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Phytochemical Screening of Guava Leave Extract

Abdullahi Adamu
Department of Science Laboratory Technology
Umaru Ali Shinkafi Polytechnic, Sokoto, Nigeria
Author mail: abdalla80adam@gmail.com

Abstract: *The medicinal potential of guava leave extract was analyzed using phytochemical analysis method. The phytochemical screening of guava extract revealed the presence of sponins, alkaloid,volatile oil, steroid, balsmas, saponin glycosides, flavonoids, tannins and anthraquinone, While glycosides and cardiac glycosides were absent. However, the result of this work indicated that leaves of guava plant contain some major bioactive compounds that can inhibit the growth of microorganism, thereby proving it as an effective potentials source of antibiotic.*

Keywords: *Extract, Guava Leave, Phytochemical, & Screening*

1.0 INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Guava is a medium sized fruit producing native plant of tropical America. It has evergreen, opposite, aromatic short-petioled leaves. The stem has reddish brown, thin and smooth bark.Guavas are typical Myrtoideae, with tough dark leaves that are opposite, simple, elliptic to ovate and 5–15 centimetres (2.0–5.9 in) long. The flowers are white, with five petals and numerous stamens. The fruits are many-seeded berries. There are quite number of species of guava but the most common is the lemon guava which is Psidiumguajava.

In folk medicine, different parts of the guava plant are used for the treatment of various human ailments such as wounds, ulcers, bowels, cholera (Begum et all., 2002) across different parts of the world. The inflorescence axillary 1-3 flowered trees are used for treatment of various diseases especially in developing countries. In Nigeria and its neighbouring countries, guava leaves are used in treatment of malaria, typhoid and yellow fever. Guava is a well-known traditional medicinal plant and is used in various indigenous system of medicine. The fruits are often included among super fruits, being rich in dietary fiber, vitamins A and C , folic acid and dietary minerals such as potassium, copper and manganese. Having a generally broad, low calorie profile of essential nutrients, a single common guava (P. guajava) fruit contains about four times the amount of vitamin C as an orange (Hassimotto et al 2005). These constituent has

made it possible to be used traditionally for treatment of ailments since a long time in history. More recent ethno pharmacological studies showed that guava is used in many parts of the world for the treatment of number of diseases such as inflammatory for diabetes, hypertension, carries wounds, analgesic and antipyretic effects (Gutierrez et al., 2008). The barks and root are also used for medicinal purposes. In the form of decoction and poultice, the bark is used as an astringent in the treatment of ulcers wounds and diarrhea, dysentery and skin ailments (Conway, 2001). It is also used as antiamoebic as an infusion or decoction. In the form of decoction and poultice, it is used to expel the placenta after childbirth and in infections of the skin, carries, vaginal hemorrhage wounds, fever, dehydration and respiratory disturbance.

The leaf is the mostly and widely used part of guava plant for medicinal purposes across the world. In Nigeria and other African countries, the leaves are used in treatment of conditions such as malaria, gastroenteritis, vomiting, diarrhea, dysentery wounds, ulcers, toothache, coughs, sore throat, inflamed gums and a number of other conditions(Jiarj et al, 1999; Abdelrahim et al., 2012; Lutterodt 1989). The decoction or infusion of the leaves is used as febrifuge, antispasmodic and for rheumatism (Hernandez 1971). It is also used as an antibiotic and in management of diabetic and hypertension inAmerica, Central and West Africa and South East Asia. In some parts of the world, boiled leaf extract is used for the treatment of rashes caused by scabies.

Guava is a small tropical tree that grows up to 35 feet tall; it is widely grown for its fruit in tropics. It is a member of the Myrtaceae family, with about 133 genera and more than 3,800 species. The leaves and bark of *P. guajava* tree have a long history of medicinal uses that are still employed today (Nwinyi *et al.,* 2008). In the view of the immense medicinal importance of *P. guajava* plant evidenced in the various studies mentioned above and also corroborated in a recent review article by Kamath *et al.* (2008), there is a strong incentive for further research into the pharmacological activities of P. guajava plant extract against common infectious diseases considering the fact that the plant is readily available in the tropics and within the reach of the local populace. Guava contains broad spectrum of phytochemicals including polysaccharides, vitamins, essential oils (Smith and Siwatibau, 1975, Macleod and Troconis, 1975), minerals, enzymes, proteins (Deo and Shastri, 2003), sesquiterpenoid alcohols and triterpenoid acids (Smith *et al,* 1975; Wilson111 and Shaw, 1978; Begum *et al.,* 2002), alkaloids, glycosides, steroids, flavanoids, tannins, saponins (Cho *et al.,* 2003; Narayana *et al.,* 2001; Geidam *et al.,* 2007).

Psidium guajava or guava is very rich in antioxidants and vitamins and also high in lutein, zeaxanthine and lycopene (Tee *et al.,* 1997; Hobert and Tietze, 1998). Guava is rich in tannins, phenols, triterpenes, flavonoids, essential oils, saponins, carotenoids, lectins, vitamins, fiber and fatty acids. Guava fruit is higher in vitamin C than citrus (80 mg of vitamin C in 100 g of fruit) and contains appreciable amounts of vitamin A as well (Baby *et al.,* 2010). Guava fruits are also a good source of pectin - a dietary fiber. The leaves of guava are rich in flavonoids, in particular, quercetin. Much of guava's therapeutic activity is attributed to these flavonoids. The flavonoids have demonstrated antibacterial activity (Nwinyi *et al.,* 2008). Quercetin is thought to contribute to the anti-diarrhea effect of guava; it is able to relax intestinal smooth muscle

and inhibit bowel contractions. In addition, other flavonoids and triterpenes in guava leaves show antispasmodic activity.

3.0 METHODS

3.1 Sample collection and treatment

3.1.1 Sample collection

The sample of guava leaves was collected within Sokoto metropolitan spe, Sokoto State, Nigeria. The leave of guava tree was allowed to sun dried for five (5) days, it was grinded using mortar and pestle. The sample after collection was kept in an ice-frozen container and immediately transported to the laboratory and kept in the refrigerator at 4^{o}C until it was ready for use.

3.1.2 Extraction of the Plant Material

In this research Soxhlet of extraction method was employed. 40 grams of sample was weighed and placed in the upper chamber in a thimble. 400ml of methanol was used as solvent. The flask was heated and the vapour was condensed to extract the sample in the thimble. The process was run for 6 hours; the sample was evaporated to dryness using steam evaporator. The dried extracts were weighed and kept in well labeled sterile sample bottles (Oajele's*et al,* 2008

3.2 Phytochemical tests

3.2.1 Materials for Phytochemical Analysis

Test-tube, conical flask, spatula, weighing balance, shaker machine

Reagents Used

10% NaOH Sodium hydroxide
5% Ferric Chloride Solution
5ml of Fehling's solution
2ml of 10% aquences hydrochloric acid
Wagner's reagent, H_2SO_4, Chloroform, ethanol. Alcoholic ferric chloride solution
5ml of 10% Ammonia solution, dilute HCl

3.2.2 Test for Flavonoid

3ml aliquot of the filtrated and 1ml of the 10% NaOH sodium hydroxide was mixed together, to find the possibility of flavonoid.

3.2.3 Test for Tannins

In this determination, a Ferric chloride solution plus5% ferric chloride solution will be added drop by drop, 2-3mls in the solution of leave of guava extract in order to observed the appearance of Tannins.

3.2.4 Determination of Saponin

In this test 5ml of the extract was poured in to a test tube + 5ml of water and its then shaken strongly to determine the present of saponin in the sample.

3.2.5 Determination of Glycosides

2.5ml of 50% H_2SO_4 was added to 5ml of the extract in a test tube. The mixture was heated in boiling water for 15 minutes. It was cooled and neutralized with 10% NaOH, 5ml of Fehling's solution was added and the mixture was boiled.

3.2.6 Determination of Alkaloids

About 2ml of 10% aqueous hydrochloric acid was stirred with 2ml of guava extract. 1ml was treated with a few drops of Wagners reagent and second 1ml portion was then treated similal with Mayers reagent.

3.2.7 Test for Cardiac Glycosides (Keller-killiani's test)

A solution of herb extract with 2ml of 3.5% ferric chloride solution was added and allowed to stand for one minute. 2mls of Conc. H_2SO_4 was carefully poured down the wall of the tube so as to form a lower layer.

3.2.8 Determination of Test for Steroids (Salwoski)

This was carried out according to the method of Harbone 1973. 2ml of the extract was dissolved in 2ml of chloroform. 2ml of sulphuric acid was carefully added to form lower layer.

3.2.9 Test for Saponin Glycosides

To 2.5ml of the extract was added 2.5ml of Fehling's solution,

3.2.10 Test for Basalms

9.5ml of the extract was mixed with equal volume of 90% ethanol, 2 drops of alcoholic ferric chloride solution was added to the mixture..

3.2.11 Test for Anthraquinones

2ml of each plant extract was shaken with 10ml benzene, and 5ml of 10% ammonia solution was added. The mixture was shaken in order to obatained the coulur of antraquinonesand.

3.2.12 Test for Volatile oils

1ml of the fraction was mixed with dilute Hcl. A white precipitate was not formed, this indicated the absence of volatile oils.

RESULTS AND DISCUSSION

4.1 RESULTS

The phytochemical screening of Guava extractrevealed the presence of saponins, alkaloids, volatile oil, steroids, balsmas, saponin glycosides, flavonoids, tannins, and anthraquinone While glycosides and cardiac glycosideswere absentas stated in (Table 1.1).

Table 1.1: Result Of The Phytochemicals Analysis Of Guava Leaves Extract

PHYTOCHEMICALS	RESULTS
Tannins	++
Saponins	+
Steroids	+
Saponin glycosides	+

Glycosides	-
Flavonoids	++
Alkaloids	++
Cardiac glycosides	-
Volatile oil	-
Anthraquines	+
Balsmas	+

Note **+** represents the presents of the constituents
- represents the absent of the constituents

4.2 Discussion

Phytochemicals are secondary plant metabolites that occur in various parts of plants, they have diverse roles in plants which include provision of vigour to plant; attraction of insect for pollination and feeding defense against predators, provision of colour while some are simply waste products (Igwe *et al.,* 2007). However this phytochemicals elicit varied biochemical and pharmacological actions when ingested by animals (Trease and Evans, 1989).

This study revealed the presence of various medically important phytochemicals in guava leaves extracts, according the result obtained in the determination of flavonoids in a guava leaf extract, it shows that there is presence of Flavonoids in a guava leaf extract due to the appearance of yellow color. The presence of flavonoids in guava leaves, Suggest the ability of this by-product to play an important role in preventing disorders associated with oxidative stress and reduced the risk of cancer, heart disease, asthma, and stroke. Similarly, during the determinations of Alkaloid in a guava leaves extract a white precipitate were observed in a solution which indicate the presence of alkaloid. Alkaloids are the most efficient therapeutically significant plant substance (Njoku and Akumefula, 2007). Its presence in the sample makes them recommendable for patients with with chronic pain, because it contain higher a significant pharmacological property which can be used for relief pain is an excellent analgesic that is relatively nonaddicton act as cardiac or respiratory stimulants.

However, in the determination of Tannin in guava leaf extract, a dark green solution were observed whichindicated the presence of Tannin in guava leaves extract.Tannin is non-toxic and can generate physiological responses in animals that consume them (Scalbert, 1991). The presence of tannin in guava leaves, suggests that, guava leaf can use as antifungal, antidiarrheal, antioxidant and anti-hemorrhoidal agents (Asquith and Butter, 1986). Similary saponin has laso been identified during the determination due the presence of honey comb froth in the solutions of guava leaves extract, this shows the present of saponin. Therefore according (Trease and Evans, 1985) guava leafs can be use as anti-inflamatory, cardiac depressant and hyper-cholesterolemic. Saponin & Steroid also have relationships with sex hormones like oxytocin which regulate the onset of labour in pregnant women and subsequent

release of milk (Okwu and Okwu 2004). The presence of this phytochemicals in guava is an indication that this leaves can be given to expectant ruminant animals and those that deliver without the expulsion of their placenta.

Moreover, Steroids were also present in the solution. Steroidal compounds are very importance and interested in pharmacy due to their relationship with compounds like sex hormones. This makes the leaves of guavauseful as vegetable for expectant mothers or breast feeding mothers to ensure their hormonal balance, has being used in some countries, since steroidal structure could serve as potent starting material in the synthesis of these hormones. However, other phytochemicals such as basalms, volatile oil, anthraquinones, saponin glycosides and were present in the study.

However, glycosides, cardiac glycosides andvolatile oil were absents in this study which may be due to geographical location of the plants, climatic and environmental conditions which may have impact on the plants.

5.1 Conclusion

The phytochemical component of the leavesof *Psidium gaujava*was analysed. The result indicatedthat the leaves of guava plant contains some major bioactivecompounds that can inhibit the growth of microorganism,thereby proving it as an effective potentials source ofantibiotic. However, the result revealed that the guava leaves plantcontains tannins, saponins, steroids, saponin glycosides, flavonoids, balsmas, volatile oil, anthraquinones and alkaloids which help toinhibits bacterial growth. The plant extract might also be apotential source for drugs formulation as the plant leavesare used traditionally for curring of many infectiousdiseases.

5.2 Recommendations

From the results of this study the following recommendations are proposed;

- Indigenous knowledge of Sokoto metropolis on use of these medicinal plants should be recognized, protected and promoted since they are found to have the major bioactive compounds that can inhibit the growth of microorganism.
- The community should be encouraged to conserve and cultivate the important medicinal plants which grow around us since they have been found to possess high antimicrobial activity. This is to reduce chances of being cleared from the indigenous forests.
- More work on *Psidium gaujava*should be encouraged in order to isolate, purify and characterize the bioactive component(s) in them.

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