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A Short Review on *Vigna unguiculata*: A God Gifted Plant in Management of Sickling of Red Blood Cell and Thrombolysis

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Abstract: *Vigna unguiculata* mostly known as cowpea an annual herbaceous medicinal plant belongs to Papilonaceae family. *Vigna unguiculata* can grow in sandy soil and very low rainfall region. The root bulbs are capable to fix atmospheric nitrogen in to soil to improve soil fertility and help to retain soil moisture. *Vigna unguiculata* contains alkaloids, flavonoids, phenols, phytic acid and different kinds of amino acids helps to prevents various types of diseases. Different types of pharmacological activity like anthelmintic activity, antibacterial activity, Antimicrobial activity, antidiabetic activity, antiviral and antifungal activity, antioxidant activity, hypocholesteerolemic activity and hypolipidemic activites are reported by using the extract of *Vigna unguiculata* collected from different parts of the plant. The present review is established the details of *Vigna unguiculata* like phytochemical constituents, nutritional value of the plant and its medicinal uses like thrombolytic activity and antisickling activity.

Keywords*: Vigna unguiculata*, cowpea, amino acids, proteins, thrombolytic activity, antisickling activity.

I. INTRODUCTION

Vigna unguiculata is a very important crop for household consumption. *Vigna unguiiculata* is largely produced in Africa [1] and is grown widely all over the world including India, Africa, Nigeria, China. In Africa, Latin America, South Asia Cowpea (*Vigna unguiculata* (L.) Walpers) also known as black eye pea [2]. *Vigna unguiculata* is belonging from the family member of Papilonaceae. The seeds and leaves of the plant are mainly used. The seeds and leaves are fully composed of different important chemical constituents like flavonoids, alkanoids, phenol, amino acid, phytic acid, etc [3,4]. This plant is also known as cowpea[2]. Cowpea is having potassium, iron, zinc, calcium, selenium, sodium, copper. It is also having one of the potential sources of vitamin A and C [5]. The seeds also contain riboflavin, niacin, thiamine, pyridoxine, panthothenic acid. The plant is basically grown in sand-soil with rich source of organic matter and minerals [6]. The seeds are basically black or grayish black. The leaves are basically greenish in color. It is having different medicinal activities and properties like thrombolytic, antisickling, antidiabetic, antibacterial, antimalarial, antioxidant, antifungal, anthelmintic, hypolipidemic, hypocholesteerolemic [7,8].

II. SYNONYMS

Sl. No.	Language	Vernacular Name
1.	English	Cowpea, Black-eye pea, Horse gram, Asparagus bean, Catjang, Catjang cowpea, Chinese long bean, Clay pea, Cream pea, Crowder pea, Pea bean, Purple-Hull pea
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 1: Synonyms of *Vigna unguiculata* [6, 9 -11]

III. TAXONOMICAL CLASSIFICATION OF VIGNA SPECIES

Kingdom	Plante
Division	Magnoliophyta
Class	Magnoliopsida
Order	Fabales
Family	Fabceae
Subfamily	Fboideae
Genus	Vigna
Parts	seeds
Tribe	Phaseoleae
Sub tribe	Phaseolinae
Species	Unguiculata

Table 2: Taxonomical Classification of Vigna Species [7, 12]

IV. PLANT DESCRIPTION

Roots	*V. unguiculata* have strong main roots branched with tap and lateral roots. Nodules are found in their roots which helps to fix the atmospheric nitrogen in soil to improve soil fertility	
Stem	Stem of *V. unguiculata* is soft and herbaceous, erect or semi-erect, branched having purple anthocyan spots on the body	
Leaf	Stem holds pointed tip, glossy, flat and oval or round shaped having appearance of compound leaves. At the end of the main stem two leaflets of middle leaves looks mutually symmetrical	
Flower	*V. unguiculata* contain 6-12 white, yellow, blue or purple colour self fertilized flowers in a bunch on the leaf axils. Petals are differing in size and shape and sepals are angular, green sometimes purple in colour. Very few numbers blooming flowers produced fruits it may be 10-20%.	
Fruits	Generally pods are green in colour and look like flat thin and long. Length of the pod varies from 8 to 15 cm and pod tips are straight or slightly beak or pointed beak. Green pod turn yellow during maturity. Sometimes brown or purple colour pods are found depends on its varieties.	

Seeds	Pod contains 2 to 12 mm long seed averagely 1 – 10 seeds in a row. straight or wrinkled Seed coat can be green, black, brown,white, red, mottled and spotted	

Table 3: Plant Description [13-15]

V. PHYTOCHEMICAL CONSTITUENTS

Vigna unguiculata contains Proteins (20.5-31.7%), Carbohydrates (56-67%), vitamins, Fats(1.14-3.03%), glycosides, minerals, flavonoids, polyphenols, tannins, vignalin, saponins, sitosterol β-D-glycosides and oleanolic acid [7,16].

VI. NUTRITION VALUE OF *VIGNA UNGUICULATA* SEEDS

Essential minerals (mg / 100 g)		**Amino acid (%)**	
Macro-minerals		Alanine	18.7
Calcium	126	Arginine	14.3
Magnesium	51	Aspartic acid	27.8
Phosphorus	53	Cysteine	3.6
Sodium	4	Glycine	9.5
Potassium	431	Glutamic acid	43.5
Vitamins (mg / 100 g)		Lysine	0.5
Ascorbic acid (C)	2.5	Methionine	3.2
Thiamin (B1)	0.110	Phenylalanine	5.5
Riboflavin (B2)	0.145	Proline	17.6
Niacin (B3)	1.450	Serine	2.6
Pyridoxine (B6)	0.067	Threonine	3.3
Vitamin A, IU	817 IU/100g	Tryptophan	0.5
----------		Tyrosine	3.3
----------		Valine	0.8
Micro-minerals		Histidine	4.5
Iron	1.10	Isoleucine	5.3
Zinc	1.01	lysine	0.5

Table 4: Nutrition Value of *Vigna unguiculata* seeds [6,17]

VII. PHARMACOLOGICAL ACTIVITIES OF *VIGNA UNGUICULATA (L.) WALP*

Plant Parts	Extracts	Biological Activities	References
Seeds	Aqueous	Antibacterial activity,	18
		Hepatoprotective	19
Seeds	Ethanol	Anthelminthic Activity,	20
		Anti-atherosclerotic	21
		Antisickling Activity	22, 23
		Hypolipidimic Activity	24
Seeds	Methanol	Antioxident	25,26
		Antibacterial	27
		Antinociceptive Activity	27
		Antidiabetic	28
		Thrombolytic Activity	29
		Hypocholesterolemic Activity, Hypoglycemic	30
		Hypoglycemic	31
Seeds	-----	HIV-1 reverse transcriptase and α-glucosidase inhibitor	32
		Antiparasitic	33
Seed oil	-----	Antimicrobial	34
		Antidiabetic	35
Leaves	Ethanol	Antimicrobial	36
		Diuretics	37
		Antisickling Activity	38
Leaves	----	Antihyperlipidemic, cardioprotective	39
Whole Plant	Methanol	Antiobesity	40
Whole Plant	-----	Antidiabetic	41

Table 5: Pharmacological Activities of *Vigna unguiculata (L.) Walp*

VIII. THROMBOLYTIC ACTIVITY

Methanolic extract of seeds of *Vigna unguiculata* was very much efficient and potent for finding the thrombolytic activities. The following extraction of *Vigna unguiculata* was carried out in room temperature and divided into different concentration 2mg/ml, 4mg/ml, 6mg/ml, 8mg/ml, 10mg/ml respectively in where streptokinase can be used as positive control and distilled water can be used as negative control by using in vitro model. The plant extract gave significant results of clot lysis, i.e. concentrations 12.01 ± 1.50 at 2 mg/ml, 16.48 ± 2.31 at 4 mg/ml,24.88 ± 1.49 at 6 mg/ml,31.24 ± 0.68 at 8 mg/ml,40.33 ± 3.64 at 10 mg/ml, in where the standard as streptokinase shown 58.41 ± 3.71 and negative control as distilled water shown 2.56±1.23%. So based on the research study it is clear that this plant extract provide best result as thrombolytic effect cum activities among the standard [28].

IX. ANTISICKLING ACTIVITY

Vigna unguiculata have a reach source of twenty three types of different kinds of mineral like Ca, Iron, Zn, Mg, Cu and Se. calcium and iron are most abundant between them. *Vigna unguiculata* extract helps to manage sickle cell disease to modify erythrocytes shapes and increase the iron content which have a beneficial effect on heamoglobin content on blood and increase the life of patient those who are suffering from sickle cell disease [23].

In Nigerian folk medicine different types of natural plant products are used to manage sickle cell anemia by inhibiting cell sickling. The study was shown that ethanolic extract of *Vigna unguiculata* seeds have effective herbal drug to manage sickle cell disease in Nigeria. Various kinds of test like sickling inhibition test, sickling reversal test and polymerization test were carried outduring the study using standard method. The result exhibit that ethanolic seed extracts of *Vigna unguiculata* have more significant ($p<0.05$) antisickling effect than Hbss control. Polymerization test result showed that ethanolic seed extracts of *Vigna unguiculata* significantly ($p<0.05$) increased delayed time before polymerization at 50, 25 and 12% concentrations against the

delayed time of the control.Result shown that the ethanolic seed extracts of *Vigna unguiculata* have therapeutically against sickle cell disease and strongly recommended as a supplements against management of sickle cell disease [22].

X. CONCLUSION

From ancient days, medicinal plants shown an important feature to relieve different types of diseases. *Vigna unguiculata* (Cowpea) is very important plant specifically in respect of thrombolytic and antisickling activities. Although the plant is having another different vital activities like anthelmintic, antilipidemic, antidiabetic, antibacterial, antifungal, antiviral, antioxidant due to potential cum 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 seeds and leaves of the plant.

Conflict of Interest: Nil

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