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A Comparative Study on Antimicrobial Activity of *Vigna unguiculata* And *Cynodon dactylon*

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Abstract: ***Extract from different parts of medicinal plant contains lots of phytochemicals and helps to cure different types of diseases. Vigna unguiculata and Cynodon dactylon both are annual herbs and found all over the country. Both annual herbs are numerous used in Ayurveda, Unani and Siddha medicines. Vigna unguiculata is a leguminous plant and contain various phytochemicals like alkaloids, flavonoids, Amino acid, phenols, and phytic acid. Vigna unguiculata extract have been reported to cure different type of diseases like anthelmintic activity, antibacterial activity, antimicrobial activity, antidiabetic activity, antiviral and antifungal activity, antioxidant activity ,hypocholesteerolemic activity and hypolipidemic activites. Extracts from different parts of Cynodon dactylon are widely used to prevent different kinds of diseases like antiviral and antimicrobial activity, against snake bites, gout and rheumatic affection, anthelmintic activity, anti-inflammatory activity, reduce burning sensation, hyperdipsia, haematuria, leprosy, bronchitis, piles, asthma, enlargement of the spleen, tumors, dysentery, diarrhoea, conjunctivitis, vomiting etc due to the lot of phytochemical likes flavonoids, alkaloids, glycosides, terpenoids, saponins, resins, tannins, reducing sugar, phytosterols, proteins, carbohydrates, volatile oil and fixed oils presents in the plant.***

Keywords*: *Cynodon dactylon, Vigna unguiculata, Antimicrobial Activity, Cowpea, Black eye pea, Durba.

I. INTRODUCTION

Vigna unguiculata is largely produced and used for household consumption in Africa [1] and very commomly known as Cowpea or black eye pea [2]. It is a leguminous plant and belongs to a family Papilonaceae. The most important part of Vigna unguiculata is its leaf and seed which are source of numerous chemical constituents like alkanoids, flavonoids, amino acid, phenol, phytic acid, etc [3,4] as well as having potassium, iron, zinc, calcium, selenium, sodium, copper and potential sources of vitamin A and C [5]. Sandy soil with rich source of organic matter and minerals are the suitable place for the growth of the plant[6]. Different parts extract shows various medicinal activities like antioxidant, antifungal, antisickling, antidiabetic, antibacterial, hypolipidemic, hypocholesteerolemic, antimalarial, anthelmintic, thrombolytic activity[7,8]. Plants have strong tap and lateral roots with nodules helps to fix atmospheric nitrogen in soil. *V. unguiculata* contains a bunch white, yellow, blue or purple colour self fertilized flowers on the leaf axils. Green, brown or purple colour pods varies in length from 8 to 15 cm with straight or slightly beak or pointed beak tips. Pod contains green, black, brown,white, red, mottled and spotted seed averagely 1 – 10 seeds in a row[9-12].

Picture I: Different parts of *Vigna unguiculata*

Our earth is a rich source of medicinal plant [13]. *Cynodon dactylon,* mainly known Durba, are used both externally and internally for various medicinal value[14]. *Cynodon dactylon* belongs to a family Poaceae and available all over the country[15]. Different parts extract of the plant such as leaves, roots, stems, fruits, seeds are used to treat various disease due to presence of different phytochemical components and plants[16]. The Plant extract shows antiviral and antimicrobial activity[17].

The plant shows positive response against snake bites, gout and rheumatic affection[18]. In Homeopathic medicine *Cynodon dactylon* is used in bleeding and skin troubles.[19,20]. *C.dactylon* is grew in warm climates and all around the year[21,22]. Completely herb and its root stalk is used in medicine[23]. The gray or green leaf blades of *Cynodon dactylon* are, 2-15cm long and 4mm broad. Leafs are flat to slightly keeled, tip sharp and glabrous. *Cynodon dactylon* flowers are spikelets with a perfect floret and lanceolate and yellow in colour; styles purple; The yellow to reddish seeds are oval and about 1.5 mm long[24].

Picture II: Different parts of *Cynodon dactylon*

II. COMMON NAME OF *VIGNA UNGUICULATA* AND *CYNODON DACTYLON*

A. *Common name of Vigna unguiculata*

Sl. No.	Language	Vernacular Name
1.	English	Cowpea
2.	Hindi	Lobia, Kulathi, Kurathi
3.	Tamil	Kaattulundu, karamani
4.	Sanskrit	Mahamasah, rajamash
5.	Marathi	Alasandalu, Kaaraamanulu
6.	Telugu	Alsandalu, Kaaraamanulu
7.	Malayalam	Vellapayar
8.	Kannada	Alasande
9.	Tulu	Lattane
10.	Urdu	Kulthi
11.	Arabic	للوبياء
12.	Bengali	Kalaya, Barbati, Kulattha, Ghangra
13.	French	Dolique asperge, Haricot asperge, Doliquemongette, Haricot indigène, Niébé.
14.	Marathi	Chavali, Alasbde
15.	Punjabi	Lodhar
16.	Spanish	Costeno, Judía catjang, Frijol de costa, Judíaespárrago, Rabiza
17.	Tamil	Karamani ,Kaattuulundu,
18.	Swahili	Kunde
19.	Kashmiri	Kath
20.	Ghana	Tipielega, Tuya, ,Adua, Ayi, Saau
21.	Gujrati	Kulathi, Kalathi
22.	Malayalam	Mudiraa
23.	Nigeria	Mongo, Ewa, Akedi, ,Wake, Ezo, Nyebbe, Ngalo, Azzo, Dijok, Alev, Arebe, Lubia, Akoti
24.	Portuguese	Feijão-fradinho ,Feijão-espargo
25.	Indonesian	Kacangtoonggak ,Kacangbol, Kacangmerah, , Kacangbéngkok

Table I: Common Name of *Vigna Unguiculata* [25 - 28]

B. Common Name of Cynodon dactylon

Sl. No.	Language	Synonyms
1.	Tamil	Aruvaumpullu
2.	Hindi	Doob
3.	Kanada	Garikehullu
4.	Marathi	Dhoorva
5.	Telugu	GarikeandThellagariki
6.	English	Bermuda and Bahama.
7.	Sanskrit	Durva
8.	Other	Weed
9.	German	Bermundagras, Hundezahngras
10.	Italian	Gramina
11.	Portuguese	Capim-Bermunda
12.	Spanish	Garmarastera
13.	Swedish	Hundtandsgras
14.	Chinese	Gou ya gen
15.	Afrikaans	Gewonekweek, Kweekgrss
16.	Arabic	Thaiel, Najeel, Tohma
17.	French	Chieendent pied-de-poule

Table II: Common Name of *Cynodon dactylon* [29-31]

III. SYSTEMIC CLASSIFICATION OF *VIGNA UNGUICULATA* AND *CYNODON DACTYLON*

	Vigna unguiculata [32,33]	*Cynodon dactylon* [34-36]
Kingdom	Plante	Plantae
Division	Magnoliophyta	Trcheobionta
Class	Magnoliopsida	Magneliophyta
Order	Fabales	Spermatophyte
Family	Fabceae	Liliopsida
Subfamily	Fboideae	Commelinidae
Genus	Vigna	Cyperales
Parts	seeds	Poaceae
Tribe	Phaseoleae	Cynodon N
Sub tribe	Phaseolinae	Cynodon dactylon
Species	Unguiculata	Cynodon dactylon

Table III : Systemic Classification of *Vigna unguiculata* and *Cynodon dactylon*

IV. PHYTOCHEMICAL CONSTITUENTS OF *VIGNA UNGUICULATA* AND *CYNODON DACTYLON*

A. *Chemical Constituents of Vigna unguiculata*

Sl. No.	Chemical Name	References
1.	Proteins (20.53-31.7%)	37,38
2.	Carbohydrates (56-67%)	
3.	Vitamins	
4.	Fat(1.14-3.03%)	
5.	Glycosides	
6.	Minerals	
7.	Flavonoids	
8.	Polyphenols	
9.	Tannins	
10.	Vignalin	
11.	Saponins	
12.	Sitosterol β-D-glycosides	
13.	Oleanolic Acid	

Table IV : Phytochemical Constituents of *Vigna unguiculata*

B. *Chemical Constituents of Cynodon dactylon*

Sl. No.	Chemical Name	References
1.	Proteins, Carbohydrates, Vitamin C, Terpenoids, alkaloids, and palmitic acid	39
2.	Flavonoids:apigenin, orientin, letuolin, and vitexin	40,41
3.	Extractive Value (water: 18.88, petroleum ether:3%, alcohol;8% and benzene:1.34 % w/w of crude drug). Volatile Oil: 1%	42
4.	Fibercontent: 30.46% and tannin content: 0.80%. Total Ash: 9.1%, water insoluble ash: 7.9%, acid insoluble ash:3.7%.	43,44
5.	Green grass (dry0 10.47% crude protein,11.755 total ash, 28.17%fiber.	45
6.	Leaves glycerin (38.49%), 9, 12-octadecadienoyl chloride, (Z,Z)-(15.61%), ethyl ester (9.50), hexadecanoic acid, phytol (4.89%) and ethyl(5.32%)	46
7.	Phenolic extracts : furfural (6.0%), hydro quinone (69.49%) and levoglucosenone (2.72%).	47
8.	Carotenoids: neoxanthin, beta-carotene, Phenolics	48
9.	Phytosterols, saponins, glycosides	49,50
10.	Essential oil triticin12.4%	51
11.	Cuticular wax contains octacosanol, docosanol, hexacosanol, tetracosanol,docosanoic acid & eicosanic acid	52,53

Table V : Phytochemical Constituents of *Cynodon dactylon*

V. PHARMACOLOGICAL ACTIVITIES OF *VIGNA UNGUICULATA AND CYNODON DACTYLON*

A. *Pharmacological Activities of Vigna unguiculata*

Plant Parts	Extracts	Biological Activities	References
Seeds	Aqueous	Antibacterial activity,	54
		Hepatoprotective	55
Seeds	Ethanol	Anthelminthic Activity,	56
		Anti-atherosclerotic	57
		Antisickling Activity	58.59
		Hypolipidimic Activity	60
Seeds	Methanol	Antioxident	61,62
		Antibacterial	63
		Antinociceptive Activity	63
		Antidiabetic	64
		Thrombolytic Activity	65
		Hypocholesterolemic Activity, Hypoglycemic	66
		Hypoglycemic	67
Seeds	-----	HIV-1 reverse transcriptase and α-glucosidase inhibitor	68
		Antiparasitic	69
Seed oil	-----	Antimicrobial	70
		Antidiabetic	71
Leaves	Ethanol	Antimicrobial	72
		Diuretics	73
		Antisickling Activity	74
Leaves	----	Antihyperlipidemic, cardioprotective	75
Whole Plant	Methanol	Antiobesity	76
Whole Plant	-----	Antidiabetic	77

Table VI : Pharmacological activity of *Vigna unguiculata*

B. *Pharmacological Activities of Cynodon dactylon*

Plant Parts	Solvents	Pharmacological Activity	References
Whole plant	Aqueous	Antipyretic and analgesic	78
		Anthelmintic	79
		Anticataleptic	80
		Anti-inflammatory	81
	Aqueous and non polysaccharide fraction	Anti-diabetic	82
	Chloroform-methanolic	Anti-inflammatory	83
	Ethanolic	Anticonvulsant	84
	50% ethanolic	Anti-inflammatory	85
	Methanolic	Anti-diarrheal	86
	Aqueous and	Wound healing	87

Aerial parts	ethanolic	Anti-diabetic	88-90
	50% aqueous-ethanolic	Reduce kidney stone	91
	Ethanolic	Gastoprotective	92
		Central Nervous system	93
	Ethyl acetate fraction	Antioxidant	94
	Hydroalcoholic	Antioxidant	95
Rhizome	Aqueous	Anti-diuretic	96
	Hydroalcoholic	Anti-arrhythmic	97
		Cardio-protective	98
Leaves	Aqueous and Chlroform	Antimicrobial	99
		Anti-diabetic	100
	Aqueous and ethanolic	Antiepileptic	101
	Ethyl acetate fraction	Antioxidant	94
		Immunomodulatory	102
	Phospate buffered saline	Antilipidperoxidative	103
Roots	Methanolic	Anticancer	104

Table VII : Pharmacological activity of *Cynodon dactylon*

VI. ANTI-MICROBIAL ACTIVITIES OF *VIGNA UNGUICULATA AND CYNODON DACTYLON*

A. *Anti-Microbial Activity of Vigna unguiculata*

Vigna unguiculata seed oil shows positive antimicrobial activity at the concentration of 400 µg/ disc showed the highest activity against Gram positive bacteria like *Sarcina lutea* and *Staphylococcus aureus* as well as *Vigna unguiculata* seed oils are active against numerous fungi namely Penicilium spp., Mucor spp. and *Candida albicans* [70].

The antimicrobial activity of three varieties of Vigna unguiculata L. Walp seed oil (LBS-1, LBS-2 and LBS-3) were investigated against five Gram positive bacteria (Bacillus megaterium, Bacillus subtilis, Sarcina lutea, Salmonella typhi and Staphylococcus aureus) and four Gram negative (Escherichia coli, Shigella dysenteriae, Shigella sonnei, Shigella shiga) and four fungi (Penicilium spp., Mucor spp., Candida albicans and Aspergillus fumigatius). The LBS-1 oil at the concentration of 400 µg/ disc showed the highest activity against Sarcina lutea (19±0.1 mm) than that of LBS-2 (14±0.3 mm) and LBS-3 (12±0.3 mm) oil whereas LBS-3 oil showed highest activity against Staphylococcus aureus (16±0.1 mm) than that of LBS-1 (10±0.6 mm) and LBS-2 (13±0.4 mm) oil. All the three oils are active against the three tested fungi namely Penicilium spp., Mucor spp. and Candida albicans but showed no sensitivity against Aspergillus fumigatius

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fumigatius

B. Anti-Microbial Activity *Cynodon dactylon*

Chloroform and aqueous extract of *Cynodon dactylon* leaves shows antibacterial activity against tested gram positive (Pseudomonas aeruginosa and Staphylococcus aureus) and gram negative (*Escherichia coli* and *Klebsiella pneumoniae*) bacteria and 75 µl/ml concentration shows the best result compare than concentration 25 µl/ml and 50 µl/ml [99].

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VII. CONCLUSION

Vigna unguiculata (Cowpea) and *Cynodon dactylon* is very important and extremely useful in ayurvedic, unani and siddha medicine From ancient days. Both plants are found all over the year and very easily and both plants are shows near about result in antimicrobial activity. *Vigna unguiculata* (Cowpea) extract at concentration 400 µg/ disc shows antimicrobial activity against gram positive, gram negative and different types of fungi. Others important activity like thrombolytic and antisickling activities, anthelmintic, antilipidemic, antidiabetic, antibacterial, antifungal, antiviral, antioxidant due to rich source of vitamin A, vitamin C, flavonoids, riboflavin, zinc, copper, magnesium, calcium, sodium, phosphorus, thiamine, amino acid, phytic acid, alkaloids, saponins, fats, resins, terpenoids, glycosides in the different parts of the plant. Different parts of *Cynodon dactylon* plants contain different types of phytochemical like proteins, minerals, carbohydrates, vitamin C, terpenoids, alkaloids and palmitic acid, Flavonoids: apigenin, orientin, letuolin, and vitexin. *Cynodon dactylon* have significant role in management of diabetics and cardiovascular disease as well as 75 µl/ml concentration shows the best result in antimicrobial activity.

Conflict of Interest: Nil

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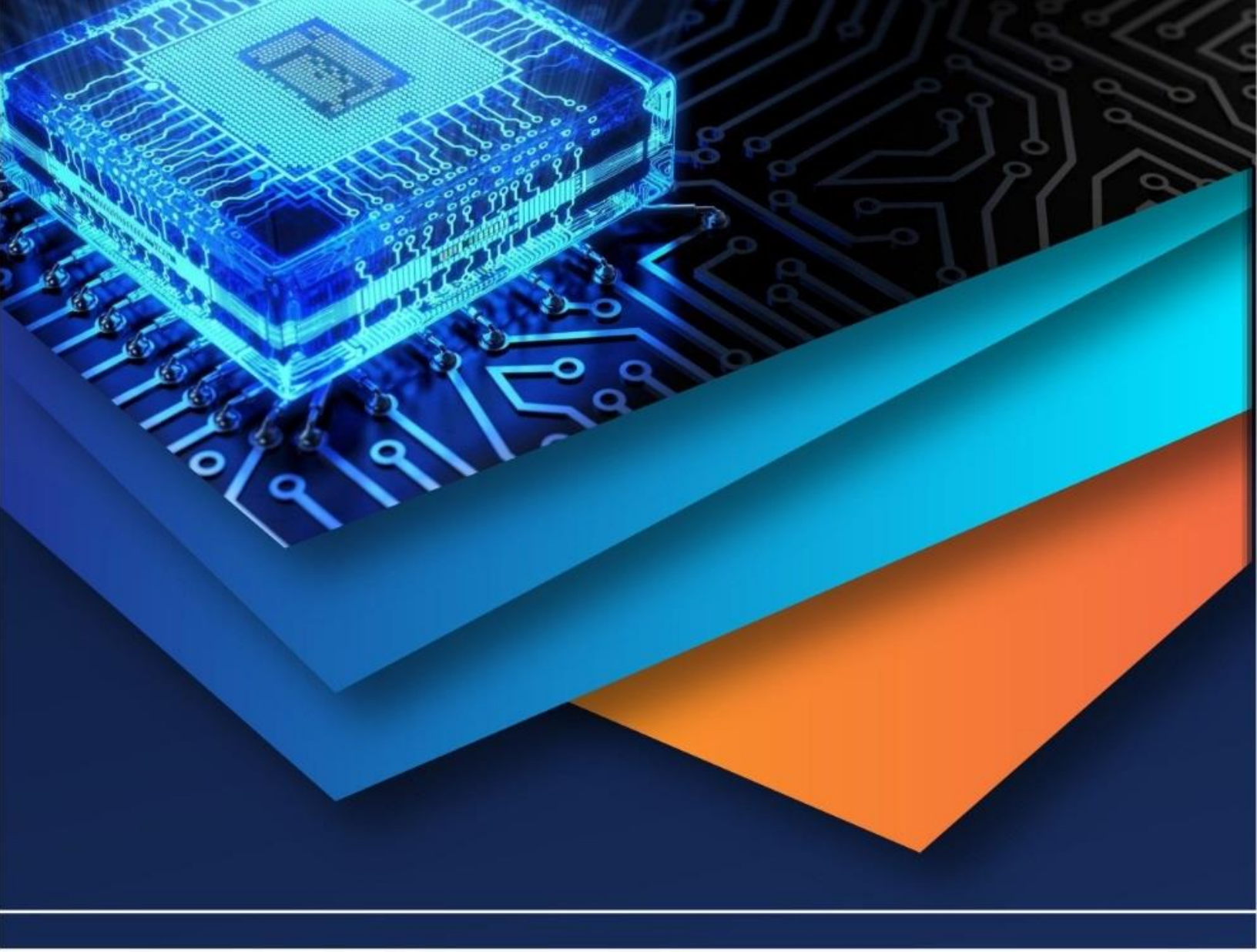

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