III. CONCLUSION:-

The ethanolic extract has shown good result comparable with the standard anti diabetic drug. From this we may conclude that phyto constituent like alkaloids, saponins, phenolic

compounds, flavonoids and tri terpenoids may be responsible for the said activity. The phyto chemical investigation shows the presence of alkaloids, glycosides, carbohydrates, phytosterols, saponins, Flavonoids, phenolic compounds, and tri terpenoids.

From the above results it can be concluded that the anti diabetic activity of ethanolic extract of *Cynodondactylon* root stalks was comparable with the standard drug. This plant shows a good anti diabetic activity of the extract against the treated model.

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