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Study of Antimicrobial Activity of *Cynodon dactylon*

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Review Article

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ABSTRACT

Plants are of most imperative wellsprings of medications since times indecent. Vast quantities of medications are being disconnected and separated from plants. The restorative plants are the wellsprings of optional metabolites and fundamental oils of remedial significance. The vital points of interest against the remedial utilization of therapeutic plants in different afflictions and scatters are their wellbeing other than practical, powerful and their simple accessibility. The utilization of and quest for medications and dietary supplements got from plants have quickened as of late. Abstract content goes here. Plants are of most imperative wellsprings of medications since times indecent. Vast quantities of medications are being disconnected and separated from plants. The restorative plants are the wellsprings of optional metabolites and fundamental oils of remedial significance. The vital points of interest against the remedial utilization of therapeutic plants in different afflictions and scatters are their wellbeing other than practical, powerful and their simple accessibility. The utilization of and quest for medications and dietary supplements got from plants have quickened as of late.

INTRODUCTION

Large numbers of drugs are being isolated and extracted from plants. The medicinal plants are the sources of secondary metabolites and essential oils of therapeutic importance. The important advantages against the therapeutic use of medicinal plants in various ailments and disorders are their safety besides economical, effective and their easy availability [1-3]. *Cynodon dactylon* is a perennial grass belonging to family Poaceae that has a variety of medicinal properties. It is cultivated throughout the tropics and subtropics. Whole herb and its root stalk are used for medicinal use [4-6]. It is native to north and east Africa, Asia and Australia and southern Europe. In Ayurveda *Cynodon dactylon* shows many pharmacological activities like antidiabetic, antioxidant, anti-diarrheal, hepatoprotective, anti-ulcer, immunomodulator, CNS depressant, antimicrobial and germicidal [7-10]. An investigation showed that the aqueous extract of *Cynodon dactylon* has high antidiabetic potential along with significant hypoglycemic and hypolipidemic effects. The plant contains crude proteins, carbohydrates, and mineral constituents, oxides of magnesium, phosphorous, calcium, sodium and potassium [11-13].

The whole plant affords β -sitosterol, flavonoids, alkaloids, glycosides and triterpenoids. *Cynodon dactylon* contains many chemical constituents like Hexadecanoic acid, Linolenic acid, ethyl ester, Hydroquinone, d-mannose [14-16]. Synonyms: *Agrostis bermudiana* Tussac; *Agrostis filiformis* J.Koenig; *Agrostis linearis* Retz; *Agrostis stellata* Willd; *Capriola dactylon* L. Kuntze; *Capriola dactylon* L. Hitchc; *Chloris cynodon* Trin. Nom. illeg; *Chloris maritima* Trin [17,18]. Common Name: Bermuda Grass; Assamese: Dubari; Bengali: Durba; Hindi: Doob, Dobri; Kannada: garikehullu, balli garike, ambate hullu; Manipuri: Tingthou; Marathi: haryali, dhurva; Mizo: phaitualhnm; Oriya: dubbo ghas; Sanskrit: Niladurva, saddala, ananta; Tamil: Arugampillu, Arukampillu, muyalpul; Telugu: Ghericha, gerichagaddi; Urdu: Doob. Common Name: Bermuda Grass; Assamese: Dubari; Bengali: Durba; Hindi: Doob, Dobri; Kannada: garikehullu, balli garike, ambate hullu; Manipuri: Tingthou; Marathi: haryali, dhurva; Mizo: phaitualhnm; Oriya: dubbo ghas; Sanskrit: Niladurva, saddala, ananta; Tamil: Arugampillu, Arukampillu, muyalpul; Telugu: Ghericha, gerichagaddi; Urdu: Doob [19-22].

CHEMICAL CONSTITUENTS

It contains crude proteins, carbohydrates and minerals constituents oxides of magnesium phosphorous, calcium, sodium and potassium. The whole plant affords sitosterol and carotene and potassium. Other compounds like vitamin c, cartone, palmonic acid, triterpenoids, alkaloids ergonovine and ergonovine etc are also present [25].

Used parts of cynadon dactylon & preparation

Stem and leaves; Prepared form for study and use, the leaves are dried in sunlight for complete moisture evaporation. Un-required parts of the plants are separated and discarded while the rest of the part is grinded to obtain the powdered form for various research experiments use [26].

Selection of culturing media

The selection of media is an important part for antimicrobial and microbiological experimentation and study. Culturing media are the compositions of various macro and micro-molecules that provides and facilitates the growth of microorganism in in-vitro condition [27-29]. In today's industrialization period many companies are producing such ready to use media for experimentation. Variety of media depends on the choice of stain of microorganism. Different microorganism requires different growth requirement thus choice of media depends on the selection of strain that has be studied [30,31].

Antimicrobial activity

The four main mechanisms by which microorganisms exhibit resistance to antimicrobials are: Drug inactivation or modification: for example, enzymatic deactivation of penicillin G in some penicillin-resistant bacteria through the production of β -lactamases [32-36]. Most commonly, the protective enzymes produced by the bacterial cell will add an acetyl or phosphate group to a specific site on the antibiotic, which will reduce its ability to bind to the bacterial ribosomes and disrupt protein synthesis; Alteration of target site: for example, alteration of PBP—the binding target site of penicillin's-in MRSA and other penicillin-resistant bacteria [37,38]. Another protective mechanism found among bacterial species is ribosomal protection proteins [39]. These proteins protect the bacterial cell from antibiotics that target the cell's ribosomes to inhibit protein synthesis. The mechanism involves the binding of the ribosomal protection proteins to the ribosomes of the bacterial cell, which in turn changes its conformational shape [40-42]. This allows the ribosomes to continue synthesizing proteins essential to the cell while preventing antibiotics from binding to the ribosome to inhibit protein synthesis; Alteration of metabolic pathway: for example, some sulfonamide-resistant bacteria do not require Para-amino benzoic acid PABA, an important precursor for the synthesis of folic acid and nucleic acids in bacteria inhibited by sulfonamides, instead, like mammalian cells, they turn to using preformed folic acid; Reduced drug accumulation: by decreasing drug permeability or increasing active efflux pumping out of the drugs across the cell surface [43-47]. These specialized pumps can be found within the cellular membrane of certain bacterial species and are used to pump antibiotics out of the cell before they are able to do any damage. These efflux pumps are often activated by a specific substrate associated with an antibiotic [48-50].

Preparation of Plant Extracts

The thimble filled with about 55 g of each plant sample Stem, Root and Flower powder was subjected to various solvents of increasing polarity for successive use [51,52]. The solvents were evaporated to dryness in the rotary evaporator to obtain the solvent free extracts. The plant extracts so obtained were lyophilized at a definite temperature. The extracts powder was stored in airtight bottles at 37 °C till [53,54].

Disc Diffusion Method

For antimicrobial study the most commonly used method for analysis is the disc diffusion method. Kirby-Bauer antibiotic testing is a strategy to decide the affectability of microorganisms to particular antimicrobial medications; more noteworthy medication adequacy yields bigger organism free zones encompassing medication containing circles after overnight development on strong media [55,56].

Zone Of Inhibition

This is a territory of media where microscopic organisms can't develop, because of nearness of a medication that obstructs their development [57].

DISCUSSION

From the various reaches results cyandon dactylon has comes up with promising result. when test with various microorganism strains of both gram positive and gram negative bacterials like Bacillus subtilis BS, Bacillus atrophaeus BA and Staphylococcus aureus S, Escherichia coli EC, Pseudomonas aeruginosaPA, Salmoneella typhi ST, Kleibsiella pneumonia KP, Erwiniacarotovora Agrobacterium tumifaciens EC and AT and a fungal strain, Candida albicans CA and many more other strain [58-63]. The antimicrobial action of the leaves of cynadon dactylon has been found by different solvent extracts including solvents like water, ethanol, alcohol as well as crude extract [64-69].since the use of these solvents as extracting agents has been proved to be more efficient in extorting the active compounds [70-74]. All the extracts exhibited different degree of inhibition against selected gram positive and gram negative bacteria due to their varying polarity and solubility [75]. The polarity of the antibacterial compounds makes

them more readily extracted by organic solvents without negatively affecting the bio activity against bacterial species [76-80].

CONCLUSION

The medicinal plants are the sources of secondary metabolites and essential oils of therapeutic importance. The grass and cultivation is not an essential, therefore the species may easily be explored for human benefits from natural habitat. The present researches provide and proof with an evidence that the cyanndon dactylon has proven as beneficial gift to mankind. Intense antimicrobial potential of cynadon dactylon leaves extracts against gram negative bacteria, gram positive and a fungus. The findings suggest that the plant could be regarded as promising alternative for development of efficient and effective drug from natural source that can be used for therapy of infectious diseases. The most active extracts could be subjected for further pharmacological evaluation by isolation of the therapeutic antimicrobials and further research on this plant can specify its pharmaceutical application.

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