Engineering technology open access Journal
ISSN: 2641-8185

Juniper Publishers
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Research Article
Volume 1 Issue 1 - February 2018
DOI: 10.19080/ETOAJ.2018.01.555553

Eng Technol Open Acc

Development and Characterisation of a Multifunctional Hybrid Nano-Flora Composite for the Prevention and Management of Cancer, Diabetes, Blood Pressure and Stroke

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Submission: February 06, 2018; **Published:** February 27, 2018

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Abstract

A research titled "Development and Characterisation of A Multifunctional hybrid Flora Composite For The Prevention and Management of Diabetes" was carried out using seven medicinal plants namely: *Zingiber officinale* (ginger), *Curcuma longa* (turmeric), *Carica papaya* (pawpaw), Vernonia amygdalina bitter (leave), *Ocimum gratissimum* (scent leaves), *Psidium guajava* (guava) and *Moringa oleifera* (moringa). The research was aimed at developing a multipurpose supplement from the above listed plants with its natural content and form unaltered. That is, to double as a food and a drug; performing bioactive functions and playing nutritional roles thus balancing the human body chemistry. At the end of the research, the results showed that most of the necessary and important bioactive compounds responsible for the prevention, management and or treatment of Diabetes, blood pressure and stroke were present in optimum concentrations in the multifunctional hybrid flora composite. The said bioactive compounds or secondary metabolites in milligram's per one hundred grams of samples are: Alkaloids (3.96), saponins (3.56), Tannins (6.86), phenols (2.75), anthocyanin (0.07) anthraquinone (2.43), Steroids (1.96), cardiac glycosides (1.97), flavonoids (6.53), carotenoids (0.92), Terpenoids (2.31), oxalate (0.96) and phylates (1.18). Other compounds present in milligram's per one hundred grams, are mineral elements such as: Calcium (126.05) Potassium (382.40), Magnesium (74.35), phosphorus (120.90), Iron (mg/100 g) (96.11), Zinc (12.94), Manganese (1.56), Sodium (96.21), Nickel (6.86) and Copper (1.10) respectively. Others per one hundred percent are; Carbohydrate (18.32), Crude proteins (10.98), Ash content (6.64), Moisture content (19.78), Fat (oil) content (5.53), Vitamins content (15.91), Fibre content (15.72) and Energy value (286.11) in kilocalories. Preliminary Performance test on the blood of victims of diabetes and blood pressure reading of high blood pressure victims within 21days of consumption of one gram per day of the flora composite shows effective drop in the glycemic level of victims' bloods glucose and Hypotensive effects on the hypertension victims. A cross examination on victims of diabetes, blood pressure and stroke, show that the more one is predisposed or exposed to the risk factors,(RFs)of these diseases, the greater the chances of been infected by those diseases and their reoccurrence. While maintaining a healthy life style will reduce their risks to the barest minimum. Adjustment of life style after effective treatment of the condition will greatly limit the chance of reoccurrence. Hence the best drug to these diseases is to maintain a healthy life style Irrespective of age, sex, race or genetic constituents.

Keywords: Diabetes; Blood pressure; Stoke; Multifunctional; Flora composite; Prevention and management

Abbreviations: IDF: International Diabetes Federation; WHO: World Health Organization; NCDs: Non-Communicable Diseases

Introduction

Right from the beginning of time man has always made relentless efforts in order to provide for himself; affordable, comfortable, healthy and purposeful life by taking advantage of the knowledge, instinct and wisdom that the same nature has given to him [1]. He has always done this by modifying; his feeding habit, life style, approach to problems and choice of environment to live in. it has been the daily quest of man to eat the best food, get the best things of life and perhaps live the best life since life began. Even though, he has, achieved some level of success, he has also failed or complicated issues. Some of the errors he incurred as a result of his quest have also affected the ecosystem and his total being. Setting the natural forces against themselves which consequently unbalances nature's cycles and whose interactions are most times, against man's healthy living [2]. The negative side effects, high cost, unavailability and inaccessibility of synthetic medicines, to a larger percentage of persons, have left man with no choice than to go back to green medicines in other to remedy his life threatening afflictions [3]. Medicinal plants have become the most if not the only important sources of life-saving drugs for the larger percentage of the world's population. These medicinal

plants contain major live saving bio-chemicals and some other essential chemical substances for the benefit of mankind [4]. Genes and environment interacts and this interaction couple with our life styles are capable of causing chronic diseases non-communicable diseases (NCD) such as diabetes, blood pressure and stroke [4].

Diabetes is defined as an abnormal health condition that is caused by impaired insulin and Leptin sensitivity [5]. The incidence of diabetes mellitus (DM), especially type 2 DM is rapidly growing. In 1985, 30 million people were estimated to be suffering from the disease and by the end of 2006, the number had increased to 230 million (approximately 6% of world population). Of this number, 80% are in the developing world. By 2011, the International Diabetes Federation (IDF) estimated that 366 million adults aged 20-79 years out of the worlds 7 billion population had DM. Approximately 7.1 million Africans by the year 2000 were reported to be suffering from DM with the figure expected to rise further from 7.1 million to 18.6 million by 2030. Majority (70% - 90%) of African diabetes is of type 2 and is more prevalent among the wealthy, hence the tag "disease of opulence". It is more pronounced in urban areas where people tend to be less physically active, eat diets rich in saturated fat and refined sugars and are more obese. Obesity is a pivotal contributor to increased prevalence of DM in both urban and rural areas, but more so in the former and the terminology diabesity reflects the close relationship between both medical conditions. The World Health Organization (WHO) estimates in Africa on obesity show generally that more than one-third of the women are obese compared to one-fourth of the men, with the poor being as vulnerable as the rich [6]. Blood pressure is the measure of the force of blood pushing against blood vessel walls. (Faral-Tello, et al.). There are two types of hypertension primary hypertension (PHT) and secondary hypertension (SHT). The primary hypertension has no root causes factors while secondary hypertensions have enormous risk factors. The global burden of hypertension is rapidly increasing, and the African continent seems to be the most affected region in the world and Nigeria forms a substantial portion of the total burden in Africa. It is estimated that hypertension affects about 1 billion people all over the world and it is the main risk factor for many other cardiovascular diseases [7]. The prevalence of hypertension is high among the Nigerian population. According to WHO, 2014, "unhealthy diets and physical inactivity contribute to about 12 million deaths worldwide, which are related to non-communicable diseases (NCDs) such as stroke, cancer and diabetes. Prevalence in Nigeria is about 30-45% and genetic and environmental factors are key to development" The World Health Organisation, has revealed that 46 percent of adults in African countries are hypertensive with adult males tending to have a higher mean systolic blood pressure than adult females. The report has Nigeria topping the list of males and females with highest percentage of adults followed by Ghana. The gender comparison data rated Nigeria adult high with 51 percent for males and 49 percent for female hypertension, followed by Ghana with 41 percent male and 38 percent female with global average of about 40 percent according to WHO 2016. The WHO blamed increasing urbanisation and unhealthy lifestyles for the rise in cases (vanguard, 2017). A Stroke is consequential results of A cardiovascular disorder especially hypertension which occurs when the blood supply to the brain is interrupted or reduced [8]. As long as diabetes and hypertensive case keeps increasing, stroke cases will also continue to increase [1]. When this happened, it deprives the brain of oxygen and nutrients, which are capable of causing the brain cells to die. A stroke may be caused by a blocked artery and it is called ischemic stroke or by the leaking or bursting of a blood vessel and is called hemorrhagic stroke while some people may experience only a temporary disruption of blood flow to their brain and this type of stroke is called transient ischemic attack [6].

Methods

Pre-treatment and processing of raw materials

Pre-treatment and processing of bitter leaves (*Vernonia amygdalina*): The fleshly harvested young and matured leaves of *Vernonia amygdalina* also called bitter leaves were collected from the farm and washed thoroughly with distilled water to remove impurity. The washed freshly harvested leaves were then dried indoor for 168hrs (seven days) after which, they were crushed into smaller sizes and grinded to obtain finely divided particles called Vernonia powder (Figure1).

Figure 1: Turmeric rhizomes sliced and crushed sample "A".

Figure 2: Ginger Rhizomes sliced and powder Sample "B"

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Pre-treatment and processing of ginger rhizomes (*Zingiber officinale*): Freshly harvest Ginger rhizomes were collected and washed thoroughly to remove unwanted materials. Then the thoroughly washed rhizomes were then sliced to aid drying, and dried for 240hrs (ten days). The dried mesocarp was then crushed and further grinded into very fine powder (Figure 2).

Pre-treatment and processing of guava (*Psidium guajava*): Freshly harvested guava leaves, matured fruits and pills were collected. The collected young and old leaves were washed thoroughly in order to remove unwanted materials from it. The washed leaves were then dried for 168hrs indoor. The dried leaves were crushed. The matured Guava fruits were sliced and dried for 240hrs indoor. The pills were crushed and dried for 240hrs also under the same condition as the two components. The three crushed components (leaves fruits and pills) were blended and grinded to form a very fine powder called guava powder (Figure 3).

Figure 3 : Pawpaw leaf and crushed powder sample "C"

Pre-treatment and processing of moringa (*Moringa oleifera*): The freshly harvest leaves of moringa olfera and the matured fruits were collected. The matured dried fruits were piled up using a mortar to get the hard seeds the hard seeds were also pitted to remove the dried harsh dried cover from it. The seeds were then crushed. The young harvested leaves were also washed and dried for 168hrs (seven days). The dried leaves were crushed and blended with the crushed seeds and grinded together to form one component called moringa powder.

Pre-treatment/processing of turmeric (*curcuma longa*): The fresh Turmeric was purchased and washed thoroughly to remove impurities. The washed turmeric was then sliced to aid drying. The sliced were then dried for 240hrs after which the dried one was crushed and grinded into fine powder (Figure 4).

Pre-treatment/processing of scent leaf (*Ocimum gratissimum*): The fleshly harvested scent leaves was collected from the farm and washed thoroughly with distilled water to remove any impurity from it. The washed fresh scent leaves was then dried under normal atmospheric condition (away from sunlight or room temperature) for 168hrs (seven days). The dried scent leaves was then crushed and grinded to obtained very finely divided powder called scent leaves powder (Figure 5).

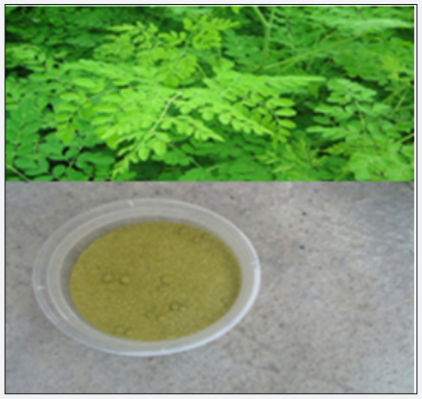

Figure 4: Moringa oleifera leaf and crushed powder sample "D".

Figure 5 : Guava leaf and crushed powder sample "E".

Figure 6 : Bitter leaf and crushed powder sample "G".

Pre-treatment/processing of pawpaw leaves and fruits (*Carica papaya*): The fleshly harvested pawpaw leaves and fruit were collected from the *Carica papaya* plant and washed thoroughly with distilled water to remove impurities from it. The washed fresh leaves and fruits were then sliced and dried under

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normal atmospheric condition (away from sunlight that is at room temperature) for 336hrs (fourteen days). The dried leaves were then crushed and grinded to obtained very fine powder called pawpaw powder (Figure 6).

Sample preparation and formulation of multi-functional flora composite

Preparation of samples: The grinded powder of ginger obtained from pre-treatment and processing of raw materials was sieved using a very fine mesh to obtain a finely divided granulated powder. The same procedure was followed for the remaining six plants. The powders were then measured into seven portions at the ratio of 3:3:3:2:2:2:1 (300g, 300g, 300g, 200g, 200g, 200g, 100g) for Ginger, Turmeric, *Moringa oleifera*, Scent leafs, Guava leafs And Pawpaw leafs respectively. This is due to their relative essentiality to the objective and aim of this research from literature. These powder portions formed the samples of interest (Figure 7).

Figure 7 : Multifunctional flora composite.

Formulation of a multifunction hybrid flora composite by simple combination of samples: The seven samples in the ratio of 3:3:3:2:2:2:1, as shown above for Ginger Rhizomes Powder, Turmeric Rhizomes Powder, *Moringa Oleifera* Leaf Powder, Scent Leafs Powder, Guava Powder, Bitter Leaf Powder and Pawpaw leaf powder respectively, were blended together using a blender in order to obtain homogenous multifunctional hybrid flora composite which total to 1600 grams (Figure 8).

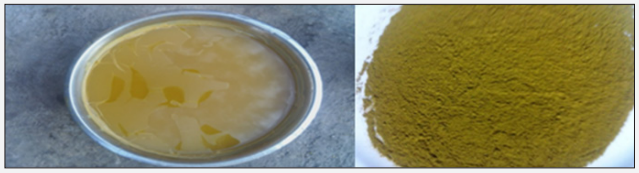

Figure 8: Show filtrate and PELLET of multifunctional hybrid flora composite.

Formulation of a multi-functional flora composite using filtration and evaporation

The seven samples of plants' powders were blended together after appropriate measurements as shown above. Using the same ratio of 3:3:3:2:2:2:1for Ginger Rhizomes Powder, Turmeric Rhizomes Powder, *Moringa Oleifera* Leaf Powder, Scent Leafs Powder, Guava Powder, Bitter Leaf Powder and Pawpaw leaf powder respectively. The resulted portion were blended together and further grinded and the raw powdered Multifunctional flora composite was hydrolyzed (that is, 500mL of water was added to It.) and stirred intermittently within 72hrs and filtered using a very fine mesh. The filtrate was re-filtered using watman filter paper and then evaporated at the temperature of 42.5 °C using fan circulated evaporator for two weeks and the paste was collected and dried using cool air and ventilate room for three days. The evaporation rate was slow because, the temperature at which the evaporator was set is below the boiling point of water (100 °C). This is because, the secondary metabolites are thermo-labile and excess heat will either denature/deactivate or make most of them escape completely or transform to other component. The dried composite material was then grinded and packaged (Figure 9).

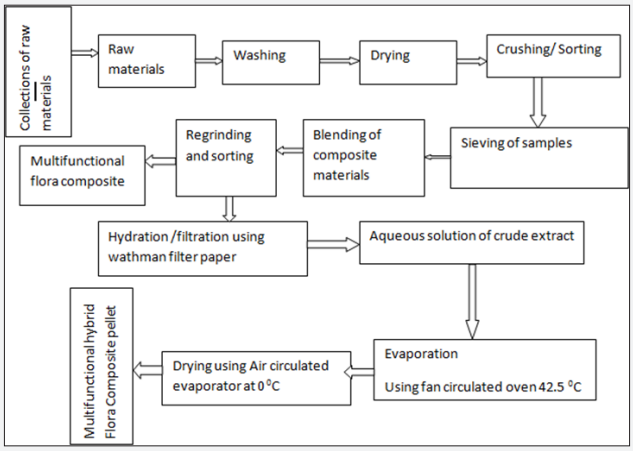

Figure 9 : Process flow diagram for the formulation of flora composite.

Result and Discussion

Results of phytochemicals screening of samples

Result of qualitative analysis (screening of samples): Table1 is the result of qualitative screening of the seven samples of plants that were used for the production of the multifunctional flora composite. The result shows that Alkaloids were present in large quantities in all of them except in guava which was only in trace amount. Phenols were present in ginger, turmeric, bitter leaf, scent leaves and pawpaw in large quantities but only in trace amount in guava and completely absent in moringa. Steroids were present in trace amount in most of the samples except in turmeric and moringa which indicated present.

Anthocyanin was present also in trace amount and completely absent in guava and moringa. Flavonoids were present in large quantities in all the plants samples except in guajava where it was only traced amount was present. Traced amount of oxalates was found in guava and scent leaf but absent in all other samples. Large amount of Saponins was preset in all

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the samples while tannin was absent in ginger, tracery present in guava and largely present in all other samples. Phylates was absent in ginger, turmeric, moringa and guava and only traces were in other samples. Anthraquinone was largely present in moringa and absent in ginger, turmeric and guava. Carotenoids were present in trace amount but absent in ginger turmeric and guava but only traces were present in the remaining samples. Cardiac glycosides were largely present in bitter leaves, guava and present in scent leaf but absent in pawpaw. Terpenoids were present in ginger, moringa and pawpaw but only present in guava and scent leaf but absent in turmeric according to the results.

Table 1: shows the results of Qualitative phytochemical screening ofginger, Bitter Leaves, Scent Leaves, Moringa,guajava leaves, Pawpaw leaves, and turmeric.

Bioactive components/ phytochemicals or plants' secondary metabolites	Ginger rhizomes	Turmeric rhizomes	Bitter leaves	Scent leaves	Moringa oleifera	Guava leaves	Pawpaw leaves
Alkaloids (mg/100g)	++	++	+++	+++	+++	+	+++
Phenols (mg/100g)	+++	++	++	+++	-	+	++
Steroids (mg/100g)	+	++	+	+	+++	+	-
Anthocyanin (mg/100g)	+	+	+	+	+	-	-
Flavonoids (mg/100g)	+++	+++	+++	+++	+++	+	+++
Oxalates (mg/100g)	-	-	-	+	-	+	-
Saponins (mg/100g)	+++	+++	+++	++	++	++	+++
Tannins (mg/100g)	-	++	+++	+++	+++	+	+++
phylates (mg/100g)	-	-	+	+	-	-	+
Anthraquinone (mg/100g)	-	-	+	+	+++	-	+
Carotenoids (mg/100g)	-	-	-	++	++	-	+
Glycosides (mg/100g)	++	++	+++	++	+	+++	-
Terpenoids (mg/100g)	+++	-	+	++	+++	++	+++

The (-) sign represent not present, (+) indicate trace, the sign (++) present and (+++) present in large quantity.

Result of quantitative screening of flora composite and discussions: Table 2 shows the results of phytochemical screening of the seven medicinal plants and the multifunctional hybrid flora composite. The first phytochemical present is alkaloids with average value of 1.80mg and composite value of 3.96mg per 100g of sample. Ginger contain 0.97mg of Alkaloids while turmeric has 3.48mg which has the highest content of Alkaloids followed by *moringa oleifera* with 3.47mg, bitter leaves 1.26mg , scent leaves 2.29mg, guava has the least content of alkaloids 0.38mg while pawpaw is relatively law, with 1.80mg of alkaloids per 100g of sample. Alkaloids are a group of naturally occurring chemical compounds that mostly contain basic nitrogen atoms. Alkaloids are produced by a large variety of organisms including bacteria, fungi, plants, and animals but those produced by plants are the safest for consumption. Alkaloids have a wide range of pharmacological activities including anti-malarial (for example quinine), antiasthma (for example ephedrine), anticancer (for example homoharringtonine), cholinomimetic (for example galantamine), vasodilatory (for example vincamine), antiarrhythmic (for example quinidine), analgesic (for example morphine), antibacterial (for example chelerythrine), and antihyperglycemic activities (for example piperine. Other alkaloids possess psychotropic (for example psilocin) and stimulant activities (for example cocaine, caffeine, nicotine, theobromine), and have been used in entheogenic rituals or as recreational drugs. The above properties make alkaloids useful in the treatment, prevention and management of typhoids, malaria fever and other viral, fungi and bacterials diseases. Preparations of plants containing alkaloids and their extracts, and later pure alkaloids, have long been used as psychoactive substances. Cocaine, caffeine, and cathinone are stimulants of the central nervous system. Mescaline and many of indole alkaloids (such as psilocybin, dimethyltryptamine and ibogaine) have hallucinogenic effect. Morphine and codeine are strong narcotic pain killers.

From the results, phenol is the next group of phytochemicals, with 2.19mg/100g average value of the seven medicinal plants and 2.62mg/100g of flora composites. Ginger from the results, contains 3.67mg of phenol per 100g of sample while turmeric indicated 6.49mg of phenol per 100g of sample. Scent leaves were revealed to have 3.84mg of phenol per 100g of sample while bitter leaves were showed to have 0.77mg per 100g of sample. It was absent in moringa, 0.46mg in guava and 0.12mg in pawpaw. Polyphenols or simply phenols are phytochemicals; this implies that they are compounds found abundantly in natural plant food sources that have antioxidant properties. Polyphenols play important roles in maintaining health and wellness of both plants and animals. These Antioxidants are groups of compounds that help protect the cells of the body from free radical damages

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or from the depleting effects of free radicals called oxidants, thereby controlling the rate of aging, cancer cells formations and consequence growth. Inadequacy of these antioxidants in the body to offer protection will ease the spread of free radicals in the body, causing the body cells to be ravaged by many deathly diseases like cancer.

Table 2: shows the results of Quantitative phytochemical screening of ginger, turmeric, Bitter Leaves, pawpaw leaves, Scent Leaves, Moringa and guava powder.

Bioactive components/ Phytochemicals or plants' secondary metabolites	Ginger rhizomes	Turmeric rhizomes	Bitter leaves	Scent leaves	Moringa oleifera	Guava leaves fruits and leaves	Pawpaw leaves	Average value	Flora composite
Alkaloids (mg/100g)	0.97	3.48	1.26	2.29	3.47	0.38	0.75	1.8	3.96
Phenols (mg/100g)	3.67	6.49	0.77	3.84	-	0.46	0.12	2.19	2.75
Steroids (mg/100g)	-	1.98	0.32	0.48	3.41	0.41	-	0.94	1.96
Anthocyanin (mg/100g)	0.4	-	0.07	0.1	0.09	-	-	0.1	0.07
Flavonoids (mg/100g)	3.98	5.58	1.78	5.37	4.38	0.59	4.73	3.77	6.52
Oxalates (mg/100g)	0.45	-	0.79	3.58	-	-	0.36	0.74	0.96
Saponins (mg/100g)	3.54	2.92	3.51	5.57	1.56	3.46	1.4	3.05	3.56
Tannins (mg/100g)	-	3.39	2.78	10.43	9.26	0.65	1.56	4.01	6.86
phylates (mg/100g)	-	-	3.56	2.92	0.56	0.94	4.89	1.75	1.18
Anthraquinone (mg/100g)	-	-	0.31	0.41	5.72	-	-	0.92	2.43
Carotenoids (mg/100g)	0.62	0.79	-	-	1.26	-	0.31	0.43	0.92
C/glycosides (mg/100g)	0.76	1.24	2.37	1.21	0.46	2.76	-	1.26	1.97
Terpenoids (mg/100g)	4.47	2.56	0.05	1.24	3.96	2.07	-	2.05	2.31

The (-) sign indicated that the components were not present.

Polyphenols give fruits, berries, and vegetables their vibrant colours, and contribute to the bitterness, astringency, flavour, aroma, and oxidative stability of the food. In the plants, antioxidants protect them against ultraviolet radiation, pathogens activities, oxidative damage to their cells and harsh climatic conditions. In the human body, polyphenols have diverse biological properties and multi-biological remediation effects including; the Fight against cancer cells and inhibiting the growth of blood vessels that feed a tumour (angiogenesis), protecting the skin against ultraviolet radiation, Fighting the oxidative effects of free radicals, reducing the appearance of aging, Promoting brain health, and protecting against dementia (that is a general term for a decline in mental ability severe enough to interfere with daily life.

One of the interesting facts about polyphenols is that they are fat soluble. Many of our health problems certainly come from the deviation of oxygen inside our body. Apparently oxygen offers both life and severe damage the body. In other words the cells in the human body are surrounded by aggressive, different form of bad oxygen also known as the notorious oxidant, with the ability to mutate and destroy the cells in it. The longer that the oxidants or the notorious oxidants or free radicals, attack the cells, the more the chances that one may suffer from cancer, immune system damage, arteries clogging, nervous system malfunction and more deathly diseases. If there are not enough antioxidants in the fatty molecules they will become rancid, which will completely break up the cell's membranes structure. According to Documented Health Benefits of phenols, Based on some human studies, phenols have been found to stabilize blood sugar and fat metabolism, reduce insulin resistance, and lower inflammation in the body hence phenols is used effectively in the management of diabetes especially Type-2 Diabetes and sometimes gestational and type 1 diabetes (Daniele, et al.). Phenols or phenolic also reverse epigenetic markers in the DNA and are responsible for reduction of tumour growth. The above established functions made this composite material a preventive, treatment and management agent for both diabetes, blood pressure and stoke.

Flavonoids group: Table 4 from the results, flavonoids group has an average value of 3.77mg and a flora composite value of 6.52mg per 100g of sample. Ginger contains 3.98mg of flavonoids, turmeric 5.58mg, bitter leaves1.78mg , scent leaves 5.37mg, moringa 4.38mg, and guava has the least content of 0.59mg while pawpaw has 4.73mg of flavonoids per 100g of samples. Flavonoids are a diverse group of phytonutrients (plant chemicals) found in almost all fruits and vegetables. There are

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three classes of flavonoids: regular flavonoids, iso flavonoids, and neo flavonoids. There are more than 500 different flavonoids that occur naturally in plants and perform a variety of functions. Along with carotenoids, they are responsible for the vivid colours in fruits and vegetables. Flavonoids Like other phytonutrients, are powerful antioxidants with anti-inflammatory and immune system benefits. Flavonoids are a group of plant metabolites that are capable of providing health benefits through cell signalling pathways and antioxidant effects. The flavonoids consist of 6 major subgroups: chalcone, flavone, flavonol, flavanone, anthocyanins and isoflavonoids. All of these act against inflammation and prevent platelets from sticking together [9]. They also block the enzymes that raise blood pressure which make them a perfect treatment, prevention and management agents for blood pressure and their antioxidants ability, made flavonoids excellent anticancer formation and anti-cancer growth agent [10-15].

Flavonoids are one group of phytochemicals found naturally in many plants with diverse functions in favour of human health. When human eat plants combinations with flavonoids, it act as shields in their bodies protecting them against toxins and to help repair damage cells and tissues. As antioxidants, flavonoids help to prevent damages from the effects of free radicals that can come up during normal body processes, such as breathing. When flavonoids prevent free radicals from building up, oxidation of "bad" lipoprotein (LDL) cholesterol decreases, which prevents atherosclerosis, or plaque formation within the walls of the arteries. Flavonoids also appear to help prevent blood clotting, lower blood pressure, lower cholesterol, decrease inflammation and help with insulin sensitivity which made it a perfect companion for cancer, diabetes, blood pressure and stroke prevention treatment and management, Thus, eating a variety of green foods rich in flavonoids lower your risk of developing heart diseases. Flavonoids are powerful antioxidant properties, which mean they reduce inflammation, promote healthy arteries, and help fight aging by preventing and repairing cellular damages in the body.

Steroids from the table above have an average value of 0.94mg and a flora composite 1.96mg per 100g of sample. Steroid was absent in ginger, 1.98mg in turmeric, 0.32mg in bitter leaves, 0.48mg in scent leaves, 3.41mg in moringa, 0.41mg in guava and absent in pawpaw per 100g of sample. A steroid is an organic compound with four rings arranged in a specific molecular configuration. Examples include the dietary lipid cholesterol, the sex hormones estradiol and testosterone: Plant steroids are types of natural organic compounds found in plants. Many types of plant steroids exist and play important roles in the biological processes of plants, such as growth and development, cell division, and resistance to damage from environmental stresses like cold weather. Some plant steroids are also useful for their effects when consumed by human beings because their presence decreases the amount of cholesterol in the bloodstream. Phytosterols have a demonstrated ability to reduce cholesterol levels in the human bloodstream because their chemical structure allows them to react with chemicals in the digestive tract that normally bond with cholesterol so that the cholesterol can be absorbed by the intestines according to (Daniel, et al.,2014). When phytosterols are present, they bond with these chemicals and prevent cholesterol molecules from doing so, causing dietary cholesterol in the intestines to be excreted rather than absorbed.

Natural steroids are organic, fat-soluble compounds that have 17 carbon atoms, and which are structured in four distinct rings. Vitamin D derivatives are a sixth closely related hormone system with homologous receptors. They have some of the characteristics of true steroids as receptor ligands. Steroid hormones help control metabolism, inflammation, immune functions, salt and water balance, development of sexual characteristics, and the ability to withstand illness and injury. Prohormones: Sometimes called hormone precursors, prohormones are substances that the body can use to make hormones. The natural steroid hormones are generally synthesized from cholesterol in the gonads and adrenal glands. These forms of hormones are lipids. They can pass through the cell membrane as they are fat-soluble, and then bind to steroid hormone receptors (which may be nuclear or cytosolic depending on the steroid hormone) to bring about changes within the cell. Steroid hormones are generally carried in the blood, bound to specific carrier proteins such as sex hormone-binding globulin or corticosteroid-binding globulin. Further conversions and catabolism occurs in the liver, in other "peripheral" tissues, and in the target tissues [15-22].

Anthocyanins from the results, has an average value of 0.10mg and a flora composite value of 0.07mg per 100g of sample. Ginger has for example anthocyanin content of 0.41mg , turmeric result indicated that it was absent, bitter leaves content is 0.07mg , scent leaves has 0.10mg , moringa, has 0.09mg , while it was completely absent in guava and pawpaw. Anthocyanin is also known as anthocyans. Anthocyanin is very important subgroups that belong to a parent class of molecules called flavonoids. Anthocyanins occur in all tissues of higher plants, including leaves, stems, roots, flowers, and fruits. Anthocyanins are very powerful antioxidants and a major component of flavonoids. Anthocyanin and other flavonoids are thought to work by inhibiting neuro-inflammation, activating synaptic signalling, and improving blood flow to the brain. It appears that some dietary anthocyanin can cross the blood-brain barrier, allowing the compounds to have a direct beneficial effect.

Laboratory studies that used a variety of cancer cells have indicated that anthocyanin not only act as antioxidants, they also activate detoxifying enzymes; prevent cancer cell proliferation; induce cancer cell death (apoptosis); have anti-inflammatory effects; have anti-angiogenesis effects: that is to say, they inhibit the formation of new blood vessels that encourages tumour growth; prevent cancer cell invasion; and induce differentiation of the cancer cells. Because, the more differentiated the cancer

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cell, the less likely it is to grow and spread. Anthocyanin has been tested against esophageal, colon, skin, and lung cancers, and in several cases has been effective against the development and progression of these cancers (Daniele, et al.). In one study, freeze-dried black raspberries inhibited cell proliferation, inflammation, and angiogenesis of esophageal cancer cells in rats.

Oxalate from results, has an average value of 0.74mg and flora composite value of 0.96mg per 100g of sample. Ginger, bitter leaves, scent leaves and pawpaw leaves contain 0.45mg, 0.79mg, 3.58mg and 0.36mg of oxalates per 100g of samples respectively. Oxalates or oxalic acid are a naturally occurring compound in foods. They are also produced in small amounts by the liver. The role of oxalates and other anti-nutrients is to provide protection for plants against predators. Oxalates specifically bind to other minerals (like calcium) and prevent your body from absorbing them. An "oxalate-free" diet is impossible.

Oxalates occur in varying amounts in almost all plant foods. If you eat food, you're almost certainly consuming oxalates in some amount. In very large quantities, oxalates can be toxic like in the leaves of the rhubarb plant. To reach toxic level, food must contain altogether about 22grams of oxalates acids in order to reach toxic levels for a 59kg woman. The most common condition associated with excessive oxalates in the diet is kidney stones. Oxalates are directly correlated with the formation of the most common type of kidney stones - calcium oxalate stones. These form when oxalates bind with calcium in the bloodstream. If you've had kidney stones, you know it. They are incredibly painful.

The word saponins are derived from a Latin word called "sapo" meaning "soap." Saponins have an average value of 3.03mg and a composite value of 3.56mg per 100g of sample. Ginger has saponins value of 3.54mg, turmeric 2.92mg, bitter leaves 3.51mg, and scent leaves 5.57mg, moringa 1.56mg, guava 3.46mg and pawpaw with the least value of 1.40mg per 100g of sample. Saponins are naturally occurring plant glycosides. Saponins offer enormous health benefits. Studies have shown that they support the immune system, promote normal cholesterol levels, and support overall wellness of the human body and, also like detergent; saponins can bind with water as well as fats and oils. This means that, in the digestive tract, saponins produce an emulsification of fat-soluble molecules. Specifically, saponins bind to bile acids and help eliminate them from the body, preventing cholesterol from being reabsorbed. Because of the unique structure of saponins it serves as system cleanser removing toxins from the body. it is hence called a purifier, antitoxins and a cleanser [22-25].

Saponins have favourable effects on cholesterol, it can help boost the immune system through toxins removals, have an antioxidant effect, and support the body frame or strength. Saponins binding to Cholesterol using the bile it produce: Saponins help to promote normal cholesterol levels this is done by capturing the excess cholesterol and exit it out through faeces. Saponins bind with bile and prevent cholesterol from being reabsorbed back into the bloodstream; rather, it is simply excreted out of the body. Hence, a lower cholesterol level in the body means less risk of heart attack or stroke. It is therefore a very effective way of preventing the occurrence of blood pressure and stroke. The cholesterol-lowering effect of saponins has been known for decades. a study was carried out giving a certain saponins extract to rats with high cholesterol reduced "bad" (LDL) cholesterol without affecting "good" (HDL) cholesterol (Goodarz et al.). Saponins Boost the Immune System In nature; plants rely on saponins as a mechanism to fight parasites. When saponins are consumed by humans, they provide a similar defence against harmful organisms. The ability of saponins to act as a broad, frontline shield reduces the burden on the immune system. Saponins and Cancer Saponins have several qualities that act against cancer cells. In particular, some saponins have an antioxidant effects and directly toxic to cancer cells and their growth. Cancer cell membranes have cholesterol-type compounds.

Tannins (tannoids) groups of phytochemicals have an average value of 4.01mg and composite value of 6.54mg per 100g of sample. Tannin from the result, is absent in Ginger but turmeric has 3.39mg , bitter leaves 2.78mg , scent leaves 10.43mg , moringa 9.26mg , guava has the least value of 0.65mg while pawpaw has1.56mg per 100g of sample. Tannin is an astringent, polyphenolic biomolecule that binds to and precipitates proteins and various other organic compounds including amino acids and alkaloids. Tannins are a broad class of compounds that are present in many plants including moringa, guava, bitter leaves, scent leaves, ginger and even turmeric. Most of the tannins fight cavities, diarrhea, and some even protect against heart diseases and cancer. They disable bacteria in the mouth, which inhibits plaque formation. Tooth decay is also prevented. But they stain teeth. Their power mainly comes from the property of astringency. It is the kind of dry, tightening and wrinkling feeling in the mouth. It is often felt while eating fruits like berries. They attach to the proteins in the saliva, creating a rough, sensation of the mouth, resembling 'sandpaper'. The tannin compounds that are present in some plants, provides them protection against predation. The feeling inside our mouth, on consumption of improperly ripened fruits, is also because of tannins. Most of them are polyphenols, whereas, some others are antioxidants. Antioxidants, protects from heart diseases Prevents cancer by preventing cellular damage. Polyphenols are examined for their potential health benefits [25-31].

Anthraquinone has an average value 0.92mg and composite value of 2.43mg per 100g of sample. Anthraquinone is completely absent in Ginger, turmeric, guava and pawpaw but bitter leaves has 0.31mg , scent leaves 0.41 and moringa with the highest anthraquinones of 5.72mg per 100g of sample. Anthraquinone are organic compounds with their origins in plants. Anthraquinones are potent laxatives and can be irritating

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to both the upper and lower parts of the gastrointestinal tract. One of the most common medicinal uses of anthraquinones is to bring about constipation relief through their laxative effects. Anthraquinones are thought to increase the amount of fluid in the colon and also serve to stimulate colon contractions.

Carotenoids from the table have an average value of 0.43mg and composite value of 0.92mg per 100g of samples. Ginger has 0.62mg, turmeric 0.79mg, moringa 1.26mg of carotenoids per 100g of sample. Distinguished by their orange, yellow, and red pigments, carotenoids are found in many plants, algae, and bacteria. Carotenoids act as antioxidants within the body, protecting against cellular damage, the effects of aging, and even some chronic diseases. As antioxidants, carotenoids are helpful for protecting vision and combating multi-cellular damages within the body as a result of the actions of free radicals or notorious oxidants. Carotenoids especially Lycopene, has been proven effective in keeping the liver, prostate, breast, colon, and lungs healthy with it antioxidants effects.

Carotenoids play the following roles in human body: first, carotenoids Supports Eye Health. The second function is in Cardiovascular Health or preventing blood pressure, stroke and other related hearts diseases. Different Population-based studies have demonstrated that carotenoids are effective substances in human diets regarding the support for cardiovascular health. Thirdly is the ability of the carotenoids to serves as anti-cancer component in human diets: carotenoids contain acetylenics, a group of metabolites known for combating tumour development (Christian). They also have action against harmful organisms and support the immune system. The combination of these properties has been so effective for fighting bacteria and immune-related infections. Researchers have shown that carotenoids, vitamin C, vitamin E, selenium, glutathione, N-acetylcysteine, and zinc notably improved the participants' chances of a man getting a woman pregnant.

Cardiac glycosides from the table, has an average value of 1.26mg and composite value of 1.97mg per 100g of samples. Ginger has cardiac glycoside of 0.76mg , turmeric 1.24mg , bitter leaves 2.37mg , scent leaves 1.21mg, moringa 0.46mg and guava 2.76mg per 100g of sample while in pawpaw, cardiac glycoside was absent according to the results. Cardiac glycosides are a class of organic compounds that increase the output force of the heart and decrease its rate of contractions by acting on the cellular sodium-potassium Adenosine Triphosphase pump. Their beneficial medical uses are as treatments for congestive heart failure and cardiac arrhythmias; however, their relative toxicity prevents them from being widely used. Most commonly found as secondary metabolites in several plants such as pawpaw plants, these compounds nevertheless have a diverse range of biochemical effects regarding cardiac cells functions and have also been suggested for use in cancer treatment [31-34].

Terpenoids from the table of results, above, has an average value of 2.05mg and a composite value of 2.31mg per 100g of samples. Ginger sample contain 4.47mg of Terpenoids, turmeric 2.56mg , better leaves 0.05mg , scent leaves 1.24mg , moringa 3 96mg and guava has 2.07mg of Terpenoids per sample. It was completely absent in pawpaw. The word Terpenoids sometimes called isoprenoids, are a large and diverse class of naturally occurring organic chemicals. These lipids can be found in all classes of living things, and are the largest group of natural products. Plant Terpenoids are used extensively for their aromatic qualities and play a role in traditional herbal remedies. The steroids and sterols in animals are biologically produced from terpenoid precursors. Sometimes Terpenoids are added to proteins, for example, to enhance their attachment to the cell membrane; this is known as iso prenylation. Terpenes are volatile compounds produced by many plants, as well as some insects. Plants that produce terpenes often possess smells and flavours we find pleasing and are known as aromatic herbs. These aromatic plants have been used by cultures around the world, not only for perfumery and cooking, but also as medicine. The distinctive flavour and smell of each aromatic plant is caused by its unique blend of terpenes. From a chemical standpoint, terpenes are a large and varied class of hydrocarbons that make up a majority of plant resins and saps.

Results of proximate analysis of samples and flora composite and discussions

Minerals analysis of samples and flora composite: The result in Table 3 above is that of mineral analysis of samples and composite pellet. The five major minerals in the human body are calcium (114.43mg), phosphorus (121.94mg), potassium (224.24mg), sodium (30.55mg) and magnesium (99.75mg). All the remaining elements in a human body are called "trace elements". The trace elements that have specific biochemical functions in the human body are sulphur, iron (11.37mg), chlorine, cobalt, copper (1.46mg), zinc (10.32mg), manganese (1.71mg), molybdenum, iodine and selenium on average. Minerals are inorganic nutrients, usually required in small amounts from less than 1mg to 1000mg per day, depending on the mineral element in question.

Table 3: Results of minerals analysis of ginger, turmeric, bitter leaves, scent leaves, guajava, moringa leaves, pawpaw and their average values.

Mineral elements /primary metabolites	Ginger	Turmeric	Bitter leaves	Scent leaves	Guava leaves	Moringa Leaves	Pawpaw leaves	Average values	Flora composite
Calcium (mg/100g)	16	228.8	13.11	64.8	18	440	20.31	114.43	126.05
Potassium (mg/100g)	ND	551.3	9	86.24	417	324.01	182.11	224.24	382.4
Magnesium (mg/100g)	ND	179.8	19.01	88.25	22.01	368	21.17	99.75	74.35

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Phosphorus (mg/100g)	34	543.9	ND	21.65	40	204	10	121.94	120.9
Iron (mg/100g)	0.6	1.1	25.58	23.37	0.28	28.3	0.35	11.37	96.11
Zinc (mg/100g)	0.36	59.7	2.07	6.86	0.25	2.29	0.72	10.32	12.94
Manganese (mg/100g)	0.23	2.3	1.03	4.63	0.2	ND	3.57	1.71	1.56
Sodium (mg/100g)	13	94.7	12.02	84.11	2.01	ND	8.01	50.55	96.12
Nickel (mg/100g)	ND	34	3.01	5.16	1.02	ND	0.07	6.18	6.86
Copper (mg/100g	ND	0.6	2.75	5.69	ND	0.57	0.32	1.45	1.1

The (ND) letters in the result represent not detected

Calcium (Ca) Calcium as an essential element with an average value of 114.43 milligrams per hundred grams of sample and composite flora values of 126.05miligrams per hundred grams of sample. Ginger contains 16.00mg, turmeric 228.8mg, bitter leaves 13.11mg; scent leaves 64.80mg, guava 18.mg, moringa 440mg, and pawpaw 20.31mg of calcium per 100g of sample. Calcium plays its roles as a constituent of bones and teeth formations, regulation of nerves and muscles functions in living cells. In blood coagulation, calcium functions as an activator by activating the conversion of prothrombin to thrombin and also takes part in milk clotting. It plays a vital role in enzyme activation also. Calcium activates large number of enzymes such as adenosine triphosphatase (ATPase), succinic dehydrogenase and lipase. Calcium is also required for membrane permeability; it is involved in muscle contraction, normal transmission of nerves impulses and in neuromuscular excitability.

The greater the need for calcium in the body, the more efficient the absorption of it into the system. The intake or absorption of calcium and phosphorus to the body system is often facilitated by a low intestinal pH which is necessary for their solubility. Lactose also enhances the absorption of calcium apart from low pH duodenum. The deficiency of calcium in children causes rickets due to insufficient calcification by calcium phosphate of the bones in growing children. The bones therefore remain soft and deformed by the body weight. In adults, it causes osteomalacia, a generalized demineralization of bones. Calcium deficiency also affects the dentition of both children and adult. Toxicity symptoms occur with excess absorption due to hypervitaminosis D or hypercalcaemia due to hyperparathyroidism, or idiopathic hypercalcaemia. Excess calcium depresses cardiac activity and leads to respiratory and cardiac failure; it may cause the heart to stop in systole, although, normally, calcium ions increase the strength and duration of cardiac muscle contraction [35,36].

Phosphorus (P) Phosphorus is essential mineral element from table 4.3 above; it has average value of 121.94 milligrammes per hundred grammes and 120.90 milligrams per hundred grames of samples. Ginger phosphorus content was 34.00mg from the result while phosphorus content in turmeric was 543.90mg, it was not detected in bitter leaves but in scent leaves, it was 21.65mg, in guava it was 40.00mg, while in moringa it was 204.0mg and 10.0mg in pawpaw per hundred grams of sample. Phosphorus is located in every cell of the body and is vitally concerned with many metabolic processes, including those involving the buffers (a solution which resists changes in pH when acid or alkali is added to it) in body fluids.

The major roles of phosphorus are that: It functions as a constituent of bones, teeth, adenosine triphosphate (ATP), phosphorylated metabolic intermediates and nucleic acids. It plays buffering roles. That is phosphate buffers, functions in the formation of high energy compounds, that is, adenosine triphosphate (ATP) and is also involved in the synthesis of phospholipids and phosphoproteins. Practically, every form of energy exchange inside living cells involves the forming or breaking of high-energy bonds that link oxides of phosphorus to carbon or to carbon-nitrogen compounds. Deficiency disease or symptoms in children causes rickets and in adults, it causes osteomalacia. Increase in serum phosphorus is found in chronic nephritis and hyperparathyroidism. Toxicity disease or symptoms include low serum Ca^{2+}: P ratio. It may also lead to bone loss. Sources of phosphorus include phosphate food additives, green leafy vegetables and fruits, especially banana.

Sodium (Na) with an average value of 50.55 milligrams per hundred grams and composite value of 96 milligrams per hundred grams of sample. Ginger contains 13. 00mg of sodium, turmeric 94.70mg, bitter leaves 12.02mg, and scent leaves 84.11mg, guava 2.01mg pawpaw 8.01mg of sodium per 100g of sample. Sodium is the principal cation in extracellular fluids. It regulates plasma volume and acid-base balance, involved in the maintenance of osmotic pressure of the body fluids, preserves normal irritability of muscles and cell permeability, sodium also activates nerves and muscles' functions and involved in Na+/K+-ATPase, maintenance of membrane potentials, transmission of nerves impulses and the absorptive processes of monosaccharide, amino acids, pyrimidines, and bile salts. The changes in osmotic pressure are largely dependent on sodium concentration. Its metabolism is regulated by aldosterone. Sodium is readily absorbed as the sodium ion and circulates throughout the body. Excretion occurs mainly through the kidney as sodium chloride or phosphate. There are appreciable losses in perspiration, and the quantities lost by this route vary rather markedly with the environmental humidity. Excessive intake of sodium chloride may result in salt toxicity which is mainly caused by sodium ion, since sodium acetate or sodium propionate affects the animals in a manner similar to that of sodium chloride.

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Potassium from the result above, was absent in ginger, 551.3mg in turmeric saple, 9.00mg in bitter leaves, 86.24mg in scent leaves, 417.0mg in guava, 324.01mg in moringa and 182.11mg per 100g of samples of each plant. Potassium (K) with average value of 224.24 milligrams per hundred grams and composite value of 382.40 milligrams per hundred grams of samples is the principal cation in intracellular fluid and functions in acid-base balance, regulation of osmotic pressure, conduction of nerves impulses, muscles contractions especially the cardiac muscles, cell membrane function and Na^+/K^+-ATPase. Potassium as a mineral element is also required during glycol-genesis (the formation of glycogen from sugar. Toxicity disease or symptoms include dilatation of the heart, cardiac arrest, small bowel ulcers. Hypokalaemia is low level of serum potassium and this occurs in diarrhoea, metabolic alkalosis and familial periodic paralysis. Deficiency disease or symptoms of potassium occurs secondary to illness, functional and structural abnormalities including impaired neuromuscular functions of skeletal, smooth, and cardiac muscle, muscular weakness, paralysis and mental. Potassium deficiency affects the collecting tubules of the kidney, resulting in the inability of the kidney's colleting tubules to concentrate urine, and also causes alterations of gastric secretions and intestinal motility.

Magnesium from above result, is absent in ginger, has a value of 179.80mg in turmeric sample, 19.01mg in bitter leaves sample and in scent leaves 88.25mg , guava 22.01mg , moringa 368.0mg and 21.17mg per hundred grams of sample .Magnesium (Mg) Magnesium as a mineral element and as a primary metabolite with an average value of 99.75 milligrams per hundred grams and composite value of 74.35 milligrams per hundred grams of samples is an active component of several enzymes in living systems within which thymine pyrophosphate is a cofactor. Oxidative phosphorylation is greatly reduced in the absence of magnesium. Magnesium is also an essential activator for the phosphate-transferring enzymes myokinase, diphophopyridine nucleotide kinase, and creatine kinase. It also activates pyruvic acid carboxylase, pyruvic acid oxidase, and the condensing enzyme for the reactions in the citric acid cycle. It is also a constituent of bones, teeth, enzyme cofactor or kinases. The health status of the digestive system and the kidneys significantly influence magnesium status. Magnesium is absorbed in the intestines and then transported through the blood to cells and tissues. Approximately one-third to one-half of dietary magnesium is absorbed into the body. Gastrointestinal disorders that impair absorption such as Crohn's disease can limit the body's ability to absorb magnesium. These disorders can deplete the body's stores of magnesium and in extreme cases may result in magnesium deficiency. Toxicity disease or symptoms of magnesium deficiency in humans include depressed deep tendon reflexes and respiration. Sources include leafy green vegetables (containing chlorophyll).

Copper (Cu) as a trace element with an average value of 1.41Milligrams per hundred grams and composite value of 1.10 milligrams per hundred grams of sample. Copper is absent in ginger, 0.60mg in turmeric, 2.75mg in bitter leaves, 5.69mg in scent leaves, absent in guava, 0.57mg in moringa and 0.32mg in pawpaw per hundred gram of sample. Copper is a constituent of enzymes like cytochrome-c oxidase, amine oxidase, catalase, peroxidase, ascorbic acid oxidase, cytochrome oxidase, plasma monoamine oxidase, erythrocuprin (ceruloplasmin), lactase, uricase, tyrosinase and cytosolic superoxide dismutase. Cupper plays a role in iron absorption it is an essential micro-nutrient necessary for the haematologic and neurologic systems (blood formation and regulations), It is necessary for the growth and formation of bone, formation of myelin sheaths in the nervous systems, cupper helps in the incorporation of iron in haemoglobin, assists in the absorption of iron from the gastrointestinal tract (GIT) and in the transfer of iron from tissues to the plasma. Clinical disorders associated with Cu deficiencies include anaemia, bone disorders, neonatal ataxia, depigmentation and abnormal growth of hair, fur or wool, impaired growth and reproductive performance, heart failure and gastrointestinal disturbances. Excess dietary Cu causes an accumulation of Cu in the liver with a decrease in blood haemoglobin concentration and packed cell volume. Liver function is adversely affected in copper poisoning. Jaundice results from erythrocyte haemolysis and this may lead to death unless treatment is started.

Iron (Fe) as a mineral element present in this composite flora material with an average value of 11.37 milligrams per hundred grams and 96.11milligrams per hundred grams of sample. Iron is 0.60mg in Ginger, 1.10mg in turmeric, 25.58mg in bitter leaves, 23.37mg in scent leaves, 0.28mg in guava, 28.30mg in moringa and 0.35mg in pawpaw sample. Iron functions as haemoglobin in the transport of oxygen. In cellular respiration, it functions as essential component of enzymes involved in biological oxidation such as cytochromes.

Fe is an important constituent of succinate dehydrogenise as well as a part of the haeme of haemoglobin (Hb), myoglobin and the cytochromes. Iron is required for proper myelination of spinal cord and white matter of cerebellar folds in brain and is a cofactor for a number of enzymes involved in neurotransmitter synthesis. Iron is involved in synthesis and packaging of neurotransmitters, their uptake and degradation into other iron-containing proteins may directly or indirectly alter brain function. (Iron exists in the blood mainly as haemoglobin in the erythrocytes and as transferrin in the plasma. It is transported as transferrin; stored as ferritin or haemosiderin and it is lost in sloughed cells and by bleeding. Fe is required for making haemoglobin and it is a pro-oxidant which is also needed by microorganisms for proliferation.Biologically important compounds of iron are haemoglobin, myoglobin, cytochromes, catalases and peroxidise. Deficiency disease or symptoms include anaemia, (hypochromic, microcytic). Fe deficiency has been reported to have a role in brain development and in the pathophysiology of restless legs. Also, Fe deficiency is associated with alterations in many metabolic processes that may impact brain functioning, among

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whom are neurotransmitter metabolism, protein synthesis and organogenesis. Sources include red meat, spleen, heart, liver, kidney, fish, egg yolk, nuts, legumes, molasses, iron cooking ware, dark green leafy vegetables.

Manganese (Mn) with an average value of 1.71milligrams per hundred grams and composite value of 1.56milligrams per hundred grams. Manganese was 0.23mg in ginger, 2.30mg in turmeric, 1.03mg in bitter leaves, 4.63mg in scent leaves, 0.20mg in guava, 3.57mg in pawpaw and absent in Moringa sample according to the result per hundred grams of sample. Manganese is involved in glycoprotein and proteoglycan synthesis and is a component of mitochondrial superoxide dismutase. Mn is a part of enzymes involved in urea formation, pyruvate metabolism and the galactotransferase of connective tissue biosynthesis. Mn activates several important enzyme systems and in this capacity it is required for the synthesis of acid mucopolysaccharides, such as chondroitin sulphate, to form the matrices of bones and egg shells. Consequently skeletal deformities and defects in shell quality occur when the manganese intake is inadequate. Mn overexposure reportedly may have an adverse effect on central nervous system (CNS) function and mood. Toxicity disease or symptoms by inhalation poisoning produces psychotic symptoms and Parkinsonism. Sources include whole grains, tea, legumes, nuts and seeds.

Zinc (Zn) has an average value of 10.32 milligrams per hundred grams and 12.94 milligrams per hundred grams of sample. Ginger from the result, has 0.36mg of zinc per hundred grams of sample while turmeric has 59.70mg, bitter leaves 2.07mg, scent leaves 6.86mg, and guava has 0.25mg of zinc, moringa 2.29mg, while pawpaw has 0.72mg per sample indicating that guava has the least amount of zinc content while turmeric has the highest from the result. Zinc is distributed widely in plant and animal tissues and occurs in all living cells. It functions as a cofactor (a substance (other than the substrate) whose presence is essential for the activity of an enzyme) and is a constituent of many. Zn dependent enzymes are involved in macronutrient metabolism and cell replication. The primary roles of zinc are mainly in cells replications and gene's expressions and in nucleic acid and amino acid metabolisms. Vitamins A and E metabolism and bioavailability are dependent on zinc status in the body. It is also required for normal testicular development and for functions of the taste buds. It is needed for tissue repair and wound healings.

Zinc plays a vital role in protein synthesis and digestion. It is also necessary for optimum insulin action as zinc is an integral constituent of insulin. Furthermore, zinc is an important constituent of plasma. Formation of zinc fingers in nuclear receptors for steroid-thyroid, calcitriol receptors, gene expression, essential in protein synthesis, involves in the storage and release of insulin, growth and repair of tissues, development of sex organs, needed in the enzymes required for the synthesis of DNA and RNA, mobilization of vitamin A from the liver and stabilization of cell membranes. It is present in meat and other protein foodstuffs, but intestinal absorption is affected by other dietary constituents. Absorbed zinc enters the liver where it is incorporated into zinc metalloenzymes and exported to peripheral tissue in plasma, bound to albumin.

Results of nutritional analysis of samples and flora composites and their discussions: Table 4 shows the result of nutrients analysis of the seven samples and their nutritional compositions. The average values as extracted from the table above are listed below: averaging from the seven plants, carbohydrate has 39.64%, crudes proteins 10.30%, ash content 7.33%, moisture content 13.21%, fat/oil 2.36%, vitamins 11.09% and fibre content 6.58%. Energy value Ginger has energy value of 80.07 (Kcal.), turmeric 333.41 Kcal. Bitter leaves 320.44 Kcal. Guava 68 Kcal. Scent leaves 390.50Kcal, moringa 205.01Kcal, and pawpaw 58.78 Kcal. By consuming food and turning it into usable energy, the human body carries out its main functions. Adenosine triphosphate (ATP) is the form immediate energy is supplied to the body. Since ATP is the primary source of energy for everybody function, other stored energy is used to replenish ATP. There are only small amounts of ATP in the body so it is necessary to have sufficient energy stores for backup. The amount of daily energy each body requires depends on an individual's daily energy consumption and metabolic energy requirements which can be estimated by body weight and activity level. The basic energy consumption of the human body is 4 kJ/kilogram of body weight and daily hour so to calculate an individual's basic energy consumption.

Table 4: Results of nutritional analysis of ginger, turmeric, bitter leaves, scent leaves, guajava, moringa leaves, pawpaw and their average values.

Nutritional composition primary metabolites	Ginger Rhizomes	Turmeric rhizomes	Bitter leaves (*Vernonia amygdalina*)	Guava (*Psidium-guajava*)	Scent leaves (*Psidiumgr-atissimum*)	Moringa oleifera	Pawpaw leaves	Average value	Flora Composite
Carbohydrate (%)	17.79	67.91	57.3	14.33	64.97	38.24	16.92	39.64	48.32
Energy value (Kcal.)	80.07	333.41	320.44	68	390.5	205.01	58.78	208.03	286.11
Crude proteins (%)	1.83	9.48	22.05	2.57	8.47	27.2	0.47	10.3	10.98

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Ash content (%)	0.89	9.67	9.23	5.75	13.6	9.79	2.41	10.33	7.64
Moisture content (%)	10.9	6.72	18.16	15.22	14.41	10.89	16.19	13.21	17.78
Fat (oil) content (%)	0.76	2.48	2.27	0.97	7.5	2.31	0.26	2.36	5.53
Vitamins content (%)	37	3.45	2.67	32.82	0.95	0.69	0.063	11.09	15.91
Fibre content (%)	7.01	4.23	8.86	5.4	9.5	9.2	1.87	6.58	7.27

Carbohydrate content from the table of results above shows that; carbohydrate has an average content value of 39.64 percent and composite value of 48.32 percent. Ginger has 17.79%, turmeric 67.91%, bitter leaves 57.30%, guava 14.33%, scent leaves64.97%, moringa 38.24%, pawpaw 16.92%. Carbohydrates are either complex sugar (starches) or simple sugars. The primary function of carbohydrate/sugar in the human body metabolism process is to provide energy to power the body for its activities. This is because they are the body's main source of fuel, needed for physical activity, brain function and operation of the organs. All the cells and tissues in the body need carbohydrates, and they are also important for intestinal health and waste elimination. Once in the body, carbohydrates are easily converted to fuel. The digestive system changes carbohydrates into glucose, also known as blood sugar. Part of the glucose is used for energy and the rest is stored in the liver and muscles for later use. Anytime the blood sugar rises, the pancreas pumps out more and more insulin, a hormone that tells cells to absorb glucose for energy supply or for storage. As cells absorb the glucose, blood sugar levels begin to fall, which signals the pancreas to start making glucagon, a hormone that tells the liver to release stored glucose.

Vitamins from the above results have an average value of 11.09 percent and a composite value of 15.91 percent. Vitamins amount to 37% in ginger, 3.45% in turmeric, 2.67% in bitter leaves, 32.82% in guava and 0.95% in scent leaves, 0.69% in moringa and 0.06% in pawpaw. Vitamins play very important Roles in human body as nutritional components of this multifunctional hybrid component. Vitamins are a group of substances that are needed for normal cell function, growth, and development. There are 13 essential vitamins. This means that these vitamins are required for the body to work properly. Vitamins are organic compounds needed in small quantities by living tissues to sustain life. We need to take vitamins from food because the human body either does not produce enough of them or none at all. Each organism has different vitamin requirements. These Vitamins are grouped into two categories such as: Fat-soluble vitamins which are stored in the body's fatty tissue. And the four fat-soluble vitamins are vitamins A, D, E, and K. These vitamins are absorbed more easily by the body in the presence of dietary fat.

There are nine water-soluble vitamins. The body must use water-soluble vitamins right away. Any leftover water-soluble vitamins leave the body through the urine. Vitamin B12 is the only water-soluble vitamin that can be stored in the liver for many years. Selenium is also part and parcel of the body defence system that is the blood and proteins formations it is said to be the major constituent of vitamin E (Selenium (Se) Selenium is a constituent of glutathione peroxidise and also a constituent element of the entire defence system that protects the living organisms from the harmful actions of free radicals. Proteins especially vitamin E which contains organic selenium is a very powerful anti-oxidant and very effective in the fight against cancer by eliminating the formation of oxidants or free radicals in the body. Vitamin B12, like the other B complex vitamins, is important for metabolism. It also helps form red blood cells and maintains the central nervous system. Vitamin C, also called ascorbic acid, is an antioxidant that promotes healthy teeth and gums. It helps the body absorb iron and maintain healthy tissue. It also promotes wound healing. Vitamin D is also known as the "sunshine vitamin," since it is made by the body after being in the sun. It is very hard to get enough vitamin D from food sources alone. Vitamin D helps the body absorb calcium. It helps the body form red blood cells and use vitamin K. Vitamin K is not listed among the essential vitamins, but without it blood would not stick together (coagulate).

Some studies suggest that it is important for bones' health. Biotin is essential for the metabolism of proteins and carbohydrates, and in the production of hormones and cholesterol. Niacin is a B vitamin that helps maintain healthy skin and nerves. It also has cholesterol-lowering effects at higher doses which is useful in the treatment and prevention of blood pressure and or diabetes. Folate works with vitamin B_{12} to help form red blood cells. It is needed for the production of deoxyribonucleic acid (DNA), which controls tissue's growth and cells growth (differentiation, multiplication and elongation) and functions. That is why pregnant women should be sure to get enough folate acid. Low levels of folate are linked to birth defects such as spina bifida (this is a birth defect where there is incomplete closing of the backbone and membranes around the spinal cord). Many foods are now fortified with folic acid.

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Riboflavin (vitamin B_2) works with the other B vitamins. It is important for body growth and the production of red blood cells. Thiamine (vitamin B_1) helps the body cells change carbohydrates into energy. Getting enough carbohydrates is very important during pregnancy and breastfeeding. It is also essential for hearts to function optimally and healthy nerve cells.

Crude Proteins from the result shown above, has an average value of 10.30 percent and composite value of 10.98 percent. Ginger has 1.83% proteins, turmeric 9.48%, bitter leaves 22.05%, guava 2.57%, scent leaves 8.47%, moringa 27.20% and pawpaw 0.47% of crude proteins. The content of proteins varies from plant to plants as shown in the table. Proteins are large, complex molecules that play many critical roles in the body. They do most of the work in cells and are required for the structure, function, and regulation of the body's tissues and organs. Proteins are made up of hundreds or thousands of smaller units called amino acids, which are attached to one another in long chains.

There are 20 different types of amino acids that can be combined to make a protein. Proteins can be described according to their large range of functions in the body. Proteins Functions as Antibody (Immunoglobulin (IG)): Antibodies bind to specific foreign particles, such as viruses and bacteria, to help protect the body from it. Secondly, if plays the roles of an Enzyme (Phenylalanine hydroxylase); Enzymes carry out almost all of the thousands of chemical reactions that take place in cells. They also assist with the formation of new molecules by reading the genetic information stored in DNA. Proteins also functions as Messengers (Growth hormone): Messenger proteins, such as some types of hormones, transmit signals to coordinate biological processes between different cells, tissues, and organs. Proteins also provide Structural component (Actin): These proteins provide structure and support for cells. On a larger scale, they also allow the body to move in addition to the above roles, proteins serves as media of Transport/storage (Ferritin): These proteins bind and carry atoms and small molecules within cells and throughout the body.

Water/moisture from the table above has an average content value of 13.21 percent and composite content value of 19.78 percent. Water is one of the very many vital needs of human beings. A healthy sedentary adult living in a temperate climate should drink at least 1.5 litres of water per day. This level of water intake balances water loss and helps keeping the body properly hydrated. The water you consume through food and drinks follows a very precise route to arrive in your cells, of which it is a vital constituent. Water plays also an essential function in helping the regulation of temperature. Secondly, it is important in Chemical and metabolic reactions in the body it does this by enabling hydrolysis reactions.

Water participates in the biochemical breakdown of what we eat (proteins, lipids and carbohydrates). It also serves as a medium for Transportation of nutrients and the removal of waste products from the body. Water as a main constituent of blood contributes to the transport of nutrients to the cells. In deed the nutrients are transported by the blood. Water, as a carrier, also helps removing waste products through urines. It also helps in the Body temperature regulation. Water enables the body to release heat when ambient temperature is higher than body temperature we begin to sweat, and the evaporation of water from the skin surface cools the body very efficiently. Water is the very central or heart of life

Oils or Lipids from the table of results above, has an average content value of 2.36 percent and composite content value of 15.72 percent. Ginger oil content was 0.76%, turmeric 2.48%, bitter leaves 2.27%, guava 0.97%, scent leaves 7.5%moringa 2.31%, pawpaw 0.26%. Lipids/oil also known as fats play many important roles in human body especially providing energy for hormones production. You would not be able to digest and absorb food properly without lipids. Of course, eating more fat than you need can lead to weight gain, but in proper amounts lipids are a healthy part of your diet. In the body they take the form of phospholipids, cholesterol and fatty acids. Although fats play a role in obesity and disease, your body needs a certain amount of fat to function optimally. Fat also known as essential body fat, Men need at least 3 percent body fat and women need at least 12 percent body fat to ensure normal functioning. You get cholesterol from your diet and your body also produces it naturally. The role that lipids play depends on the type of lipid.

As body fat, triglycerides play a role in energy storage. They also provide a layer of insulation under the skin and protective cushioning around the organs. Your body also uses triglycerides to make the myelin sheaths that surround nerve cells. Myelin sheaths act as insulation and help the nerve signal travel faster along the length of the nerve. When you have excess Low Density Lipoproteins in your bloodstream, cholesterol gets deposited in your arteries. Cholesterol build up can block arteries and cause heart attacks. High Density Lipoproteins transports excess cholesterol from your cells and tissues to your liver, which uses cholesterol to produce bile. According to the National Cholesterol Education Program, desirable cholesterol numbers for adults range from 200 milligrams per decilitre for total cholesterol, less than 100 milligrams per decilitre for LDL and greater than 40 milligrams per decilitre for High Density Lipoproteins. Because High Density Lipoproteins protects against heart disease, higher levels, such as 60 milligrams per decilitre, offer greater protection. Phospholipids are chains of fatty acids.

Fibre from the above table has an average content value of 2.36 percent and composite content value of 7.27 percent. Ginger was revealed to have fibre content of 11.01%, turmeric 4.23%, bitter leaves 8.86%, and guava 5.4%, scent leaves 5.9%, moringa 9.20%, pawpaw 1.86%. Fibre is made up of the indigestible parts or compounds of plants, which pass relatively unchanged through our stomach and intestines. The main role of fibre is to keep the digestive system healthy. Other terms for dietary fibre include 'bulk' and 'roughage', which can be misleading since

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some forms of fibre are water-soluble and aren't bulky or rough at all.

An inverse association has been found between fibre intake and heart attack, and research shows that those eating a high-fibre diet have a 40 percent lower risk of heart disease like Stroke. Children aged between four and eight should consume 18g of fibre each day. Girls aged 9 to 13, and 14 to 18 years, need 20g and 22g per day respectively. Boys aged 9 to 13, and 14 to 18 years, need 24g and 28g per day respectively according WHO 2014. The digestive system slows down with age, so a high-fibre diet becomes even more important. When blood cholesterol levels are high, fatty streaks and plaques are deposited along the walls of arteries. Fibrous foods are often bulky and, therefore, filling. Soluble fibre forms a gel that slows down the emptying of the stomach and the transit time of food through the digestive system. This helps to maintain lower blood sugar levels and prevent a rapid rise in blood sugar levels, which has been linked with obesity and an increased risk of diabetes. Fibre and diabetes .For people with diabetes, eating a diet high in fibre slows glucose absorption from the small intestine into the blood. This reduces the possibility of a surge of insulin, the hormone produced by the pancreas to stabilise blood glucose levels.

Ash from Table 4 shows that it has an average content value of 10.33 percent and composite content value of 7.64 percent. Ginger ash content was 0.89%, turmeric 9.67%, bitter leaves 9.23%, 5.75%, scent leaves 13.6%, moringa 9.79%, while pawpaw is 2.41%. The Ash is the inorganic residue remaining after the water and organic matter have been removed by heating in the presence of oxidizing agents, which provides a measure of the total amount of minerals within a food. Ash content is a measure of the total amount of minerals present within a food, whereas the mineral content is a measure of the amount of specific inorganic components present within a food, such as Ca, Na, K and Cl. High mineral contents are sometimes used to retard the growth of certain microorganisms. Some minerals are essential to a healthy diet (for example, calcium, phosphorous, potassium and sodium) whereas others can be toxic (for example, lead, mercury, cadmium and aluminium) Processing. It is often important to know the mineral content of foods during processing because this affects the physicochemical properties of foods.

Result of performance test on hybrid flora composite

Blood glucose level test on individual with diabetes Mellitus using ACCU-CHEK Aviva system using three individuals for 21 days taking 1000mg of sample daily (Table 5).

The result of the first person indicated by letter "A" in the above table has an initial blood glucose level of 129.17 milligrams per decilitres. After taking 1000mg of the supplement for seven days, a reduction to 106.43mg/dL was noted. After another seven days of taking the same quantity of supplement, the glucose level dropped to 101.52mg/dL and after another seven days it dropped further to 98.79mg/dL. The same quantity of supplement was given to the remaining three patients for the same number of times per day for the same 21 days and it showed that: "B" has initial blood glucose level of 126.45mg/dL after the seven days, it dropped to 112.51mg/Dl. After 14 days, it further dropped to 96.75mg/dL and finally after 21 days, it dropped to 87.19mg/dL. Patient "C" had initial blood glucose level of 105.24mg/dL after the seven days it dropped to100.87mg/dL. It further dropped to97.84mg/dL and after three weeks, it dropped to 95.42mg/dL. Patient "D" had initial glucose level of 114.23mg/dL it reduced to 106.53mg/dL after seven days. After another seven days, it further dropped to 98.96mg/dL and finally to 94.78mg/dL after the 21 days of taking the composite material 1000mg each day. The result above shows that the composite material is a good management agent for diabetes mellitus.

Table 5: Results of efficacy test on sample of blood glucose level.

Bloodglucose level mg/dL	A	B	C	D
Initial bloodglucose level mg/dL	129.17	126.45	105.24	114.23
Bloodglucose level after 7 days mg/dL	106.43	112.51	100.87	106.53
Bloodglucose level after 14 days mg/dL	101.52	96.75	97.84	98.96
Bloodglucose level after 21 days mg/dL	98.79	87.19	95.42	94.78

Blood pressure test between 7- 21 days of consuming 1000 milligrams of flora composite per day

First person "A" had initial blood pressure level of 160/90mmHg and after taking the 1000mg of composite material for seven, days the blood pressure reading showed a dropped in the systolic pressure but a constant in the diastolic pressure as shown here (140/90mmHg) after the next seven days, the systolic pressure further dropped to 120 and the diastolic pressure dropped to 80 that is, (120/80mmHg). While after the last seven days, the systolic pressure dropped to 110 the diastolic pressure remains constant. That 110/80mmHg). The second patient "B" shows slightly different trend. The initial blood pressure was 140/80 mmHg. But the systolic pressure levels dropped to 120 and continue like that till the end of the third week. While the diastolic pressure remains constant at 80 and only dropped to 70 at the end of the third week. 120/80mmHg and 120/70mmHg respectively. The third patient "C" had initial blood pressure level of 140/90mmHg, and a dropped to 120/90mmHg. The systolic blood pressure level remains contact at 120 while the diastolic pressure dropped to 80 finally at the end of 21 days, the systolic pressure dropped to 100 while diastolic pressure remains constant at 80. That is, 100/80 mmHg. The above result also indicate that the multifunctional supplement, has serious value in hypertensive management and prevention (Table 6).

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Table 6: Blood pressure level test on individuals with hypertension.

Blood Pressure Readings (mmHg)	A	B	C
Initial blood pressure measurement (mmHg)	160/90	140/80	140/90
Blood pressure measurement after 7 days (mmHg)	140/90	120/80	120/90
Blood pressure after 14 days (mmHg)	120/80	120/80	120/80
Blood pressure after 21 days (mmHg)	110/80	120/70	100/80

Conclusion

The research entitled "Development and Characterisation of a Multifunctional Hybrid Flora Composite for the Prevention and Management of Diabetes" was carried out with the sole objectives of formulating a multipurpose and wide spectrum supplement to play the roles of food and drug in human body because of the established pedigree of source plants. At the end of the research, the results as discussed in chapter four above revealed a hybrid flora composite of excellent characteristics in terms of phytochemicals (secondary metabolites), mineral elements and nutritional contents. The performance test on blood glucose level and high blood pressure level validate the multifunctional nature of the hybrid flora composite as both results show great positive effect on diabetic and hypertensive patients thereby presenting it to be an effective alternative medicine (food and drug supplement) for diabetes and high blood pressure prevention and management. Although, the hybrid flora composite from performance test result show that it is an effective supplement for diabetes prevention and management, maintaining quality life style modification of unhealthy ones, and healthier feeding habits, remains the best and most prevalent precursors for absolute freedom from diabetes, blood pressure and stroke and their associated complications. Hence, to avoid the occurrence and reoccurrence of these diseases, one needs to adjust his life style including feeding habits. This implies that; to have optimum result from taking this multifunctional flora composite just like any other green medicine or supplement, one need to combine it with life style modification or adjustment to suit good health conditions.

References

1. Paul SH, Usman AA, Adeniyi OD, Olutoye MA (2017) Production and Application of Moringa-Aluminates for Water Treatment as a Facile Biochemical Coagulant. Current Trends Biomedical Engineering & Biosciences.
2. Paul SH, Adeniyi OD, Olutoye MA (2017) Production and Characterization of Soymilk Using Locally Prepared Date Paste (Phoenix Dactylifera), White Sugar and Glycerol as Sweeteners. Current Trends in Biomedical Engineering & Biosciences 7(2).
3. Odey MO, Iwara IA, Udiba UU, Johnson JT, Inekwe, UV, et al. (2012) Preparation of Plant Extracts from Indigenous Medicinal Plants. International Journal of Science and Technology 1(2).
4. Philip K, Malek SN, Wirakarnain S, Sim KS, Kumar S, et al. (2009) Antimicrobial activity of Some Medicinal plants from Malaysia. American Journal of Applied Sciences 6(8): 1613-1617.
5. National Heart, Lung and Blood Institutes of Health (2013) Department of Health & Human Services, USA.
6. Heart Diseases and Stroke Prevention (2017) Know the Facts about Stroke, Centres for Disease Control and Prevention's Division for Heart Disease and Stroke Prevention.
7. James TA, Meakin R, Aminu MU, Nick F (2015) Current Prevalence Pattern of Hypertension in Nigeria: A Systematic Review. Journal of American Stroke Association.
8. Tahiya HA, Alabri AH, Salim AM, Amzad HA, Weli QA (2013) Comparative study of phytochemical screening, antioxidant and antimicrobial capacities of fresh and dry leaves crude plant extracts of *Datura metel L*. Journal of King Saud University Science 26(3):237-243.
9. Adesuyi AO, Elumm IK, Adaramola FB, Nwokocha AGM (2012) Nutritional and Phytochemical Screening of Garcinia kola. Advance Journal of Food Science and Technology, Maxwell Scientific Organization 4(1): 9-14.
10. Afolabi F, Afolabi OJ (2013) Phytochemical Constituents of Some Medicinal Plants in South West, Nigeria. Journal of Applied Chemistry 4(1): 76-78.
11. Akhila S, Vijayalakshmi NG (2015) Phytochemical Studies on Carica Papaya Leaf Juice. International Journal of Pharmaceutical Sciences and Research 6(2).
12. American Heart Association AHA (2010) Blood pressure and how to manage it. American Society of Hypertension Institute.
13. American Society of Hypertension ASH (2010) Blood Pressure and Your Health your guide to: Blood pressure basics, the danger of high blood pressure and Steps to avoid or lower high blood.
14. Aravind G, Debjit B, Duraivel S, Harish G (2013) Traditional and Medicinal Uses of Carica papaya. Journal of Medicinal Plants Studies 1(1): 7-15.
15. Asish B, Swapna M, Sucharitha M, Devika K, Ashwini (2015) The Bioactive Compounds Obtained from the Papaya (Carica Papaya) Act as Potential Anticancer Agents against the Human Prostate Cancer Cell Line Du-145. International Journal of Pharmacy & Bio-Sciences.
16. Blood pressure association (2008) what is normal blood pressure? Blood Pressure UK is an operating name of the Blood Pressure Association Registered as a Charity in England and Wales.
17. Edak A, Uyoh, Peter NC, Imabasi AD, Anna CB (2013) Evaluation of Antioxidant Capacity of Two Ocimum Species Consumed Locally as Spices in Nigeria as a Justification for Increased Domestication. American Journal of Plant Sciences 4: 221-229.
18. Egbon EE, Olayioye EY, Olayioye SA, Adesuyi AT, Owolabi T (2017) Phytochemical screening and proximate composition of Phyllanthus amarus, International Research Journal of Plant Science 8(1): 9-12.
19. Ekhaise FO, Soroh AE, Falodun A (2010) Antibacterial Properties and Preliminary Phytochemical Analysis of Methanolic Extract of Ocimum Gratissimum (Scent Leaves). Bayero Journal of Pure and Applied Sciences 3(2): 81-83.
20. Eyong U, Eyong MA, Agiang IJ, Atangwho IA, Iwara MO, et al. (2011) Phytochemicals and micronutrients composition of root and stem bark extracts of *Vernonia amygdalina* Del. Journal of Medicine and Medical Science 2(6): 900-903.
21. Heart Disease and Stroke Statistics (2013) Know the Facts about N Stroke Update. National Centre for Chronic Disease Prevention and Health Promotion Division for Heart Disease and Stroke Prevention.

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DOI: 10.19080/ETOAJ.2018.01.555553

22. Louay L (2014) Medicinal and pharmacological properties of Turmeric (*Curcuma longa*): A review. International Journal of Pharmaceutical Biomedical Science 5(1):17-23.

23. Louis H, Miller MF, Good GM (1999) Definition, Diagnosis and Classification of Diabetes Mellitus and its Complications, Report of a WHO Consultation, Part 1: Diagnosis and Classification of Diabetes Mellitus.

24. National Heart Lung and Blood (2010) Your Guide to Lowering Blood Pressure interactive (301): 592-8573.

25. National Institute for Communicable Diseases (2016) Typhoid: NICD recommendations for diagnosis, management and public health response. The National Institute for Communicable Diseases (NICD) a division of the National Health Laboratory Service (NHLS) 2:1-15.

26. National Institute of Neurological Disorders and Stroke (2017) Know the facts about Stroke. National Institutes of Diabetes, Digestive and Kidney Disease (2015) Department of Health and Human Services National Institutes of Health NIH USA.

27. Nosheen A, Ihsan-ul H, Bushra M (2015) Phytochemical analysis and comprehensive evaluation of antimicrobial and antioxidant properties of 61 medicinal plant species, Arabian Journal of Chemistry.

28. Nwachukwu CU, Umeh, CN, Okere S, Nwoko MC, Kalu IG, et al. (2010) Identification and Traditional Uses Of Some Common Medicinal Plants In Ezinihitte Mbaise L.G.A., Of Imo State, Nigeria.

29. Nwankwo CS, Ebenezer IA, Ikpeama AI, Asuzu FO (2014) The nutritional and anti – nutritional values of two culinary herbs-uziza leaf (Piper guineense) and scent leaf (*Ocimum gratissium*) popularly used in Nigeria. International Journal of Scientific & Engineering Research 5(12).

30. Offor CE (2015) Phytochemical and Proximate Analyses of Psidium Guajava Leaves, Journal of Research in Pharmaceutical Science 2(6): 5-7.

31. Oseni K, Babatunde O, Olumide SF, Olusoji AA (2016) Nutraceutical and Antioxidant Properties of the Seeds, Leaves and Fruits of Carica papaya: Potential Relevance to Humans Diet, the Food Industry and the Pharmaceutical Industry-A Review. Turkish Journal of Agriculture-Food Science and Technology 4(12): 1039-1052.

32. Sobhy El AS, Gamal MH, Sameh EM, Mohamed HA, Rashad RA (2015) Biochemical and functional properties of Moringa oleifera leaves and their potential as a functional food. Global Advanced Research Journal of Agricultural Science 4(4):188-199.

33. Udochukwu U, Omele FI, Uloma IS, Osewe FD (2015) Phytochemical Analysis of *Vernonia Amygdalina* and *Ocimum Gratissimum* Extracts and their Antibacterial Activity on Some Drug Resistant Bacteria. American Journal of Research Communication 3(5): 225.

34. American Stroke Association (2017) What is stroke, American Stroke Association.

35. American Heart Association (AHA) (2017) Together to end stroke.

DOI: 10.19080/ETOAJ.2018.01.555553

How to cite this article: Paul SH, Jacob SO, Usman AA, Auta M, Olutoye MA. Development and Characterisation of a Multifunctional Hybrid Nano-Flora Composite for the Prevention and Management of Cancer, Diabetes, Blood Pressure and Stroke. Eng Technol Open Acc. 2017; 1(1): 555553. DOI: 10.19080/ETOAJ.2018.01.555553