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PRELIMINARY ANALYSIS OF GUAVA (*Psidium guajava*) LEAVES EXTRACTS FOR BIOACTIVE COMPOUNDS AND NUTRITIVE MINERAL ELEMENTS FOR ETHNO-MEDICINAL AND HEALTH BENEFITS.

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ABSTRACT

It has been empirically established that Guava, *psidium guajava fruits and leaves have both ethno-medicinal and health benefits. For the above reasons and moreso to establish the scientific evidence for the said application and other health benefits, 10g of pulverized leaves of Guava was extracted with 100cm3 of 98.9%*

Introduction

There is a large number of plants both wild and cultivated in Nigeria and in West Africa which has been researched upon for their medicinal properties but quite a few number of them which has been used in ethno-medicine remain unrecognised and under-utilized. Guava plant (leaves and fruits) fell into this category. It has been reported that most African plants (leaves, fruits, bark and roots) contain some phytochemical and nutritive element that are of immense health benefits to humans. Due to the above health benefits, various extract from plants parts classed under natural products, either as pure compounds or as standardized extracts, provide

n-hexane while 20g of pulverized leaves was extracted with 150 cm3 of methanol,water mixture in ratio 4:1. The above extracts were mixed with distilled water and phytochemical screening conducted according to standard methods; Wagner,1993; Sofowora,1982; Trease and Evans,1989; Horbone,1995,e.t.c. The phytochemical analysis of the n-hexane extract indicated the presence of flavonoids, tannins, anthocyanins, steroids, reducing sugar, terpenoids but indicated absence of alkaloids while the screening analysis on the methanol, water extract indicated the presence of condensed tannins,sterols,flavonoids, reducing sugar, alkaloids, anthocyanins and terpenoids. The trace metal analysis showed the presence of sodium ion and potassium ions as obtained by spectrophotometric analysis conducted on the dilute aqueous extract of guava leaves. From trace metal analysis, the average emission intensity of sodium and potassium were found to be 4 and 99 respectively. Their concentration was extrapolated in part per million from standard curves to be Na =0.3 ppm and K= 49 ppm and therefore their masses are 0.3 mg Na and 49 mg K in 5g of sample. The sodium ion and potassium ion (Na+/K+) ratio in the leave extract was found to be 0.006 indicating a high level of potassium in the extracts. Hence guava leaves currently being used as an herbal tea and the leave extract as a supplement are good sources of medicinal phytochemicals and nutritive mineral elements like potassium coupled with excellent health benefits.

Keywords: Guava, Potassium, Sodium, medicinal, health.

openings for new drug development because of availability of their chemical diversity (Agboeze et.al 2022). The use of plant extracts (concoctions) to cure diseases has become a vital part of human existence. The above practice is because microorganisms have developed resistance to many drugs and created scenarios where some of the ordinary and less

expensive antimicrobial therapeutic agents lose their potentency in disease treatment and control. Hence there is a need to find an alternative to chemotherapeutic drugs in disease treatment mainly of plant origin which is easily available, cheap and has considerably few side effects. As a result of the above, scientists have become involved in screening such plants in order to establish their potential antimicrobial effect and the health benefits of the phytochemicals they contain which serve as radicals scavengers.

Phytochemical is defined as non-nutrient plant chemical with potential health benefits to reduce the risk of chronic diseases (Xinyi,Wang et.al.,2022). According to Rouf, Khalid et.al. 2021, phytochemicals are non-nutrient bioactive components that are primarily responsible for scavenging toxic radicals (after oxidative stress by generating anti-oxidants), the main cause of most chronic diseases. Phytochemicals have great antioxidant potential and are of great interest to both chemists and food scientists due to their beneficial health effects on humans.

Epidemiological and animal trials suggest that the regular consumption of fruits and vegetables and whole grains reduces the risk of various diseases linked with oxidative damage which also promotes quick aging (Thakur, Singh and Khedkar, 2020).

Free radical scavengers (phytochemicals) act as hydrogen donors, electron donor, peroxide decomposer, singlet oxygen quencher, enzyme inhibitor and metal chelating agents (Thakur, Singh and Khedkar, 2020). Among the phytochemical mentioned as potentially providing health benefits are polyphenols, flavonoids, isoflavonoids, anthocyanidin, phytoestrogens,terpenoids, carotenoids, limonoids, phytosteroids, glucosinolates and fibers.

Research has shown that fruits and leafy vegetables protect us against risk of many cancers and those high in potassium have been proven to reduce the risk of stroke (Nicola, 1999).

Guava, Psidium guava is the common name for any of the various tropical shrubs and small tree comprising the new world genius Psidium of the myrtle family (Myrtaceae), characterized by tough, dark, opposite leaves with edible fruit. The term guava is also used for the fruit which is a true berry. Guava is often considered super fruit, being rich in vitamins A and C, omega-3 and omega-6 polyunsaturated fatty acids and especially high levels of dietary fibber. A single strawberry guava also has good levels of the dietary minerals, potassium and magnesium. Guava also contains both major doses of antioxidant pigment, carotenoids and polyphenols giving them relatively high dietary antioxidant value among plant foods (Rachman, 1993).

Dietary sodium and potassium are essential components in maintaining body functions such as normal heart rhythm (Baraba et.al.,1999: Nicola, 1999). However unlike sodium which is associated with high blood pressure, potassium is linked with reducing it (Gordon and Paul, 1996, Gordon, 2003). Recent studies however have shown that excess sodium is not the sole consideration in the control of elevated blood pressure, more important is the sodium ion/potassium ion ratio which has been determined to be around 0.6 suggesting that our diets should contain about 67% more of potassium then sodium. This nutritional support aimed at maintaining an ideal sodium ion/potassium ion ratio in the body fluid has become necessary, (Denniston, et.al.,2004; Smith and Ojofeitimi, 1995). More so, extracts from guava leaves or bark are implicated in possible therapeutic mechanism against cancer, bacterial infections, inflammation and pain(Smith and Ojofeitimi,1995).

Based on the above information, this research work was primarily undertaken to determine the phytochemicals and nutritive mineral elements found in guava leaves through the method of flame photometric analysis. The significance of this study lies in the fact that when this phytochemicals and mineral elements are determined, it will further lend support to the use of guava leaves extracts in ethno-medicine practices in

treating many diseases including cancer, a major threat to human health in this 21st century.

MATERIALS AND METHODS

Sample collection

Fresh guava leaves with greenish colour were obtained from guava trees in Mubi, forest Adamawa State. They were identified by a taxonomist with the department of botany, Adamawa State University. The leaves were kept at room temperature to dry. After air drying, the leaves were ground into fine powder using pestle and mortar. It was sieved over a 30mm mesh sieve to obtain 30g of pulverized sample.

Reagents

30cm^2 volumetric flask, 100cm^2 beakers, 250 cm^2 beaker, test tube/rack, 300g maximum weight digital weighing balance, wire guaze,125mm whatman filter paper, spatula, steam bath, 200ml cylinder, filter funnel, 100watt Binatone, hotplate, Jenway flame atomic emission spectrometer (flame photometer) model PFP.7. Vecstar murfle furnace model EFC, distilled water, 99% methanol,15% ferrite chloride solution, conc. sulphuric acid, iodine crystals, potassium crystal, dilute ammonia solution, HCl acid solution, chloroform, 98.9% of n-hexane and acetic anhydrides. Reagents for phytochemical analysis were prepared according to method of Harbone (1973) and Sofowora (1995) and were used for test for alkaloids,steroids,tannins,flavonoids e.t.c.

Solvent extraction: 20g of the pulverized sample was soaked in 150 cm^2 of methanol: water (4:1) mixture for 24 hours for complete extraction. Elemental analysis was carried out by flame photometric method according to Skooge,(1952), Bechman, (1984), and Finar (1975).

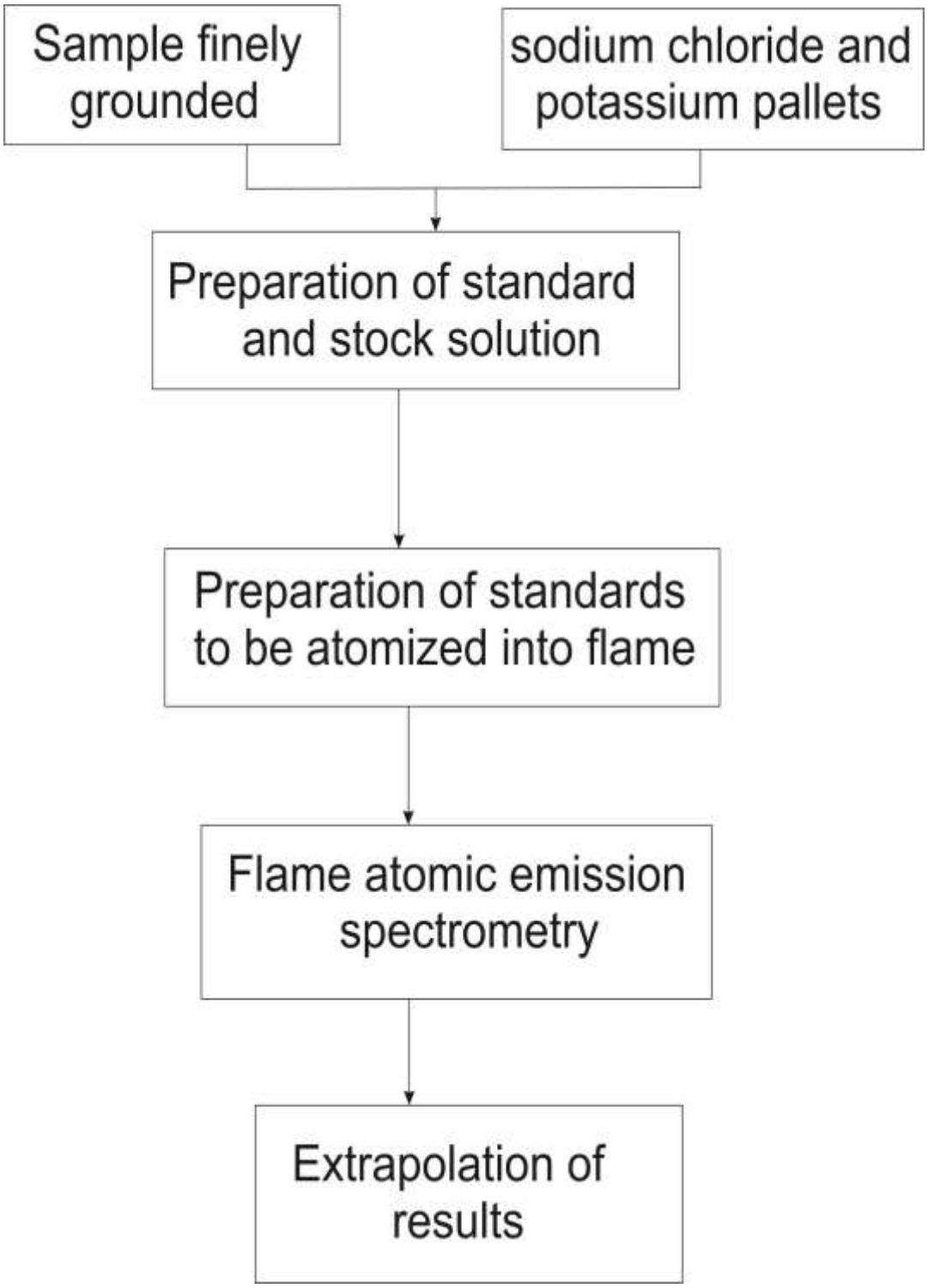

Figure1. Schematic diagram for elemental analysis.

RESULTS AND DISCUSSION

Table 1. Summary of bioactive agents analysis

	Alkaloids	Flavonoids	Tanins	Anthocyanins	Steroids	Reducing Sugars	terteno ids
Methanolic extract of sample	+	+	+	+	+	+	-
Hexane extract of sample	-	+	+	+	+	+	+

+ means presence of bioactive agent

i. Means absent of bioactive agent

Bioactive and nutritive agents determination in guava leaves extract show that the leaves are highly rich in alkaloids, steroids, terpenes, flavonoid, phenolic compounds, condensed tannins and anthocyannins. Moreso,the leave extract is very rich in nutritive numeral element like sodium and potassium.

Table2: Nutritive mineral element

	Sodium (Na^+)	**Potassium (K^+)**
Average emission intensity	4	99
Concentration in part per million (ppm)	0.3	49
Mass of element in 5g of sample mg/L	0.03	4.9

Sodium ion /potassium ion (Na^+/K^+) ratio

$$\frac{0.03}{4.9} = 0.00612$$

$$\cong 0.006$$

From table 2 displayed above, average emission intensity for Na^+ is 4 while K^+, potassium is 99. Concentration in parts for million (ppm) for sodium Na^+ is 0.3 while potassium is 49.Mass of element in 5g of sample mg/L is 0.03 for Na while for potassium it is 4.9 The result of the sodium Na^+/potassium ion

ratio is 0.006 which show that the leaves extract contain high percentage of potassium more than sodium.

CONLUSION

This study however justifies the scientific and ethno-traditional use of the leaves extract of guava in traditional medicine practice due to their high content of radical scavengers and mineral elements with high health benefits.

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