Comparative Phytochemical Analysis of *Luffa Aegyptiaca* Leaves Using Different Solvents

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COMPARATIVE PHYTOCHEMICAL ANALYSIS OF *LUFFA AEGYPTIACA* LEAVES USING DIFFERENT SOLVENTS

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DECLARATION

I hereby declare that this project is written by me and it has not been presented before in any institution for bachelor Degree except for quotation and summaries which have been dully acknowledged

Firdausi Musa Garba

10 - 12 - 2019
Date

CERTIFICATION

This project entitled "Comparative phytochemical analysis of *luffa aegyptiaca* leaves using different solvents" meets the regulation governing the award of Bachelor of Science of the Federal University Gusau and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

I dedicate this project to my loving parents Alh Musa Garbaand Hajia Aisha KadoMayana. May Allah bless you both immensely.

AKNOWLEDMENT

In the name of Allah, the Most High, The all Knowing, the Merciful. Salutations and blessings be open out noble prophet Muhammad (SAW) peace be upon him. My deepest gratitude goes to Allah (SWT) who has provided all that was needed to complete this project and the program for which it was undertaken for. There was never lack or want. Throughout this entire study, He took care of everything that would have stopped me in my tracks and strengthened me even through my most difficult times. I would like to express my gratitude to the head of department of biological sciences Dr. (Mrs) S.A Shinkafi, my appreciation also goes to project coordinator Mal.NuraSulaiman I am grateful to my supervisor in person of mal NuraSulaiman who helped me with my project by effecting all the correction throughout the entire work without whom the work wouldn't become a reality I pray that Allah continue to guide, and protect him, I would like to thanks the entire lectures and all staff of biological science for their academic and moral training I received from them. My special gratitude and admiration goes to my parents, Alhaji Musa Garba and Hajiya Aisha KadoMayana for their prayers, support, encouragement, sacrifices and assistance for my success. Thank you so much may Allah reward them abundantly and may Al-jannatul Firdaus be their final destination.

Abstract

Luffa aegyptica (gourd sponge) belong to the family curcubitacea. It is a climbing annual plant grown in almost all part of the country as weed, possessing both medicinal and nutritional value. The analysis was conducted to extract, identify and compare phytochemical contents of luffa aegyptiaca leaves using different solvents. The result shows the presence of alkaloids, tannins, glycosides, cardiac glycosides, saponin glycosides steroids and balsams. This plant is recommended to be use as a potential source of phytochemicals. Further research is recommended on anti-nutritional and antioxidant properties of luffa aegyptiaca fruit and seeds.

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CHAPTER ONE

1.0 INTRODUCTION

Phytochemicals generally originated from the plant source are nothing but the bioactive compounds also known as secondary metabolites. There are two types of metabolites produced in plants viz. Primary metabolites and Secondary metabolites. Primary metabolites are important for the plants regular metabolism such as growth and development. Secondary metabolites produced by plants may have little need for them. These are synthesize in almost all parts of the plant like bark, leaves, stem, root, flower, fruits, seeds, etc.(Onuoha I., *et al.*, 2013) During past several years, phytochemicals have been used worldwide as the traditional herbal medicine. Because of this pharmaceutical industries as well as researchers put a greater emphasis on the phytochemical studies. Also these phytochemicals present in the different plant parts are used up by the local peoples for healing of certain disorders(Ugochukwu S.C., *et al.*, 2013). These are also widely used in the field of agriculture. Secondary metabolites are economically important in the production of drugs, flavor and fragrances, dye and pigments, pesticides and food additives. Many of the drugs that are derived from the secondary metabolites are simple synthetic modifications or copies of these naturally obtained substances(Hussain *et al.*, 2012).

The utilization of medicines produced from plants is increasing, thus leading to the interest in the use and importance of medicinal plants as well as intensive research to document scientific evidence for the claimed of their therapeutic efficacy (M. Hall *etal.*,2005).Plants are known to have substance for self defense against microorganism and the active principle of the medicinal plants are known to be concentrated in organs such as; leaves, stem, root, seed, and fruits among others (Kochar*et al.*, 1981).

Herbs are widely used in Nigeria and other parts of African countries to treat ailments. (Fareed *et al.*, 2013). The folkloric used of medicinal plants could be possibly due to the presence of various chemical agents (phytochemicals) which plays vital protective role against invaded pathogenic microorganism (Renu*et al.*, 2005). The plant '*Luffa aegyptiaca*' commonly known as sponge gourd belongs to the Curcubitaceace family. It is a vigorous climbing annual vine with several lobed cucumber-like leaves. The fruits were also cucumber-like shape develops at maturing, with a network of fibers surrounding a large number of flat blackial seeds. It was reported to have been originated from India. It is widely distributed in tropics, subtropics as a cultivated and/or neutralized plant.

In Nigeria, *Luffa aegyptiaca* is grown in almost parts of the country as weed; and it have been reported to posses both medicinal and nutritional potential (Stephen et al., 2003). Based on this fact, this study was designed to investigate and thus report the phytochemical content and of the leaves-extract of *Luffaaegyptiaca* using different solvents.

1.1 STATEMENT OF PROBLEM

Luffa aegyptiaca is reported to have economic value such as medicinal values. The research is centered on investigating and analyzing the claims made on this plant (leaves). Andalso to know the phytochemical components responsible for the medicinal value of this plant (leave)

1.2 JUSTIFICATION

The research was undertaken to justify the claims in order to obtain phytochemical components that are present in *luffa aegyptiaca*leaves, like *luffa aegyptiaca* helps in curing jaundice and it's a phenomenal blood purifier. The active principle found in

plant is phytochemical s. The medicinal value of these phytochemicals is because of the presence of chemical substances that produce definite physiological actions on the human body.

1.3 AIM AND OBJECTIVE

The main aim of the research is to extract the phytochemical content of *luffa aegyptiaca*.

Objective

The specific objective is;

To identify phytochemical content of *luffa aegyptiaca* using different solvents.

1.4 RESEARCH QUESTIONS

Are there chemical compounds present in *luffa aegyptiaca*?

Are the phytochemicalcomponents present in the leaves of *luffa aegyptiaca*?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 INTRODUCTION TO GOURD SPONGE(*luffa aegyptiaca*)

Is a herbaceous annual climber that naturalized in all kinds of vegetation. It is dispersed pantropically and subtropically to all countries where rainfall is high enough. *Luffa aegyptiaca*is the source of the commercial loofah or vegetable sponge which is the hard fibre-vascular network found within the ripe fruit after the intervening tissue has been rotted away.(Watt*et al.*,2001).The fibre may also have some potential as a paper-material. In Ghana loofahs are used for filtering water and palm-wine in Gabon to brush clothes and as cleaning squabs in Jebel Marra as well as scrubbers and sponges for washing. A bitter substance and a saponin have been isolated from *luffa* leaves is used in Guinea on tumours.

The fruit-juice is reported used on the inside of the nose to treat apoplexy and in Queensland, Australia, unripe fruit have been used as a fish-poison. The pulp of young fruit may also be applied as a poultice to swellings, etc. (Verger *et al.*, 2002). The fruit however is eaten in West Africa and is often cultivated for this purpose but they have to be picked young before the fibrous vascular bundles harden and before the purging substance develops towards ripening. In various countries edible cultivars have been selected. In Togo the whole fruit is steeped in guinea-corn beer for 12–15 hours to strengthen the fermentation (Gaisser*et al., 2008*).

An aqueous or alcoholic emulsion is reported usefully anthelmintic, and the seeds are eaten for this purpose with meat in Guinea. An oil is present at about 45–51% weight of the kernel. It is variously described as colorless, green, brownish green and dark red, perhaps dependent on the method of extraction, of a faint odor, pleasant taste and

semi-drying. It is edible and consists of a mixture of mainly linoleic, 43%, and oleic acids, 40%, with smaller amounts of palmitic and stearic acids (Dalziel, *etal.*,1937). It is proposed as a good substitute for culinary olive oil and has been used in the U.S.A. in soap-manufacture. The seedcake is bitter and toxic and is unfit for cattle-feed, but by virtue of being rich in nitrogenous matter, 41%, and phosphorus, 1.8% could be used in agricultural fertilizers. Glycosides are present and a bitter probably identical with cucurbitacin B.

The leaves have medicinal uses: in Gabon to promote healing of wounds in Congo in a plaster to maturate abscesses and to kill filaria in S Africa a leaf-infusion is taken by the Zulu for stomach-ache in Tanganyika leaf-sap is added to a a root-decoction to prevent abortion, a surprising application considering that the root is a drastic purge even in minute quantity (Oliver *et al.*,2009). A haemolyticsaponin, as in the fruit of wild forms, is present and also a trace of alkaloid (Bouquet *et al.*, 2011).

A root-preparation is said in Gabon to be an effective remedy for cancer of the nose (Sillans*etal.*,2006).If the fruits are scarified before normal harvesting and the plant has an incision in the stem about 25 cm above the ground, a clear liquid is expressed which in Japan is held to have medicinal value for respiratory diseases (Ingram *etal.*,2012).

2.1.1 Morphology of *luffaaegyptiaca*

Luffa (*Luffa aegyptiaca Mill.*) is a plant from the cucumber family grown for its multipurpose fruit in many tropical countries. It is an annual climbing or trailing herbaceous species that can grow to a length of 15 m. The luffa fruit is a cylindrical, fusiform, smooth, and dehiscent capsule, 20-50 cm long x 6-10 cm broad, with has a characteristic fibrous mesocarp (Achigan-Dako*et*al., 2011; eFloras, 2014). The leaves are alternate, large (6-25 cm x 6-27 cm) ovate and dark green. The seeds are numerous, dull

black, elliptic-ovoid, 10-12 mm long x 6-8 mm broad. The Luffa genus encompasses 7 species among which two are domesticated: *Luffa aegyptiaca and Luffa acutangula* (Joshi *et al.*, 2004).

2.1.2Ecology

Luffa aegyptiaca may be common as a spontaneous plant on abandoned land, as a fallow crop and on garbage heaps. Unlike many other cucurbits it grows well in tropical lowlands. It prefers seasonal climates because dry-season planting is more successful than wet-season planting. In Africa it thrives in the dry forest or moist savanna area, around 8–10°N. Outside these latitudes, too much rain or excessive dryness often affect the development of the fruits. In humid areas growth is directed towards the production of leaf biomass, whereas under dry conditions the energy is directed towards abundant flowering. Too much heavy rainfall during flowering and fruiting leads to fruit rot. Frost is not tolerated. *Luffa aegyptiaca* prefers a well-drained soil with a high organic matter content and a pH of 6.5–7.5.

2.1.3Pharmacological Activities of *luffa aegyptiaca*

Plant is bitter tonic, emetic, diuretic and purgative and useful in asthma, skin diseases and splenic enlargement. It is used internally for rheumatism, backache, internal hemorrhage, chest pains as well as hemorrhoids. Young fruit can be eaten raw like cucumber or cooked like squash, while the young leaves, shoots, flower buds, as well as the flowers can be eaten after being lightly steamed. The seeds can be roasted as a snack, or pressed to produce oil. Externally, it is used for shingles and boils. The dried fruit fibers are used as abrasive sponges in skin care, to remove dead skin and to stimulate the circulation. The fruits are anthelmentic, carminative, laxative, depurative, emollient, expectorant, tonic and galactagogue and are useful in fever, syphilis, tumors, bronchitis, splenopathy and leprosy. The vine is most commonly

grown for the fibrous interior of the fruits. Kernel of seed is expectorant, demulcent and used in dysentery. Seed oil is used in leprosy and skin diseases. Fruit is intensely bitter and fibrous. It has purgative property and is used for dropsy, nephritis, chronic bronchitis and lung complaints. It is also applied to the body in putrid fevers and jaundice. Pharmacological actions of *Luffa aegyptiaca*:

2.1.3.1.1 Anti-inflammatory:

Anti-inflammation intraperitoneal administration of water decoction of sigualuo inhibited carrageen an induced plantar edema in rats. P Muthumani et al has carried out phytochemical screening and Anti inflammatory, Bronchoditor and Antimicrobial activities of the seeds of luffa cylindrical and concluded all the extracts revealed the presence of sugar, protein, alkaloids, flavonoids, sterols and glycosides as major constituents. Cu-1 is oil has shown more unsaturation and less acid value which has been hydrolyzed and the resulting free fatty acids have been covered into their respective methyl esters for separation on GLC. CU-2 this is the unsaponifable fraction of the oil. The sterols or related compounds are present in this fraction as the chemical and spectral data suggests. This showed very high antifungal and significant antibacterial activity. CU-3 has significant anti-inflammatory activity. CU-4 showed bronchodilator activity (Zhang*et al.*, 1995)

2.1.3.1.2Anti-fungus

In vitro,luffacylin inhibited Mycosphaerellaarachidocola and fusariumoxysporum (Parkash*et al.*, 2002)

2.1.3.1.4 Analgesia and sedation in mice

Intraperitoneal administration of water decoction of sigualuo inhibited acetic acid-induced writing, raised and the pain threshold in hot plate and electric shock tests, reduced spontaneous activities, and synergized the effects of pentobarbital sodium (Muthumani*et al.*,2010)

2.1.3.1 Anti-mycordial

ischemia in a pituitrin-induced acute myocardial ischemia mouse model, oral administration of water decoction of sigualuo lowered twave increase in electrocardiogram, inhibited the decrease of hearth rate, inhibited the raise in serum lactate dehydrogenase level and mycocardialmalondialdehde level, and enhanced the activity of myocardial superoxide dismutase.

2.1.3.2 Anti-hyper triglyceride

in a hypertriglyceridema rat model, oral administration of water decoction of sigualuo decreased serum cholesterol and triglyceride levels, increased high density lipoptroein-cholestrol, and reduced the body weight.

2.1.3.3 Immuno-stimulation

Oraladministration of the petroleumetherfraction of the ethanol extracts of fruits, leaves and stems potentiated the cytophagic action and acid phosphatase activity of peritoneal macrophages in mice. In vitro, 3-0B-D glucopyranosylmaslinic acid (contained in the leaf) enhanced the production of interleukin-1 and tumor neurosis factor-a in mouse thymocytes, and the production of interleukin-2 in mouse splenic cells.

2.1.3.4 Anti- allergy

Oral administration of ethanol extract of the stem inhibited homologous passive cutaneous anaphylaxis in rats, heterologous passive cutaneous anaphylaxis in mice, Arthus reaction in mice, and sheep rd blood cell-induced delayed type hypersensitivity in mice

2.1.3.5 Anti-asthma

anti-tussive and expectorant effects oral and intraperitioneal administration of water decoction and ethanol extracts of sigualo suppressed SO2- and ammonium aerosol-induced cough in mice, and increased the respiratory tract phenol red excretion in mice. In guinea pigs, intraperitioneal administration of water decoction of sigualuo inhibited histamine induced asthma.

2.1.3.6 Miscellaneous

sigualuo had anti-acute hepatic injury, cardiac stimulation, S180 sarcoma inhibitory, and anti-human immunodeficiency virus actions. Oral administration of proteins isolated from the seeds exhibited anti-reproductive property in mice. Luffin P1 inhibited trypsin. Luffin S had ribosomeinactivating protein-like activity. Intracerebroventricular administration of 3-O-B-D glucopyranosly-maslinic acid promoted the recovery from cerebral ischemia induced behavioral disorders in rats.

2.2 Phytochemical

Phytochemical literally means plant chemicals, they are biologically active naturally occurring chemical compounds found in plants, which provide health benefits for humans further that those attributed to macronutrient and micronutrients (Hasler, *et al.*, 1999). They protect plants from disease and damage, and contribute to the plant's color, aroma and flavor. These compounds are known as secondary plants metabolites and have biological properties such as antioxidant activity, antimicrobial effect, modulation of detoxification enzymes, stimulation of the immune system, decrease of platelet aggregation and modulation of hormone metabolism and anticancer property (Mathai, 2000).

In general, the plant chemicals that protect plant cells from environmental hazards such as pollution, stress, drought, UV exposure and pathogenic attack are called phytochemicals are found in fruits, vegetables, legumes, whole grains, nuts, seeds, such as in the roots, stems, leaves, flowers, fruits or seeds (Costa, *et al.* 1999). Many Phytochemicals, particularly the pigment molecules, are often concentrated in the outer layers of the various plants tissues (King and Young, 1999). There are more than thousands known and many unknown Phytochemicals. It is well known that plants produce these chemicals to protect themselves, but recent researches demonstrate that many Phytochemicals can also protect human against diseases (Narasinga, 2003). Phytochemicals are not essential nutrients and are not required by the human body for sustaining life, but have important properties to prevent or to fight some common diseases. Many of these benefits suggest a possible role of Phytochemicals in the prevention and treatment of disease, because of this property; many researchers have been performed to reveal the beneficial health effects of

Photochemical. The purpose of the present review is to provide and overview of the extremely diverse Photochemical present in medicinal plants.

Plants are known to contain many phytochemicals in their various organs(such as leaves, stem bark, flower, root etc). The following below are some of secondary constituents;

2.2.1 Terpenoids

form the largest group of plant products and are the most common ingredients in volatile oils. They are among the most widespread and chemically diverse groups of natural products. They are flammable unsaturated hydrocarbons, existing in liquid form commonly found in essential oils, resin or oleoresins (Firn, 2010). Terpenoids includes hydrocarbons of plant origin of general formula (C5H8) and are classified as mono-, di-, tri- and sesquiterpenoids depending on the number of carbon atoms. Examples of commonly important Monoterpenes include terpinen-4-ol, thujone, camphol, eugenol and menthol. Diterpenes are classically considered to be resins. The triterpenes include steroids, sterols and cardiac glycosides with anti- inflammatory, sedative, insecticidal or cytotoxic activity. Sesquiterpenes like monoterpenes, are major components of many essential olis(Martinez et al., 2008).Terpenoids form the largest compounds. These plant products possess interesting biological activities. They contain anti-insect, anti-fungal and anti-bacterial properties (Sofowora, 1993).

2.2.2 Saponins

The term Saponin is derived from Saponariavaccaria (Quillajasaponaria), a plant, which abounds in saponins and was once used as soap. Saponins therefore possess "soaplike" behavior in water, i.e they produce foam. On hydrolysis, an aglycone is produced, which is called sapogenin. There are two types of sapogenin: steroidal and

triterpenoidal. There are two major groups of saponins and these include: steroid saponins and triterpene saponins. Saponins are regarded as high molecular weight compounds in which, a sugar molecule is combined with triterpene or steroid aglycone. Saponins are soluble in water and insoluble in ether, and like glycosides on hydrolysis they give aglycones. Saponins are extremely poisonous, as they cause heamolysis of blood and are known to cause cattle poisoning (Kar, *et al.*, 2007).Saponin is also used in the manufacture of shampoos, insecticides and various drug preparations and in synthesis of steroid hormones (Okwu*et al.*, 2004). Generally, saponins are toxic, but researches have recently shown that consumption of saponins by human beings may be beneficial in reducing heart disease (by binding of saponins with plasma membrane and cholesterol). The presence of steroidal saponins could develop resistance to viral diseases. (Finar *et al.*, 1989) reported that, saponins had expectorant action which is very useful in the management of upper respiratory tract inflammation. So these plants may be used to treat various ailments.

2.2.3 Alkaloids

These are the most important among the secondary metabolites, they comprises the largest single class of secondary substances of which over 2000 are known (Godwin and Mercer, 2009). They are basic compounds that are derived from plants. In nature, alkaloids exist in large proportions in the seeds and roots of plants and often in combination with vegetable acids (Madziga*et al.*, 2010). It contains one or more nitrogen atoms (usually in a heterocyclic rings). The compounds have basic properties and are alkaline in reaction, turning red litmus paper blue. In fact, one or more nitrogen atoms that are present in an alkaloid, typically as 1°, 2° or 3° amines, contribute to the basicity of the alkaloid. The degree of basicity varies considerably, depending on the structure of the molecule, and presence and location of the

functional groups (Sarkerand Nahar, 2007). These are widely used in medicinal purposes which have positive and negative effects even to human beings. Most of the plants have alkaloids in different organs with different chemical configurations (Harbourne, 1984). Alkaloids are reported to have analgesic, antiinflammatory and adaptogenic activities which help to alleviate pains, developed resistance against diseases and endurance against stress. They also have a protective role in animals (Edeoga et al. 2006). Alkaloids are heterogeneous group of compounds which contain one or more nitrogen atom in acyclic system. The following are some of the examples of alkaloids:

i. Codeine: this is widely used in the production of cough expectorant. It is active in depressing the cough centre in the medulla oblongata.

ii. Morphine: this can be used in the treatment of terminal cancer, and it can also be used to help to relieve severe pains at post operation discomfort, it can also be used as a pre aesthetic.

iii. Hernine: this can be used as a more potent analgesic than morphine which is used as an anti-tussive agent. iv. Reserpine: this can be used as anti-hypertensive and psychotherapeutic analgesic (Edeoga*et al.*,2006).

2.2.4 Tannins

This is a term used to describe a group of compounds in some plants which can „tan" (convert) animal skin to produce leather. They are colourless and non crystalline compounds (Trease and Evans, 1989). They are widely distributed in plant flora. They are phenolic compounds of high molecular weight. Tannins are soluble in water and alcohol and are found in the root, stem, bark and outer layers of plant tissue. They are acidic in reaction, and the acidic reaction is attributed to the presence of phenolics or

carboxylic group (Kar, 2007). They form complexes with proteins, carbohydrates, gelatin and alkaloids Tannins are used as anti-septic and this activity is due to the presence of the phenolic group. They also serve as anti-microbial agents in plants. They form colloidal solutions in water and precipitate proteins from solutions. Two basic groups are usually recognized: hydrolysable tannins and condensed tannins. Hydrolysable tannins, upon hydrolysis, produce gallic acid and ellagic acid and these are called gallotannins or egallitannins. On heating, they form pyrogallic acid. Common examples of hydrolysable tannins include theaflavins (from tea), diadezein, genistein and glycitein (Kar*et al.*, 2007).Tannins rich medicinal plants are used as healing agents in a number of diseases. Tannins were also reported to have demonstrated activity against bacteria.

2.2.5Flavonoids

are important group of polyphenols widely distributed among the plant flora. Structurally they are made of more than one benzene ring (a range of C15 aromatic compounds) anjd numerous reports support their use as anti-oxidants or free radical scavengers (Kar, 2007). The compounds are derived from parent compounds known as flavans. Over four thousand flavonoids are known to exist as pigments in higher plants. Flavonoids are 15 carbon compounds generally distributed throughout the plant kingdom (Harbourne, 1991). Flavonoids have been referred to as nature"s biological response modifiers because of strong experimental evidence of their inherent ability to modify the body "sraction to allergies, virus and carcinogens. More recent research has enabled scientists to group them into classes on the basis of similar protective functions as well as individual physical and chemical characteristics of the molecules. Flavonoids have been reported to be synthesized by plants in response to microbial infection and have been shown to have anti-bacterial activities.

They show anti-allergic, anti-inflammatory, antimicrobial and anti-cancer activity (Aiyelagbe *et al.*, 2009).

2.2.6Anthraquinones

These are derivatives of phenolics and glycoside compounds. They are solely derived from anthracene giving variable oxidized derivatives such as anthrones and anthranols (Firn *et al.*, 2010). Other derivatives such as chrysophanol, aloe-emodin, rhein, salinosporamide, luteolin and emodin have in common a double hydroxylation at positionsC-1andC-8.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Study Area

The experiment was carried out at Biochemistry laboratory of Federal University Gusau Zamfara state Nigeria from August to November, 2019.

3.2Sample collection

Fresh leaves of *luffa aegyptiaca*was collected in a clean polyethen bag from behind Dan-turai model school in gusauzamfara stateand taken to Biochemistry laboratory, Federal University Gusau for analysis.

3.3 Sample Preparation

The leaves werewashed thoroughly and under running tap. The leaves were shade dried for a period of two days, the dry leaves were grinded using mortar and pestle.The powder was soaked with solvents, The solvent of extraction was allowed to remain in contact with the plant material for 24 hours. The extract wasfiltered with the help of sieve.

3.4 Phytochemical analysis

The extracts was analyzed for the presence of flavonoids, tannins, saponins, glycosides, alkaloids, cardiac glycosides, steroids, saponin glycoside, balsams and, anthraquines.

3.4.1 Tests for Flavonoids.

To 1ml of 10% NaOH sodium hydroxide was added to 3ml of aliquot of the filtrated in a test tube, if a yellow colour is developed this indicates the possible presence of flavonoid compounds (EL-Oleyi*et al.*,1994, Harbone).

3.4.2 Tests for Tannins.

Ferric chloride solution 5% ferric chloride solution was added drop by 2-3ml of the extract and the colour produced is noted. Condensed tannins usually give a dark green colour; hydrolysable tannins give blue black colour (Harbone, 1998, Trease and Evans, 1978).

3.4.3 Tests for Saponins

To 5ml of the extract was placed in a test tube + 5ml of water and sharked strongly. The whole tube will be filled froth that lasts for several minutes. (Harbone, 1998, wall, *et al.*, 1954).

3.4.4 Tests for Glycosides

To 2.5ml of 50% H_2SO4 is added to $5cm^3$ of the extracts in a test tube. The mixture is heated in boiling water for 15 minute. Cool and neutralize with 10% NaOH, add 5ml of Fehling's solution is added and the mixture is boiled. A brick-red precipitate is observed which indicate the presence of glycosides Harbone, (1973).

3.4.5 Tests forAlkaloids

About 2ml of each extract is stirred with 2ml of 10% aquences hydrochloric acid. 1ml is treated with a few drops of wagners reagent and second 1ml portion is treated similarly with mayers reagent. Turbidity or precipitation with either of these reagents is taken as preliminary evidence for the presence of alkaloids Harbone, (1973).

3.4.6 Tests for cardiac glycosides

To one of herb extract 2ml of 3.5% ferric chloride solution was added and allowed to stand for one minute. Or ms 1 of conc.H_2SO_4 is carefully poured down the wall of the tube so as form a lower layer. A reddish brown ring, the interface indicates the presence of cardiac glycoside.

3.4.7 Test for steroids

This was carried out according to the method of Harbone (1973). 0.5g of the extract was dissolve in 2ml of chloroform 2ml of sulphuric acid is carefully added to form lower layer. A reddish brown color at the inter face indicate the presence of a steroidal ring.

3.4.8 Tests for Saponin glycosides

To 2.5ml of the extract was added 2.5ml of Fehling's solution A and B. a bluish green precipitate showed the presence of saponin glycosides EL-Oley *et al*, (1994).

3.4.9 Tests for balsams

The extract was mixed with equal volume of 90% ethanol. 2 drops 5% of alcoholic ferric chloride solution was added to the mixture. A dark green colour indicates the presence of balsams EL-Oley *et al*, (1994).

3.4.10 Tests for anthraquines

3ml of each plant extract was shaken with 3ml benzene, and 3ml of 10% ammonia solution was added. The mixture is shaken and the presence of a pink, red or violet colour in the ammoniacal (lower) phase indicates the presence of anthraquinones

CHAPTER FOUR

4.0Result

The result of this study showed the presence of different phytochemicals by using three(3) different solvents (Aqueous, methanol and chloroform). Flavonoid was absent in aqueous and chloroform but moderately present in methanol. Tannins were moderately present in aqueous and methanol but highly present in chloroform. Saponin was slightly present only in aqueous and absent in both methanol and chloroform. Cardiac glycosides were moderately present in both aqueous and methanol but absent in chloroform. Saponin glycosides was highly present in aqueous, absent in methanol and moderately present in chloroform. Alkaloid was absent in aqueous, slightly present in methanol and moderately present in chloroform. Steroids were moderately in aqueous but slightly present in both methanol and chloroform. Balsams were absent in aqueous, slightly present in methanol but moderately present in chloroform. Lastly, Anthraquinine was absent in all the three solvents (aqueous, methanol and chloroform).

Table 1: PHYTOCHEMICALS IDENTIFIED IN L.A LEAVES.

Parameters	Sample +AE	Sample +ME	Sample +CE
Flavonoids	-	+	-
Tannins	++	++	+++
Saponins	+	-	-
Glycosides	-	++	+
Cardiac glycosides	++	-	-
Saponin glycosides	+++	+	++
Alkaloids	-	+	+
Steroids	++	+	++
Balsams	-	-	-
Anthraquinine	-		

Keys: +=slightly present ++= moderately present +++ = highly present

Note: AE = Aqueous extract, ME = Methanol extract and CE = Chloroform extract.

CHAPTER FIVE

5.0DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1DISCUSSION

The presence of Tannins, glycosides, cardiac glycosides , saponin glycosides, Alkaloids and Steroid from the preliminary phytochemical screening of the leaves of luffa aegyptiaca extract were indicative of the potentialities of the leaves in the field of medicinal plants. The present of these phytochemicals in the present study is accordance with the finding of (Grudae*t al.*, 2005) who reported that plants contained varieties of phytochemicals, some of which have antioxidant, antibacterial, antifungal and antiviral properties. The disparity observed from the result on the level of concentration of the phytochemicals obtained from different extracting solvers could be due to the difference in solubility of the bioactive substances in the solvents. This was reported by (Anukwurarji*et al.*, 2013).

Phytochemical analysis is very useful in the evaluation of some active biological components of some plants. Phytochemical screening helps to reveal the chemical nature of the constituents of the plant extract which may also be used to search for bioactive agents that could be used in the synthesis of very useful drugs. The result of the study revealed that luffa aegyptiaca leaves correlate with the report of (Aja *et al.*,2010) which showed that Talinumtriangulare leaves are rich in phytochemicals. This result also supported the reports of Aja *et al.*, (2015) that revealed high levels of phenols and other phyochemicals in Dissotisrotundifolia and Cajanuscajan leaves and seeds had revealed that Moringaoleifera leaf is a good source of phytochemicals which is in line with the present result on Senna occidentalis leaves. However This result does not correlated with the report of Nwali*et al.*,(2012) which showed that Bryophylumpinnatum leave containedlow levels of phytochemicals.

The presence of tannin in luffa aegyptiaca leaves indicates that luffa aegyptiaca is a good source of tannins. This indicates that luffa aegyptiaca leaves have antimicrobial activities. This is in line with the study by (Carson and Riley 2003) that reported anti-bacterial and astringent properties of tannic acid which have action upon mucous tissue such as tongue and inside the mouth. The indigestion of tannic acid cause constipation and can be used in the treatment of diarrhoea. Tannins are polyphenols that are obtained from various parts of different plant belonging to multiple species. Tannins can also be effective in curbing hemorrhages and as well restrict bare swellings. The presence of alkaloids in luffa aegyptiaca leaves obtained in the result showed that luffa aegyptiaca is a good source of alkaloids. Alkaloids have been implicated in inducing a stress response and apoptosis in human breast cancer cell. Alkaloids which are nitrogen–containing naturally occurring compounds commonly found to have anti-microbial properties. The alkaloids can be used as a central nervous system stimulant as well as powerful pain relievers. The result of phytochemical analysis revealed that luffa aegyptiaca leaves contained saponins content. This justifies the use of the extract from this plant to stop bleeding and in the treatment of wounds. Saponin has the property of precipitating and coagulating red blood cells. Saponin has been reported to cause the reduction of blood cholesterol by preventing its re-absorption. Saponins inhibit sodium ion (Na+) efflux by the blockage of the entrance of Na+ out of the cell Schneider and Woliling, (2004). This leads to higher Na+ concentration in the cells, by activating the Na2+Ca2+ an anti-porter in cardiac muscle which strengthens the contraction of heart muscle. Saponins have antioxidant, anti-inflammatory, anti apoptosis and immunostimulant and anti-neurodegenerative properties and therefore could delay neural aging.

5.2 Conclusion

Based on this research, *luffa aegyptiaca* leaves seemed to have the potential act as a source of useful drugs and also to improve the health status of the consumers as a result of the presence of various compounds that are vital for good health. These findings suggested that the leaves could be potential source of natural antioxidant having great importance as therapeutic mediator and preventing oxidative stress and immune modulators property

5.3 Recommendations

- Further detailed isolation and characterization of active constituents of *luffa aegyptiaca* should be emphasized.
- It recommend that further research should be conducted on the stem, root and seed of *luffa* plant.
- Further investigations on the chemical compositions and possible isolation of the active ingredient for specific functions in order to standardize the formulation for efficient medical use should be carried out.

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