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Formulation of a Multifunctional Flora Composite for the Prevention and Management of Cancer, Diabetes, Blood Pressure and Stroke

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Abstract

A research entitled "formulation of a multifunctional flora composite and the roles of life style in the prevention and management of Cancer, Diabetes, Blood Pressure and Stroke" was carried out using the leaves, fruits, rhizomes and other parts of five medicinal plants namely: Garcinia cola, Vernonia amygdalina, Ocimum gratissimum, Psidium guajava and moringa oleifera. The research was aimed at developing a multifunctional composite, a bio-activator or a supplement from the above listed plants with its natural content and form unaltered to double as a food and a drug at the same time by performing bioactive functions, playing nutritional roles and balancing the human body chemistry through its nutritional and medicinal applications with a minimum or no alteration to its natural bioactive forms or nutritional contents. At the end of the research, it was revealed that most of the necessary and important bioactive compounds responsible for the prevention, treatment and or management of Cancer, Diabetes, blood pressure and stroke were present in optimum concentrations. These Bioactive compounds or secondary metabolites as determined, responsible for those roles as listed above, base on average are: Alkaloids (1.17mg/100g), saponins (3.39mg/100g), Tannins (3.98mg/100g), phenols (1.58mg/100g), anthocyanin (0.11mg/100g) anthraquinone (2.07mg/100g), Steroids (0.88mg/100g), glycosides (1.43mg/100g), flavonoids (4.73mg/100g), carotenoids (0.31mg/100g), Terpenoids (1.43mg/100g), oxalate (0.96mg/100g) and phylates (2.33mg/100g). These compounds were all present in both the preliminary screening and the quantitative analysis respectively. The primary metabolites or Nutritional compositions like energy value (273.41Kcal.), moisture content (13.14%), carbohydrate (43.88%), proteins, (12.23%) (total fibre (8.49%), oil (2.43%), vitamins (13.03%) and ash content(7.24%), were determined in addition to the mineral elements such as: calcium (104.56mg/100g), potassium (318.25mg/100g), magnesium (93.06mg/100g), phosphorus (52.03mg/100g), iron (15.76mg/100g), zinc (4.99mg/100g), manganese (1.54mg/100g) sodium (27.31mg/100g), nickel (2.31mg/100g) and copper (1.68mg/100g). Based on the data obtained from this research, the composite material developed from these six medicinal plants has the capacity to prevent, treat and manage cancer, diabetes, blood pressure and stroke. In addition to the primary and secondary metabolites in the composite, life style modification to favor the effective survivals of the man irrespective of age and gender.

Keywords: Plants; Human health; Life style; Phytochemicals, Metabolites; Nutrition; Cancer; Blood pressure; Diabetes; Stroke

Introduction

Industrialization, modernization, and technological advancement have led to modifications in the lifestyle of the world's populace, giving rise to increase in the indices of several diseases, including chronic degenerative diseases such as insulin resistance diabetes mellitus, blood pressure, Cancer, malaria fever, typhoid fever, kidney diseases, metabolic syndrome and other related cardiovascular diseases which overall effects are capable of reducing the quality of life, increasing the costs of life, hospitalizations or medications and frustrating living [1]. Many studies have shown that green plants and their extracts, either isolated or crudes, are very helpful in the prevention, management or treatment of such diseases as listed above and many more not mention depending on the phytochemical composition of the source plants, methods and time of extraction, solvents used and components of interest and their functions [2]. The bioactive compounds extracted from the source plants in this case, bitter cola, scent leaves, ginger, moringa oleifera, Psidium guajava and bitter leaves [1]. The above mentioned plants contain very important, effective and excellent primary and secondary metabolites that are beneficial to human and plant growth and health [3]. These bioactive compounds are effective and responsible for: heaptoprotection (Heaptoprotection also called antihepatotoxicity is the ability of a substance to prevent damage to the liver and This damage is known as hepatotoxicity), antioxidant, anti-inflammatory, antispasmodic, anti-cancer, antimicrobial, anti-hyperglycaemic, analgesic, endothelial progenitor cells, anti-stomach-aches and anti-diarrhea functions in each or most of them and form the constituents and composition of the scholarly developed multifunctional hybrid flora composite newly developed which

can be used for the prevention treatment, and management of Cancer, Diabetes, blood pressure and stroke (Paul SH et al. 2017).

The word Cancer is a broad term referring to a class of diseases characterized by abnormal cells growths that invades healthy cells in the body. Breast cancer for instance, starts in the cells of the breast as a group of cancer cells that can then invade surrounding tissues or spread (metastasize) to other areas of the body just like prostate cancer starts at the abdominal region of the body and later metastasize to other parts of the body [4]. What Causes Cancer to Develop is the abnormality in cell development in the body: Cancer begins in the cells which are the basic building blocks that make up tissue. Tissues are found in the breast, prostate and other parts of the body. Sometimes, the process of cell growth goes wrong and new cells form when the body doesn't need them and old or damaged cells do not die as they should [5]. When this occurs, a buildup of cells often forms a mass of tissue called a lump, growth, or tumour [6]. Breast cancer for instance, occurs when malignant tumours develop in the breast just like prostrates cancer occurs around the abdominal region of the human body by the formation of malignant growth [6]. These cells can spread by breaking away from the original tumour and entering blood vessels or lymph vessels, which branch or spread into tissues throughout the body. When cancer cells travel to other parts of the body and begin damaging other tissues and organs, the process is called metastasis. Cancer as an abnormal health condition remains one of the leading causes of morbidity and mortality in the entire universe. Cancer is the second leading cause of death amongst the non-communicable diseases after cardiovascular disease being the first [7]. Chemotherapy is routinely used for cancer treatment. Since cancer cells lose many of the regulatory functions present in normal cells, they continue to divide when normal cells do not [7]. This feature makes cancer cells susceptible to chemotherapeutic drugs. Approximately five decades of systemic drug discovery and development have resulted in the establishment of a large collection of useful chemotherapeutic agents. However, chemotherapeutic treatments are not devoid of their own intrinsic problems [8]. Various kinds of toxicities may occur as a result of chemotherapeutic treatments. For example, 5-fluorouracil, a common chemotherapeutic agent, is known to cause myelotoxicity, cardiotoxicity and has even been shown to act as a vasospastic agent in rare but documented cases. Another widely used chemo drug, doxorubicin causes cardiac toxicity, renal toxicity, and myelotoxicity. Similarly, bleomycin a well known chemotherapeutic agent is known for its pulmonary toxicity [6]. In addition, bleomycin shows cutaneous toxicity [9]. Cyclophosphamide, a drug to treat many malignant conditions, has been shown to have bladder toxicity in the form of hemorrhagic cystitis, immunosuppression, alopecia and at high doses cardiotoxicity The toxicity of chemotherapeutic drugs sometimes creates a significant problem in the treatment of cancer using allopathy or established medicine. Various therapies have been propounded for the treatment of cancer, many of which use plant-derived products [7]. There are four classes of plant-derived anticancer agents in the market today, the vinca alkaloids (vinblastine, vincristine and vindesine), the epipodophyllotoxins (etoposide and teniposide), the taxanes (paclitaxel and docetaxel) and the camptothecin derivatives (camptotecin and irinotecan) [9]. Plants still have enormous potential to provide newer drugs and as such are a reservoir of natural chemicals that may provide chemo protective potential against cancer. Recently, Taneja and Qazi have suggested a number of compounds from medicinal plants with potential anti-cancer activities [7]. Cancer has the following as its major risks factors: Growing older, intake of Tobacco, Sunlight, exposure to Ionizing radiation, ingestion and exposure to Certain chemicals and other substances, Some viruses and bacteria, Certain hormones, Family history of cancer, Alcohol and Poor diet, lack of physical activity, or being overweight. Most cancers start or enhance by the prevailing influences of these factors [8].

Diabetes is defined as an abnormal health condition that is caused by impaired insulin and Leptin sensitivity [10]. In simple terms, diabetes is an abnormality that means having excess glucose or sugar in the blood [11]. Even though your blood actually needs some amount of glucose for energy supply to keep you strong, too much of it could be disastrous to your health [12]. Glucose comes from the food human ingest into their body, from the liver and also from our muscles. The blood then carries the same glucose into all parts (cells) of the body. Insulin is a chemical or hormone secreted or produced by the pancreas into the blood which controls the rate at which glucose gets into the body cells. If the system does not have enough insulin required for controlling this processes, or if the available insulin does not work optimally as expected, then the glucose will not get into the body cells [13]. Instead, it will remain in the blood cells rather accumulating. Eventually, it will becomes high and at this stage it is said "you have high blood sugar" or diabetes [14]. Leptin or satiety hormone is a hormone produced in a person's fat cells. Amongst its primary roles is to regulate the individual's appetites and body weight [15]. It is this hormone if it is functioning optimally, that tells your brain when to eat, how much to eat, and when to stop eating, which is why it's called the "satiety hormone." It also tells your brain what to do with the available energy in your body [10]. The primary role of insulin is not to lower your blood sugar, but to store the extra energy (glycogen, a starch) for present and future consumption if need be. Its ability to lower your blood sugar is merely a "side effect" of this energy storage process. Diabetes is basically of three types: type 1 Diabetes, type 2 Diabetes and Gestational diabetes [12]. Type 1 diabetes is insulin dependent diabetes and very common among juveniles even thought adults who have their insulin producing cells destroyed by their immune system, are like to suffer type 1 diabetes and those who had it as kids who are now adults. It can be said to be one of the most dangerous form of diabetes because of its incurability. In any case be it adult or infant; to survive type 1 diabetes, one needs to be taking

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insulin in the best possible way [16]. Type 2 diabetes, is the most common form of diabetes and is common amongst middle aged and old people even though, infants and adult could also be affected [17]. It is also called non-insulin dependent diabetes. Insulin resistance is usually the starting point of type 2 diabetes. This happens whenever fat, muscles and lever cells fails to use insulin to carry glucose into the body's cells as source of energy supply [11]. Gestational diabetes is common among pregnant women especially at the late stage of their pregnancy [12]. This is caused by shortage of insulin, or by pregnancy hormone [13]. This disappears shortly after the baby is delivered and the child is likely to become diabetes later in his or her life time A.H.A. 2017). The best way to manage your health and avoid the devastating effects of diabetes is to control your blood glucose level, blood pressure, cholesterol level and avoid smoking or anything that resembles it [16].

Hypertension (HTN) is a medical term for high blood pressure [15]. The condition is dangerous because it makes the heart work too hard and contributes to hardening of arteries (atherosclerosis), apart from increasing the risk of heart disease and stroke. Hypertension can also lead to other conditions to include but not limited to: congestive heart failure, kidney disease, and blindness [16]. Conventional antihypertensive drugs are usually associated with many side effects. About 75 to 80% of the world population use herbal medicines, mainly in developing countries, for primary health care because of their better acceptability with human body and lesser side effects [17]. Hypertension (HTN) or high blood pressure (HBP) is a chronic medical condition in which the BP in the arteries is elevated (ACS 2010). It is classified as either primary (essential) or secondary. About 90 to 95% of cases are termed primary HTN, which refers to high BP for which no medical cause can be found. The remaining 5 to 10% of cases, called secondary HTN, are caused by other conditions that affect the kidneys, arteries, heart, or endocrine system (B.P.A., 2008). Persistent HTN is one of the risk factors for strokes, heart attacks, heart failure, and arterial aneurysm, and a leading cause of chronic kidney failure [N.H.L.B.I., 2010]. Moderate elevation of arterial BP leads to shortened life expectancy. Both dietary and lifestyle changes as well as medicines can improve BP control and decrease the risk of associated health complications. Hypertension is usually classified based on the systolic and diastolic Blood Pressures [15]. While Systolic Blood Pressure is the one in vessels during a heartbeat, Diastolic blood pressure is the pressure between heartbeats [16]. If the systolic or diastolic blood pressure measurement is higher than the accepted normal values for the age of the individual, it is classified as pre-hypertension or hypertension [17]. Although research has not given any direct cause or causes, however there are many risk factors such as sedentary lifestyle, stress, visceral obesity, potassium deficiency (ACS, 2010). Obesity, more than 85 % of cases occur in those with a body mass index greater than 25, salt (sodium) sensitivity, alcohol intake, and vitamin D deficiency. Risk also increases with aging, some inherited genetic mutations, and having a family history of hypertension. An elevation of rennin, an enzyme secreted by the kidney, is another risk factor, as is sympathetic nervous system over activity (HPSP, 2017). Insulin resistance, which is a component of syndrome X, or the metabolic syndrome, is also thought to contribute to hypertension. Consuming foods that contain high fructose corn syrup may increase one's risk of developing hypertension. The second types of high blood pressure, is called: Secondary hypertension is said to results from an identifiable cause base on definition (A.S.H., 2010). This type is important and easy to recognize and treated by dealing with the root cause or causes (B.P.A., 2008). Most of the mechanisms associated with secondary hypertension are generally fully understood. However, those associated with primary (essential) hypertension are far less understood. The increase in blood volume leads to hypertension (NHLBI, 2010). An overactive sympathetic nervous system, leading to increased stress responses. It is also known that hypertension is highly heritable and polygenic (caused by more than one gene) and a few candidate genes have been postulated in the etiology of this condition [13]. Recently, work related to the association between primary hypertension and sustained endothelial damage has gained popularity among hypertension scientists (WHO, 2017). It remains unclear however whether endothelial changes precede the development of hypertension or whether such changes are mainly due to long-standing elevated blood pressures (HPSP, 2017). Hypertension is a major independent risk factor for coronary artery disease, stroke, and kidney failure.

The term stroke is used to describe an abnormal health condition that occurs when the flow of blood to an area of the brain is cut off due to interference or leakages in the channels responsible for the flow of the blood into the brain [16]. Sometimes, stroke is refers to as a brain attack. Stroke occurs when a blood vessel that supply blood to the brain leaks or is blocked by a clot. Then part of the brain does not get enough oxygen this is because, when brain cells are starved of oxygen, they die [18]. This type of health condition called Stroke is a medical emergency and must be treated as such. It's important to get treatment as soon as possible otherwise; it may become very disastrous (BPA, 2008). This is because; a delay in treatment increases the risk of permanent brain damage and consequently death. Research has shown that in men, Stroke is the fifth leading cause of death (ASH, 2010). Killing almost the same number of men each year as prostate cancer and Alzheimer's disease all combined together. Stroke is also the leading cause of long-term disability and deformation among people. This condition can cause brain damage, which may be permanent and life threatening as well (A.C.S., 2010). Many effects from a stroke can be successfully treated (AHA). One of the ways to treat stroke, is by physiotherapy (subject the victims to exercising machine that shake off (melting) some of the buildup blood clots. Lowering blood pressure is one of the sure ways that can help prevent strokes [11]. This means it is important to know your risk of

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having a stroke and taking action to reduce that risk as soon as you find out. Taking the appropriate decision and at the right time, is very important. There are basically three types of stroke: Ischemic stroke Ischemic stroke is the most common form of stroke, accounting for around 85% of strokes. This type of stroke is caused by blockages or narrowing of the arteries that provide blood to the brain, resulting in ischemia - severely reduced blood flow [15]. Hemorrhagic stroke: this is caused by arteries in the brain either leaking blood or bursting open. The leaked blood puts pressure on brain cells and damages them [16].The ruptures can be caused by conditions such as hypertension, trauma, blood-thinning medications and aneurysms that are weaknesses in blood vessel walls. Intracerebral hemorrhage is the most common type of hemorrhagic stroke and occurs when brain tissue is flooded with blood after an artery in the brain bursts (WHO, 2012). Subarachnoid hemorrhage is the second type of hemorrhagic stroke which is the type of stroke that bleeding occurs in the subarachnoid space - the area between the brain and the thin tissues that cover it [18]. Transient ischemic attack (TIA) (mini stroke) TIAs is different from the aforementioned kinds of stroke because the flow of blood to the brain is only briefly interrupted [10]. TIAs are similar to ischemic strokes in that they are often caused by blood clots or other debris. TIAs should be regarded as medical emergencies just like the other kinds of stroke, even if the blockage of the artery is temporary. There are a number of factors that causes or at least lead to stroke and they include: High blood pressure, Smoking, Obesity or overweight, Diabetes, Alcohol and Lack of exercise [14].

Materials and Methods

Materials

The equipments used for this research were obtained from and used in federal cereal research centre Bidda and department of Chemical Engineering, federal university of technology minna. The materials used for this research, includes moringa oleifera leaves, scent leaves (*Ocimum gratissimum*), bitter cola (*Garcinia cola*), guava leaves (*Psidium guajava leaves*) and bitter leaves (*Vernononia amygdalina leaves*).

Preparation of samples and pre-treatment

Pre-treatment and processing of *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 168 hrs (seven days) after which, they were crushed into smaller sizes and grinded to obtained finely divided particles called Vernonia powder.

Pre-treatment and processing of bitter cola (*Garcinia cola*): The fresh bitter cola were collected and washed thoroughly with distilled water to remove impurities. The washed flesh bitter cola was then sliced and dried under ambient temperature for 240hrs (ten days). The dried sliced bitter cola was then crushed and grinded into a very finely divided powdered.

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.

Pre-Treatment and Processing of Guava: 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.

Pre-treatment and processing of *Moringa olfeira:* 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 scent leaves: 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.

Samples preparation and development of multi-functional flora composite

Preparation of samples: The grinded powder of Chanca piedra obtained from pre-treatment and processing of raw materials was sieved using a very fine mesh size of micro-millimeters to obtain a finely divided granulated powder. The powder was then divided into different portions 1.0kg each. The same procedures were followed for the remaining eight plants were processed and grinded into powders. One each of the different plants sample materials that that were divided into 1.0kg, were pick to form samples as shown below

1. Zingiber officinale powder: sample "A"
2. Garcinia cola powder sample "B"
3. Vernonia amygdalina powder: sample "C"

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4. Scent leaves power sample "D"
5. Moringa oleifera powder: sample "E"
6. Guajava powder: sample "F"

Formulation of a multi-functional flora composite

The five samples of plants' powders were blended together after weighing 1.0kg of each of each. The resultant composite material was then hydrolyzed with distilled water and stirred for 48hrs using an improvised stirrer in the tank to maintain constant agitation and also aid speedy extraction of both the soluble and extractable components in the composite material. The composite material was then filtered and the filtrate evaporated under 40.2 ^{0}C. The solid extract was further dried, and crushed into a fine powder and packaged which can be taken as tea using honey as a sweetener and a preservative.

Phytochemical analysis

Phytochemical analyses: The Phytochemical analyses for the above listed constituents were carried out based of the methods spelt out by Association of Analytical chemists (AOAC, 2012).

Results and Discussion

Discussion of results

The results as presented above shows that both individual plants and their composite material have multi-dimensional compositions. The present of essential secondary metabolites like: alkaloids, Terpenoids, phenols, saponins, tannins, and flavonoids from diverse plant's origins with enormous individual's multi functional properties, which include but not limited to; anti-cancer, anti-diabetic, anti-hypertensive, anti-inflammatory, anti-oxidant, anti-virus and anti-fungi , is worthy of note. The present of primary metabolites such as: minerals elements; calcium (Ca) magnesium (Mg) potassium (K), sodium (Na), iron (Fe) and zinc (Zn) and carbohydrate, proteins, fibre, vitamins, essential oils and huge energy values of which, each plays very crucial roles in the day today functioning and survivals of not only man as animal, but also plants themselves from which they are extracted, have demonstrated the diverse applications of these green medicines to human nutritional and overall health especially in the prevention and management of the above diseases. Phytochemicals or secondary metabolites as they are popularly called; are defined as biologically active compounds found in many green plants in small quantities that do not have established nutrient functions neither in plants nor animals but make effective and significant contributions to protecting their body against degenerative diseases Affor C.E., 2015). Ginger for example, is made up of over 400 different compounds [19] but the major ones as indicated by this result, include: flavonoids (2.54mg/100g) on the average, phenols (2.23mg/100g), Terpenoids/terpene (1.10mg/100g), carbohydrate (28.20mg/100g), amino acids, raw fibre (2.04 %), ash (4.04 %), protein (3.32 %), phytosterols, vitamins, and minerals elements. Terpene components of ginger include zingiberene, β-bisabolene, α-farnesene, β-sesquiphellandrene, and α-curcumene, while phenolic compounds include Gingerol (6-gingerol, 8-gingerol and 10-gingerol), paradols, and shogaol (Table 1).

Table 1: shows the result of analysis for the quantitative phytochemical constituents of Ginger, biter cola, bitter leaves, scents leaves and guajava leaves and fruits and composite

Bioactive Components/ Phytochemicals Or Plants' Secondary Metabolites	Ginger	Bitter Cola	Bitter Leaves	Scent Leaves	Moringa Oleifera	Guava Leaves	Flora Composite Material
Alkaloids (mg/100g)	0.97	0.95	1.26	2.29	3.47	0.38	1.17
Phenols (mg/100g)	3.67	0.73	0.77	3.84	-	0.46	1.58
Steroids (mg/100g)	-	0.1	0.32	0.48	3.41	0.41	0.88
Anthocyanin (mg/100g)	0.4	0.02	0.07	0.1	0.09	-	0.11
Flavonoids (mg/100g)	3.98	12.31	1.78	5.37	4.38	0.59	4.73
Oxalates (mg/100g)	0.45	0.95	0.79	3.58	-	-	0.96
Saponins (mg/100g)	3.54	2.67	3.51	5.57	1.56	3.46	3.39
Tannins (mg/100g)	-	0.74	2.78	10.43	9.26	0.65	3.98
phylates (mg/100g)	-	2.42	5.56	3.92	0.56	0.94	2.23
Anthraquinone (mg/100g)	-	-	0.31	0.41	11.72	-	2.07
Carotenoids (mg/100g)	-	-	-	0.62	1.26	-	0.31
Glycosides (mg/100g)	0.76	-	2.37	1.21	0.46	3.76	1.43
Terpenoids (mg/100g)	3.82	-	0.05	1.24	4.96	2.07	2.02

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The word Cancer is a broad term referring to a class of diseases characterized by abnormal cells growths that invade healthy cells in the body [10]. Flavonoids (4.73mg/100g), is composite material with great potent, efficient and effective water-soluble super antioxidants and free radical scavengers that prevent oxidative cell damage in the body. Flavonoids have strong anti-cancer activity when in contact with the human cells and protect the body against all stages of carcinogenesis or cancer cells growth. According to [20] flavonoids in this case with average value of 4.73mg/100g have protective effects including anti-inflammatory, antioxidant, antiviral and anti-carcinogenic. Hence, it is these secondary metabolites that actively help in protecting the body from viral infections and cancer cells formations and consequence growth. Phenols with average value of 3.67mg/100g are also very special secondary metabolites used as antiseptic drugs for the treatment of bacterial infections and fungi inversions. Hence, this composite material can be used for the prevention of typhoid and malaria fever also. Experimental studies also showed that ginger and its bioactive components including 6-gingerol and 6-shogaol which are micro-components of flavonoids; exert anticancer activities against cancer cells especially gastrointestinal cancers [21] (Table 2). The anticancer activity of ginger phytochemical components; flavonoids, Terpenoids and phenols are attributed to their ability to modulate several signaling molecules like cell growth regulatory proteins and caspaces [22]. Caspaces are a family of protease enzymes playing essential roles in programmed cell death (including apoptosis, pyroptosis and necroptosis) and inflammation). Gastrointestinal (GI) cancer for example is a cancer of different organs of the digestive and respiratory system [18]. GI cancer is defined as the cancer of organs of the digestive system including the esophagus, gallbladder, liver, pancreas, stomach, small intestine, large intestine, rectum, and anus [23]. The risk factors commonly associated with gastrointestinal cancer include: infection, smoking, drinking alcohol, high fat diet, age, race, gender, family history, and geographical location [20]. The occurrence of gastrointestinal cancer is very high in developed countries because of industrialization and feeding habits. It is one of the most common cancers around the world. Even though a variety of chemotherapeutic drugs have been introduced many decades ago to fight gastrointestinal cancer, most of them are either too expensive and or have higher side effects or a combination of both. Ginger (*Zingiber officinale*) extracted flavonoids (3.98mg/100g), is a natural agent and with no sight effects hence, considered save for consumption and cost effective. Terpenoid/Terpene (3.82mg/100g) components of ginger include zingiberene, β-bisabolene, α-farnesene, β-sesquiphellandrene, and α-curcumene, while phenolic compounds include gingerol, paradols, and shogaol. 6-gingerol and 6-shogaol components of the phenols (3.67mg/100g) in ginger and others in the composite material, reduced the viability of gastrointestinal cancer cells by damaging microtubules these active ingredients in the composite material, targets several cellular molecules that contribute to tumour-genesis, cell survival, cell proliferation, invasion, and angiogenesis.

Table 2: shows the result of quantitative analysis for nutritional composition of Ginger, biter cola bitter leaves scents leaves and guajava leaves and fruits.

Nutritional Composition Or Primary Metabolites	Ginger Rhizomes	Bitter Cola	Bitter Leaves	Psidium Guajava	Scent Leaves	Moringa Oleifera	Composite
Carbohydrate (%)	17.79	70.32	57.3	14.33	64.97	38.24	43.83
Energy value (Kcal.)	80.07	570.43	320.4	68	390.5	205	272.4
Crude proteins (%)	1.83	11.28	22.05	2.57	8.47	27.2	12.23
Ash content (%)	0.89	4.18	9.23	5.75	13.6	9.79	7.24
Moisture content (%)	10.9	9.28	18.16	15.22	14.4	10.89	13.14
Fat (oil) content (%)	0.76	1.03	2.27	0.97	7.5	2.31	2.43
Vitamins content (%)	37	4.02	2.67	32.82	0.95	0.69	13.03
Fibre content (g)	2.01	3.93	10.86	5.4	9.5	19.2	8.49

Phytochemicals and diabetes prevention: Diabetes mellitus is the most common endocrine disorder, which results to too many other complications such as micro- and macro-cardiovascular diseases [19]. Preventing diabetes will mean preventing those other cardiovascular complications and diseases. Ginger, bitter leaves scent leaves and guava leaves have great Anti-diabetic, hypolipidemic and anti-oxidative properties. These properties, has been attributed to the presence of different minor biochemical components in their phenols like Gingerol and shogaol, a components of phenols in Ginger (Table 3). Ginger flavonoids, terpene and its polyphenols have been shown to target multiple signaling molecules that provide a basis for its use against multifactorial human diseases like cancer, diabetes, blood pressure and stroke. According to the research carried out by, People with type 2 diabetic were giving Ginger supplementation especially the tea, to examine blood sugar fasting level in their blood after been given a 2g/day of ginger supplements for 12 days [21]. At the end of the exercise, they were examined and noticed significant reduction in the levels of fasting blood sugar hemoglobin A1c, apolipoprotein B, apolipoprotein B/apolipoprotein A-I and malondialdehyde in ginger group when compared to baseline, as well as control group, while it increased the level of apolipoprotein A-I. Hence, oral administration of ginger powder supplement improves fasting

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blood sugar, hemoglobin A1c, apolipoprotein B, apolipoprotein A-I, apolipoprotein B/apolipoprotein A-I and malondialdehyde in type 2 diabetic patients [21]. Diabetes mellitus is a complex metabolic disorder resulting from either insulin Insufficiency or insulin dysfunction [15]. The treatment of diabetes with synthetic drugs is costly and chances of side effects are high. Phytomedicine or green medicines have been used since ancient time in many parts of the world where access to modern medicine is limited. Using a well characterized natural product with known positive effects on the body system is not just a welcome development, but a course that must be encourage by all. Low-fat vegan diet has improved glycemic control in type II diabetic patients (Paul SH et al. 2017). Phytochemicals identified from medicinal plants such as phenols, Terpenoids, flavonoids and tannins, as it is in the case of this very one, presents an exciting opportunity for the development of new types of natural treatments for diabetes mellitus and its accompanied complications like blood pressure and stroke. Most prevalent of phytochemical groups are the alkaloids, terpene/terpenoids, and phenols. Several formulations like herbal teas, extracts, decoctions, infusions and tinctures are prepared from individual medicinal plants or their combinations for superior quality. Essential plants such as ginger, bitter cola, bitter leaves, scent leaves and guajava plants are not only a testimony of great survival agents for man, but the needed natural composites for the modern man overcome the complications that are caused by climate change, the consequent attacks of new breeds of disease causal organisms and emergence of catastrophic infections, disorder and negative influence of mutation (Paul SH et al. 2017). Despite considerable progress in the development of synthetic drugs, the search for the invention of Phytomedicine as alternative therapy for Glycemic control is very important. Glycemic control is a medical term referring to the typical levels of blood sugar (glucose) in a person with diabetes mellitus. "Perfect glycemic control" would mean that glucose levels were always normal (70-130 mg/dl, or 3.9-7.2 mmol/L) and is distinguishable from a person without diabetes. Control and outcomes of both types I and II diabetes may be improved by patients. Home glucose meters can be used to regularly measure their glucose levels [15]. The American Diabetes Association in 1994 recommended that 60- 70% of caloric intake should be in the form of carbohydrates. Even though, some researchers have claimed that 40 % is better, while others have claimed benefits for a high-fibre, 75 % carbohydrate diet .Plant based drug are considered to be less toxic and free from side effects than synthetic ones. The many side effects of insulin therapy and other oral hypoglycemic agents necessitate the use of more effective and safer anti-diabetic drugs [10]. For example, long-term use of Metformin causes diarrhea, nausea, gas, weakness, indigestion, abdominal discomfort and headache. Hence, they play an important role as alternative medicine. Phytomedicine are mainly whole, fragmented or cut, plants parts of plants, algae, fungi, lichen in an unprocessed state, usually in a dried form, but sometimes fresh. Herbal drugs are defined by their botanical (scientific) binomial. The active principles present in medicinal plants have been reported to possess pancreatic beta cells regenerating, insulin releasing and fighting the problem of insulin resistance [24]. Anti diabetic plants also possess strong antioxidant/free-radical scavenging properties. Progressing evidences from in vitro, animal, and epidemiological studies suggest that ginger and its active constituents suppress the growth and induce apoptosis of variety of cancer types including skin, ovarian, colon, breast, cervical, oral, renal, prostate, gastric, pancreatic, liver, and brain cancer. These roles of ginger and its constituents are associated with antioxidant, anti-inflammatory and anti-mutagenic properties as well as other biological activities [23].

Table 3: shows the result of quantitative analysis of Ginger, biter cola bitter leaves scents leaves and guajava leaves and fruits.

Minerals Elements Present In Individual Plants And Composite Materials	Ginger	Bitter Cola	Bitter Leaves	Scent Leaves	Guajava Leaves	Moringa Leaves	Composite Material
Calcium (mg/100g)	16	71.5	13.11	64.8	18	440	104.56
Potassium (mg/100g)	ND	73.25	9	86.24	417	1,324.00	318.25
Magnesium(mg/100g)	ND	61.08	19.01	88.25	22	368	93.06
phosphorus(mg/100g)	34	12.52	10.94	21.65	40	204	52.03
Iron (mg/100g)	0.6	16.44	25.58	23.37	0.28	28.3	15.76
Zinc(mg/100g)	0.36	18.14	2.07	6.86	0.24	2.29	4.99
Manganese (mg/100g)	0.23	3.17	1.03	4.64	0.19	ND	1.54
Sodium(mg/100g)	13	52.71	12.02	84.11	2	ND	27.31
Nickel(mg/100g)	ND	4.82	3.01	5.16	1.02	ND	2.34
Copper (mg/100g)	ND	1.06	2.75	5.69	ND	0.57	1.68

Caffeine (component of bitter cola originated alkaloids (2.29mg/100g) is a central nervous system natural stimulant. Its chemotherapeutic form is the world's most widely consumed psychoactive drug. Unlike many other psychoactive substances, it is legal and unregulated in nearly all parts of the world. There are several known mechanisms of action to explain the effects of caffeine. The most prominent is that it reversibly blocks the action of adenosine on its receptor and consequently prevents the onset of drowsiness induced by adenosine. Caffeine (1.17mg/100g) also stimulates certain portions of the autonomic

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nervous system. Optimum use of caffeine containing alkaloids improves heart functions, reduced or eliminates blood pressure [18]. Caffeine containing alkaloids also reduced body weight, fats, and decreased or eliminates insulin resistance eliminating type 2 diabetes and stroke. At the same time caffeine also enhances glucose-stimulated first- and second-phase insulin secretion and beta-cell hyperplasia. Terpenoids (3.82mg/100g), the largest group of phytochemicals, traditionally used for medicinal purposes in India and China, are currently being explored as anticancer agents in clinical trials. Terpenoids (also called "isoprenoids") are secondary metabolites occurring in most plants. More than 40 000 individual terpenoids are known to exist in nature with new compounds being discovered every year. A large number of terpenoids exhibit cytotoxicity against a variety of tumour cells and cancer preventive as well as anticancer efficacy in preclinical animal models [25].

Carbohydrate (18.32%): Carbohydrates or polysaccharides are the most abundant biological molecules known. They are said to be chemically simpler nucleotides or amino acid because in there pure form, they contain just three elements namely Carbon, Hydrogen and Oxygen. They play very important roles in the body as sources of energy or fuel and as well as structural materials. Carbohydrates also provide readily accessible fuel for physical performance and regulate nerve tissue. deducing from the results obtained from phytochemical and mineral screening, reviews from literatures, clinical findings and invitro animals test, it shows that this flora composite made from six medicinal plants including ginger, bitter leaves, scent leaves, guava leaves and fruits, bitter cola and moringa olefera leaves has the capacity to prevent cancer cells formations and their consequence growth when taken for 12 days 600 mg/day. People who took their blood pressure after taken it for 12 days, 200mg each tree times a day. The tea of the six medicinal plants was also given to 12 people with blood pressure and partial stroke, and after 21 days, they regain their sensation and the blood pressure dropped [26]. After running their blood pressure diabetes patients with high sugar level, were also given both the tea and the composite extract and the sugar level droped in their blood after testing and the above results is as a result of the present of this secondary metabolites like alkaloids, terpenoids, flavonoids` (gingerol shogaols composite in the ginger) in the alkaloids.

Triterpenes as α-glucosidase and α-amylase inhibitors: The therapeutic approach to treating type 2 DM is to decrease postprandial glucose levels. It can be achieved through the inhibition of α-glucosidase and α-amylases which delay the absorbance of carbohydrates in the intestine, leading to a decrease in the postprandial insulin level. There are many in vitro investigations indicating the ability of various plant-derived triterpenes to inhibit α-glucosidase and α-amylase activity. They are responsible for de phosphorylation process of the receptor β-subunit. Inhibitors of PTP 1B can potentially ameliorate insulin resistance and normalize plasma glucose and insulin levels without inducing hypoglycemia Type 2 diabetes mellitus is an important preventable disease and a growing public health problem. Epidemiologic and interventional studies suggest that weight loss is the main driving force to reduce diabetes risk. Landmark clinical trials of lifestyle changes in subjects with pre diabetes have shown that diet and exercise leading to weight loss consistently reduce the incidence of diabetes [27]. However, from these studies it cannot be established whether dietary changes alone play a significant role in preventing diabetes. Here we review epidemiologic and clinical trial evidence relating nutrients, foods and dietary patterns to diabetes risk and the possible mechanisms involved. The differential effects of carbohydrate and fat quantity and quality, and those of specific foods and whole diets are discussed. Importantly, most dietary components influencing diabetes risk have similar effects on biomarkers of cardiovascular risk and inflammation.

Flavonoids: have protective effects including anti-inflammatory, anti-oxidant, antiviral, and ant carcinogenic properties. They are generally found in a variety of foods. Garcinia kola can be a good dietary source of flavonoids.

Alkaloids: are heterogeneous group of naturally occurring compounds found in the leaves, bark, roots or seeds of plants. Some alkaloids stimulate the nervous systems like those that contain caffeine and the related constituents. How too much of it is capable of causing paralysis, elevate blood pressure or lower it below minimum. Certain alkaloids act as pain relievers, others act as tranquilizers. Others have also been noted to contain antimicrobial properties. Alkaloids from Garcinia kola *Vernonia amygdalina, Psidium guajava, Ocimum gratissimum* and *moringa olefera*, are relevant in the manufacture of vaccines to prevent diseases.

Phenols: is a crystalline aromatic organic compound. Dilute solutions of phenol are useful antiseptics, but strong solutions of phenols are caustic and scarring to tissues. Concentrated phenols are widely used in the manufacture of resins, plastics, insecticides, explosives, dyes and detergents and as raw materials for the productions of medicinal drugs such as aspirin.

Minerals and their functions: Dieticians may recommend that minerals are best supplied by ingesting specific foods rich with the chemical element(s) of interest. The elements may be naturally present in the food (e.g., calcium in dairy milk) or added to the food (e.g., orange juice fortified with calcium; iodized salt fortified with iodine). Dietary supplements can be formulated to contain several different chemical elements (as compounds), a combination of vitamins and/or other chemical compounds, or a single element (as a compound or mixture of compounds), such as calcium (as calcium carbonate, calcium citrate and so on) or magnesium (as magnesium oxide, and so on.), or iron (as ferrous sulfate, iron bis-glycinate, and so on). The dietary focus on chemical elements derives from an interest in supporting the biochemical reactions of metabolism with the required elemental components. Appropriate intake levels of certain chemical elements have been demonstrated to be

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required to maintain optimal health [28]. Diet can meet all the body's chemical element requirements, although supplements can be used when some requirements (e.g., calcium, which is found mainly in dairy products) are not adequately met by the diet, or when chronic or acute deficiencies arise from pathology, injury and other forms of complications. Research has supported that altering inorganic mineral compounds (carbonates, oxides and other related compounds) by reacting them with organic ligands (like: amino acids and organic acids.) improves the bioavailability of the supplemented mineral.

A mineral is a chemical element required as an essential nutrient by organisms to perform functions necessary for life. Minerals are of the earth's origin and cannot be made by living organisms. Plants get minerals elements from the soil. Most of the minerals in a human diet come from eating plants and animals or from drinking water. As a group, minerals are one of the four groups of essential nutrients, the others of which are vitamins, essential fatty acids, and essential amino acids. The five major minerals in the human body are calcium, phosphorus, potassium, sodium, and magnesium. All of the remaining elements in a human body are called "trace elements". The trace elements that have a specific biochemical function in the human body are sulphur, iron, chlorine, cobalt, copper, zinc, manganese, molybdenum, iodine and selenium. Minerals are inorganic nutrients, usually required in small amounts from less than 1 to 2500mg per day, depending on the mineral element in question. As with vitamins and other essential food nutrients, mineral requirements vary with animal species, ages and heath condition. For example, humans and other vertebrates need large amounts of calcium for construction and maintenance of bones and normal nerves and muscles functions. Phosphorus is an important constituent of adenosine triphosphate (ATP) and nucleic acid and is also essential for acid-base balance, bone and tooth formation. Red blood cells cannot function properly without iron in haemoglobin, the oxygen-carrying pigment of red blood cells. Iron is also an important component of the cytochromes that function in cellular respiration. Magnesium, copper, selenium, zinc, iron, manganese and molybdenum are important co-factors found in the structure of certain enzymes and are indispensable in numerous biochemical pathways. Vertebrates need iodine to make thyroid hormones. Sodium, potassium and chlorine are important in the maintenance of osmotic balance between cells and the interstitial fluid. Magnesium is an important component of chlorophyll in plants. The interactions between nutrition and diseases, nutrition and drug metabolism have been reported. Excessive intake of some minerals can upset homeostatic balance and cause toxic side effects. For example, excess sodium intake is associated with high blood pressure and excess iron can cause liver damage. Also, severe shortages or self-prescribed minerals can alter the delicate balance in body functions that promotes health most chemical elements that are ingested by organisms are in the form of simple compounds. Plants absorb dissolved elements in soils, which are subsequently ingested by the herbivores and omnivores that eat them, and the elements move up the food chain. Larger organisms may also consume soil (geophagia) or use mineral resources, such as salt licks, to obtain limited minerals unavailable through other dietary sources.

Calcium makes up 920 to 1200mg of adult body weight, with 99% of its contained in bones and teeth. Phosphorus makes up about 1% of a person's body weight. The other major minerals potassium, sodium, chlorine, sulphur and magnesium) make up only about 0.85% of the weight of the body. Together these eleven chemical elements (H, C, N, O, Ca, P, K, Na, Cl, S and Mg) make up 99.85% of the body. There is not scientific consensus on whether all of the elements in light green in periodic table are essential or not. Zinc (Zn) is one of the essential trace elements and has numerous physiological functions. Zn acts as an antioxidant and also as a part of other antioxidant related proteins, such as metallothionein (MT) and Zn-copper superoxide dismutase. Zn deficiency often occurs in patients with diabetes. Therefore, the effect of Zn deficiency or Zn supplementation on diabetes-induced cardiac and renal pathogeneses has been explored by researchers. Zn deficiency was induced by chronic treatment of diabetic mice with Zn chelator N, N, N, N-Tetrakis (2-pyridylmethyl)-1,2-ethylenediamine (TPEN) for 4 months. For Zn supplementation study, diabetic mice or rats were treated with Zn for 3 months. Inflammation, fibrosis, and histopathological changes in the heart and kidney of these diabetic mice and rats were examined by western blotting assay, immunohistochemical and fluorescent staining. Results showed that diabetes induced cardiac and renal oxidative damage, inflammation and fibrosis, which were reversed by Zn supplementation that also induced cardiac and renal MT synthesis. Furthermore, Zn deficiency was found to significantly enhance the renal damage induced by diabetes. Several clinical observations also support the preventive effect of Zn in the development of diabetic cardiomyopathy and nephropathy. Therefore, Zn plays an important role in the protection of the heart and kidney against diabetes-induced oxidative damage, inflammation, and fibrosis. These studies suggested that diabetic patients should be monitored and treated for Zn deficiency to avoid the acceleration of diabetes-induced cardiac and renal injury.

Conclusion

Deducing from the result obtained; green medicines especially the multifunctional flora composite developed from ginger, scent leaves, bitter leaves moringa, guava and bitter cola or their combination, is a very important composite material for the prevention of cancer, diabetes, blood pressure and stroke and also for their optimum management, in case they have already occurs. This is because; the compounds are composed of multidimensional bioactive compounds needed for both the nutritional and phytochemical functioning of the human body. The minerals elements such as calcium, are needed for bones

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and teeth formation, sodium and potassium is needed for acid-base balance in the body, zinc and iron for blood formations and coloration of blood, phosphorus and others for body building, Carbohydrates at optimum level is needed for energy supply, proteins for body build up, vitamins for maintenance of our body, fibres for effective digestions and body balance and fluid or moisture needed for food and blood circulation. Taking a balance supplement prepared using a very simple formulation method such as this, will give you the optimum result in terms of health and nutritional needs. Taking this green medicines and observing simple healthy life styles and tips, will helps prevent the occurrence of cancer, diabetes or it cardiovascular consequences like blood pressure, liver or kidney failure and stroke in the first instance and help in the management of secondary cases. That is, taking the bio-activator along side with the maintenance of ideal body weight, the promotion of the so-called prudent diet (characterized by a higher intake of food groups that are generally recommended for health promotion, particularly plant-based foods as envisaged by this research) and a lower or total abstinences from the intake of red meat its products, sweets, high-fat dietary and refined grains or food) or a Mediterranean dietary pattern rich in olive oil, fruits and vegetables, including whole grains, pulses and nuts, low-fat dairy, and avoidance of alcohol consumption (mainly red wine) appears as the best strategy to decrease diabetes risk, especially if dietary recommendations take into account individual preferences, thus enabling long-time adherence. The adherence to these basic and fundamental health tips as prescribed by these research findings will help rid Nigeria of unnecessary cancer, diabetes, blood pressure and stroke cases. In summary, using a multi-functional flora composite developed from selected medicinal plants either as combined effects or consumed individually along sides with life style modification to favor the disappearance of this diseases, is the best way to avoid the occurrence of the diseases in the first place. When green medicine well characterized is consumed, active exercise, avoidances of alcohols, maintenance of a good body weight (body mass index between 18.5-23.5kg/m2), abstinence from smoking, avoiding exposure to harsh radiation, living in a highly healthy and sanitized environment; obeying the rules of life and natural orders will give human the best health condition no matter the age or gender.

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