DETERMINATION OF SOY BEANS SEASONING WITH GARLIC AND GINGER SPICE FOR POTENTIAL HEALTH SUSTAINABILITY

By

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ABSTARCT

Soybeans are a type of legume, native to eastern Asia. They are an important component of Asian diets and have been consumed for thousands of years. Today, they are mainly grown in Asia, and South and North America. In Asia, soybeans are often eaten whole, but in Western countries heavily processed soy products are much more common. Various soy products are available, including soy flour, soy protein, tofu, soy milk, soy sauce, and soybean oil. Soybeans contain antioxidants and phytonutrients that have been linked with various health benefits, while concerns have also been raised about adverse effects. For generation, people are not only using Garlic because of its medicinal value, but traditionally, people have rubbed their bodies with it, buried it besides their bodies in coffin, worn it around their necks, draped it on household walls and even prayed to it. This great bulb has a lot of benefits, because no other plant has been held out for so long as a cure for so many human ailments. Previous reviews have emphasized the importance of careful scientific research in establishing the safety and efficacy of potential therapeutic plant remedies and in defining the risks and benefits of herbal medicine. Ginger has been used for thousands of years for the treatment of numerous ailments, such as colds, nausea, arthritis, migraines, and hypertension. The medicinal, chemical, and pharmacological properties of ginger have been extensively reviewed. Over the last few years, interest in ginger or its various components as valid preventive or therapeutic agents has increased markedly, and scientific studies focusing on verification of ginger's pharmacological and physiological actions have likewise increased. The primary purpose of this research work is to comprehensively examine the available scientific evidence regarding soy beans seasoning, garlic and ginger spice for potential health sustainability.

INTRODUCTION

Soybeans, scientifically called glycin max. is a monocotyledon which belongs to the legumenoesae. The cultivated soybean as a cultigens believed to have originated from the north Esther china earilier the 1000bc. The spread of soybean from its indigenous land has been due to it adaptability and predominant utilization as food for humans or part of animal feed, as a medicinal plant, and recently used in industry (Dadson et al, 1998) FAO reports in 2000 indicated a worldwide production of over 160million tons of soybean with USA being the largest producers of the crop, followed by tatin Americans, the Caribbean, Asia and Afirca of this 160million, sub-Saharan Africa cultivated about 817,000ha of land with soybeans which yielded about 99kg per ha of soybeans (FAO 2006).

Soybeans are gaining prominence in Nigeria as over 200,000Ha of land was devoted to its cultivation as far back as 1992. This according to CTA was then the largest area of land devoted to soybean cultivation in the whole of Africa (CTA, 1992).

Soybeans have been described in various ways some call it the "miracle bean" or the "golden bean" because it is a cheap, protein-rich grain. It contains 40per cent high quality protein, 20percent edible vegetable oil, and a good balance of amino acids. It has therefore, tremendous potential to improve the nutritional status and welfare of resource poor people particularly in a developing country like Nigeria. Soybean can also contribute to enhanced sustainability of intensified cropping systems by improving soil fertility through nitrogen fixation, permitting a longer duration of ground cover in the cropping sequence, and providing useful crop residues for feeding livestock. However soybean is a relatively new crop in Africa. Until recently, it was seen as being appropriate only for large-scale commercial farming where the crop can be utilized industrially and for formulation of livestock feed(Shannonet al. 1995). Soybean is widely distributed in most parts of the world; the crops has a lot of potentials in Africa (Adamu and Amatobi; 2001). It is generally known that the seed of soybean contains the highest and riches protein amoung all cultivated tegumes (FAO, 1989). World-wide interest and attention in soybean is mainly due to its high nutrition value and seed protein content (Tlamigu and Idowu, 2001). It is primarily the source of vegetable oil and protein for use in food and industrial application (Endress, 2001).

There have been many studies relating to the performance of soybean to environmental conditions, agronomic practices, variety performance the bulk of soybeans produced in Nigeria come from the southern guinea savanna but production has also extended to the northern guineas savanna but production has also extended to the northern guinea savanna and forest belts (Okpara and Ibianm, 2000).

STATEMENTS OF THE PROBLEM.

Food is one of the basic needs of the human being. It is required for the normal functioning of the body parts and for a healthy growth. Food is any substance, composed of carbohydrates, water, fats and oil, proteins, that is either eaten or drunk by any animal, including humans, for nutrition or pleasure. Unfamiliar with taste and texture of joy product is one of the major attributes that is contributing to the shortcoming hitting the soy product market in Nigeria. Moon et al; (2005) reported that soy food suffer from image problem especially with respect to perception about taste. For instance, a perception is formed by consumers that soy foods are inadequate substitutes for animal foods especially from a flavor point of view. This lack of adaptability has created the erroneous impression among most consumers that soy has an offensive flavor and is distasteful resulting in their avoidance of its consumption on normal bases and the retarding the production and market

development of the soy industry. This is in line with Chapman's (2004) finding which indicated the negative attitude towards the taste of soy food was a stumbling block to its consumption frequency

OBJECTIVE OF THE STUDY

The main objective of the study is examine the health benefit of soy bean seasoning with garlic and ginger spice for potential health sustainability

The specific objectives are as follows:-

I. To determine soybean beaconing for potential health sustainability.

II. To determine the soy bean seasoning with garlic and ginger spice for potential health benefits.

III. To examine whether health benefits of soy mediate the influence of nutritional awareness, health knowledge and health motivation in the decision making process of consumers to soy

LITERATURE REVIEW

Soy Beans as A Crop

The soybean (Glycine Max L), is one of the oldese crops of china, and has been used by chinese and other oriental cultures for centuries in many forms as one of the most important sources of proteins and oil (Wilson, 1991). For this reason and due to many others (high protein yield per unit area than other crop), the soybean has caught the attention of the world and now it is seen as a crop that could help to combat world hunger. Most recently, interest in soybean has increased due to the presence of is flavones, compounds that may play in important role in preventing and creating chronic diseases (Messina and Messina, 1991; Messina at al; 1994; Kennedy 1995. Setchell 1998; Munro at al; 2003).

Wild types of soybeans were first introduced in the United State as a hay crop. Introductions from China, Manchuria, Korea and Japan have been important in developing cultivars for the United States.

Modera breeding efforts to improve the agoonomic traits, such as more crect growth, reduced lodging and increased seed size, have been primarily responsible for the development of soybeans into a crop of worldwide import ante (Mullen 2003).

Garlic as A Crop

Garlic (alliumsativuml) is a bulb belonging to the family Alliaceae it is the second most widely cultivated crop in the family after Onion (AlliumCepa), as reported by purseglove (1972). The crop when fully grown is between 40 and 60cm in height it consist of an underground bulb and above ground vegetative part, which also consist of a flat as well as slender leaves.

Rooting system is fibrous, while the

bulb comprises small bulblets called cloves (A mans 1989; Wadjito et al., 1988). Garlic originated from the central Asia about 3000 years and latter spread to the medieerranean regions (Tindal, 1986). The crop was later carried to western countries by the French, Spanish and Portuguese explorers.

Spain is the largesse producer of the crop with over 100,000 tonners per annum. Other important producing countries include Mexico, Egypt, Bulgaria, Romania, Poland, France, Japan and India. In Nigeria garlic has been in cultivation for many years and is confined to the Sudan savannah zone, especially in Kano, Sokoto, Kebbi and Borno states (Miko 1999). Today however, the cultivation is expanding, principally as a result of the crops high economic value.

Garlic requires cool but dry weather with moderate moisturefor proper growth. It is also requires well drained soil with high organic matter contents.

It is sensitive to high humidity, excessive moisture and high tempreture, which units the growth of the crop (Babaji 1996).

The crop has been known to have severs food and medicinal uses. It is used for preserving meat and meat products, used as spices in saland and for seasoning of vegetables. Garlic extracts are generally used in curing whopping cough, long diseases and stomach pain and child birth disorder. The extract could be used against ear-ache, hypertension, eye-sores, an antidote against poisons, as well as antibacterial (Debkitaniya et al., 1981). Garlic could also be used as an insecticide and could also reduce cholesterol level in human blood and as a repulsive to snakes.

Garlic production and bulb yield could be improved through proper farm yard manure application and proper spacing (Kusumo and widjajanto, 1973; Lucero et al., Hamma et al.)

Ginger as A Crop

Ginger (ZiniberOfficinale Roscoe)is one of the major root and tuber crops in Nigeria. It is a perennial crop that has the edible underground rhizome as the major economic part. The rhizomes, which consist of numerous short finger-like branches, are bornehorizontally near the surface of the soil (purseglove, 1972, NRCRI, 1987). It belongs to the natural order, zingiberaceae and is fibrous. Between December and February annually, the entire follage withers and dies and when this occurs the rhizomes are ripe and ready for harvesting.

Cingers (zingibesOfficinale Rose) is a spice and root crop growth as cash crop in Nigeria,

mostly growth in the southern part of Kaduna state (Northern Nigeria) for export. In the world market, the current major five exporting countries have been China, Nigeria, India, Jamaika and Brazil (Asumugha, 2002). Nigeria ginger is known to produce the highest quality essential oils mainly Oleoresin and gingerol. These valued for their aroma and pungency. Ginger cultivation in Nigeria dates back to 1927 when it was believed to have been introduced from southeast Asia. Among the spices (papers, ginger, Onion, and chites). It is the only one that is grown on a commercial scale for export. Ginger is mainly exported in split-dned from, while exports of fresh gingers are negligible.

Nutritional Quality In Soy Bean

Regarding to the phenolic compounds found in soybean, during the past several years, there has been much interest among clinicians and researchers in the potential role of soy food in the preventing and treating chronic diseases.

Increasing evidence has suggested that the isoflavones in soybeans might be the contributing factors (akiyama et al., 1981; Adlercreatz et al., 1992 cassidy et al., 1994a. Anthony. The isoflavones occur predominantly as glycosides forms in plant and food derived from their plants. Soybeanand soy foods can contain glucosides, 6”-Omalony- glucosides, and 6”-0-acetyglucosides in addition to the aglycones (Hendnch and Murphy 2001). Isoflavones have an extremely limited distribution in nature and soy bean and soy foods can be considered the only natural dietary sources of these compounds (coward et al; 1993; Messina 1997). It is not surprising therefore that some researchers found that blood and urinary isoglavonelevels of Asian (adlercreatz et al; 1993) and western vegetanians (adlercreatz et al; 1995) are 10-100 fold higher than those of individuals consuming typiscal western diets.

Raw soybeans typically contain 2000 to 4000mg of idoflavones 1kg where as the isoflavones content in soy foods, on a dry weight basis range an from about 1000 to 3000mg/kg (Messina 1997).

Eldridge and kwolek (1983) measured the anatomical distribution of soybean isoflavones on seeds. They found that different isoflavones concentration are found in different parts of the seed; showing hypocotyls with the highest concentration (14000 to 17,500mg\kg)followed by cotyledons (1580 to 3190mg\kg), where as hulls showed the lowest concentration (100 to 200mg/kg). Many researchers also evaluated the effect of different processing method on the isoflavone composition of diverse soy products. In general, Pedro ceasing of soybeans for the manufacture of soya containing food products increases the hydrolysis of isoflavone glucoside, resulting in higher concentration of aglycones

(Hutchison et Al; 1995, Zhou and Desman 1997).

Health Related Effects Of Ginger

The medical values of these great ancient spices are widely recognized across the continents to contain a number unique organic phytochemical ingredients that can take care of some human ailments. Recent studies on health related effects of gingers which have also stimulated farmers concern on the growth of plant have shown the efficacy of the plant in some life challenging ailments such as entrée toxin induced diarrhea diabetic nephropathy, nausea, plasma and antioxidant, vomiting, high cholesterol, high blood pressure and inflammation (chen et al; 2007; Ernest and Pither, 2008; Kim et al; 2008).

Garic Medicine Value

Garlic is rich in sugar, protein, fat calcium, potassium, phosphorus, sulfured, iodine, fibre and silicon, in addition to vatimins. Its pungent flavor meters its used mainly as a spice, seasming and flavoring for food stuff involving both green tops and bulbs. Its medicinal value is also well recognized in the control and treatment of hypertension, worms, germs bacterial and fungal diseases, diabetes, cancer, ulcer, rheumatism etc. Dehydrated garlic and extracts are fast replacing fresh bulbs for industrial and home usage in the production of drugs, insecticides and explosives.

Traditionally, garlic has a long history as a remedy for improving strength, reducing fatihue, and increasing immunity both in prevention and treatment of infections diseases and gastrointestinal function. In modern times, garlic has also been linked to improved cardiovascular health, including blood pressure, cholesterol, and other cardiovascular markers. J. NUTR.2016 146:403s-409s

METHODOLOGY

The methods and procedures that were used in the study were content analysis of some vital literature that relate to the current knowledge in the chosen area as to determine soy beans seasoning with garlic and ginger spice for potential health sustainability. Therefore, the information was gathered through clinical trials which were identified by a computerized literature search .

DATA AND FINDINGS

RESEARCH FINDINGS

BIOACTIVE OF GINGER

At least 115 constituents in fresh and dried ginger varieties have been identified by a variety of analytical processes. Gingerols are the major constituents of fresh ginger and are found slightly reduced in dry ginger, whereas the concentrations of shogaols, which are the major gingerol dehydration products, are more abundant (Jolad et al. 2005) in dry ginger than in fresh ginger. At least 31 gingerol-related compounds have been identified from the methanolic crude extracts of fresh ginger rhizome (Jiang, Solyom et al. 2005). Ginger has been fractionated into at least 14 bioactive compounds, including gingerol, paradol, shogaol,1-dehydro gingerdione, hexahydrocurcumin, tetrahydrocurcumin, gingerenone A, 1,7-bis-(4' hydroxyl-3' methoxyphenyl)-5-methoxyhepthan-3-one, and methoxy gingerol (Koh et al. 2009). The proportion of each individual component in a sample of ginger depends on country of origin, commercial processor, and whether the ginger is fresh, dried, or processed (Schwertner, Rios, and Pascoe 2006). Of the bioactive pungent components of Jamaican ginger, including and gingerols and shogaol, gingerol appears to be the most abundant pungent bioactive compound in most of the oleoresin samples studied (Bailey-Shaw et al. 2008). Although phylogenetic analysis has showed that all ginger samples from widely different geographical origins are genetically indistinguishable, metabolic profiling showed some quantitative differences in the contents of gingerols (Jiang et al. 2006). An examination of the concentrations of gingerols and shogaol in 10 different ginger-root dietary supplements purchased randomly from a variety of pharmacies and health food stores yielded some disconcerting results (Schwertner, Rios, and Pascoe 2006). Perhaps not surprisingly, the content of these active components was found to vary extensively from none or very minute amounts to several milligrams per gram. In addition, the suggested serving size ranged from about 250 mg to 4.8 g/day (Schwertner, Rios, and Pascoe 2006). The basis for the wide range of dosing is not clear. These studies suggest that ginger contains a variety of bioactive compounds and standardization of contents is critically lacking.

GARLIC AS A BIOACTIVE AGENT

When looking at the garlic bulb itself (overall vegetable product) it tends to contain:

- A water content of around 65%
- A carbohydrate content of around 28% (which is mostly fructans)
- Protein at around 2% (mostly alliinase and glycoproteins) and 1.2% free amino acids
- 2.3% organosulfur compounds (commonly seen as the main bioactives)
- 1.5% dietary fiber

Garlic bioactives are somewhat unique in the vegetable, as there are two main groups of molecules that exist in the actual clove prior to processing; alliin (*S-allylcysteine sulfoxide*) and the Glutamyl-S-allylcysteine molecules. These two classes are some of the *organosulfur* compounds mentioned above, and aside from being relatively balanced (unless otherwise processed) they make up the majority of the organosulfurs.

When the clove is mechanically disturbed (chewing, slicing, crushing) then alliin turns into allicin via *alliinase* and then allicin spontaneously creates all manner of bioactives and gives off some hydrogen sulfide (H_2S) in the process. When the clove ages, the Glutamyl-S-allylcystiene molecules slowly lose their glutamyl moieties and it increases levels of S-allylcysteine (SAC) among some other similar cysteine prodrugs.

Garlic contains two main classes of molecules, which spontaneously form a wide variety of bioactives. This includes alliin (main sulfur containing compound in fresh garlic), which converts into allicin via the above pathway, and the glutamyl-S-allylcysteine, which gradually form S-allylcysteine during the aging process (which can then form SAMC and SMC)

The known bioactives of garlic are:

- **Alliin** (*S-allylcysteine sulfoxide*) as

one a pool of bioactives at 10mg/g fresh weight and 30mg/g dry weight of raw garlic[14] and of which 70-80% degrades into Allicin (*Diallyl thiosulfinate*; not present in the garlic initially) and is then further degraded into the Diallyl sulfides, the Ajoene molecule and the dithiin class of cyclic molecules

- The **Glutamyl-S-allyl-L-cysteine** class of molecules (second initial pool of bioactives) including *γ-glutamyl-S-allyl-L-cysteine* and *γ-glutamyl-S-(trans-1-propenyl)-L-cysteine*, two molecules present in garlic in high levels alongside low levels of *γ-glutamyl-S-allyl-mercapto-L-cysteine* and S-allylcystiene (SAC) SAC content increases during aging of garlic from 200µg/g to 7,200µg/g and is seen as the main bioactive of 'aged' garlic
- The diallyl sulfides, which include; diallyl sulfide, diallyl disulfide (DADS), diallyl trisulfide (DATS or Allitridi), and diallyl tetrasulfide (DATTS), which are seen as the main bioactives of garlic oil and main derivatives of allicin; letting allicin sit for 20 hours results in DADS (66.7%), DATS (14.6%), DAS (13.3%) and diallyl tetrasulfide (5.4%) with higher polysulfides being of sparse quantities; diallyl sulfides are seen as the main metabolite(s) of allicin
- A cyclical form of alliin known as cycloalliin and the fat soluble cyclical derivatives of allicin known as vinyldithiins such as 1,2-vinyldithiin; these derivates are more sparse than the diallyl sulfides
- Ajoene (*(E,Z)-4,5,9-trithiadodeca-1,6,11-triene 9-oxide*), one of the stable end products of alliin degradation and made from allicin S-thiolation and 2-propenesulfenic acid addition and again less prominent than diallyl sulfides
- Allylmercaptane (AM) and allylmethyl sulfide (AMS), which are produced from DADS after oral ingestion and oxidized into allylmethyl sulfoxide (AMSO) and then allylmethyl sulfone ($AMSO_2$)
- S-methylcysteine sulfoxide (Methiin)
- Dimethyl sulfides as well as allyl methyl sulfides, also present in garlic oil and similar to the diallyl sulfides are derivatives of allicin
- Thiacremonone (*2,4-dihydroxy-2,5-dimethylthiophene-3-one*), a cyclic sulfur bearing compound
- Garlicnins A1, B1-4, C1-3, and D1 (Cyclic sulfoxides); thought to be formed sponaneously from allicin
- Allixin, a cyclic non-sulfur

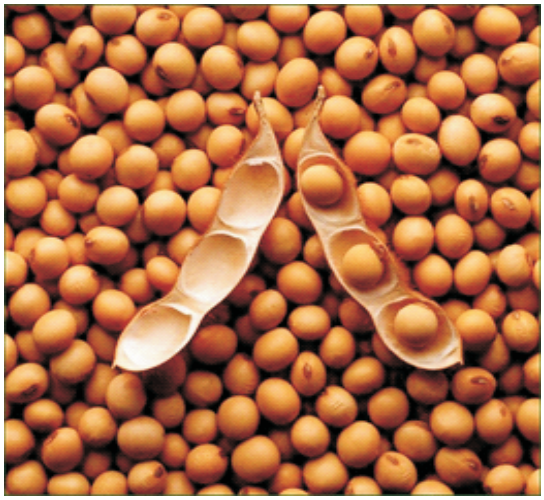
component that accumulates in the necrotic areas of garlic bulb that may reach up to 1% of the bulb's dry weight after a year

- Sodium 2-propenyl thiosulfate

Finally, the protein fragment of garlic itself contains some bioactives. There is also a 14kDa glycoprotein known to be involved in the induction of natural killer (NK) cells and thought to be involved in altering T-cell cytokine production, since the extract of garlic where the glycoprotein is found alters T-cells.

In regards to the sulfur containing compounds, there are two main classes of traditional bioactives, which are pretty much either made from allicin spontaneously reconfiguring itself (this makes diallyl sulfide molecules, Ajoene, and vinyldithiins) or from the Glutamyl-S-allylcysteine being aged (this makes S-allylcysteine mostly). There is a protein fragment involved in immune health, and some cyclical bioactives with unknown origins

SOY BEANS



Soybeans are among the best sources of plant-based protein. The protein content of soybeans ranges from 36 to 56% of the dry weight.One cup of boiled soybeans (172 g) contains around 29 grams of protein . The nutritional value of soy protein is good, although the quality is not quite as high as animal protein. The main types of protein in soybeans are glycinin and conglycinin, which make up approximately 80% of the total protein content. These proteins may trigger allergic reactions in some people. Consumption of soy protein has been linked with a modest decrease in cholesterol levels. Soybeans also contain bioactive proteins, such as lectin and lunasin, which may have anti-cancer properties.

Soybeans are rich in fat. In fact, soybeans are classified as oilseeds and are often used to make soybean oil.The fat content is approximately 18% of the dry weight, mainly polyunsaturated and monounsaturated fatty acids, with small amounts of saturated fat. The predominant

type of fat in soybeans is linoleic acid, accounting for approximately 50% of the total fat content.

Being low in carbs, whole soybeans are very low on the glycemic index, which is a measure of how foods affect the rise in blood sugar after a meal. The low glycemic index makes soybeans particularly suitable for people with diabetes.

Soybeans contain a fair amount of both soluble and insoluble fibers. The insoluble fibers are mainly alpha-galactosides, such as stachyose and raffinose. These fibers may cause flatulence and diarrhea in sensitive individuals. Alpha-galactosides belong to a class of fibers called FODMAPs, which may exacerbate the symptoms of irritiable bowel syndrome. Despite unpleasant side effects in some people, soluble fibers in soybeans are generally considered to be healthy.They are fermented by bacteria in the colon, leading to the formation of short-chain fatty acids, such as butyrate, which may improve colon health and cut the risk of colon cancer.

Soybeans are a good source of various vitamins and minerals.

- **Molybdenum:** Soybeans are rich in molybdenum, an essential trace element, primarily found in seeds, grains and legumes.
- **Vitamin K1:** The form of vitamin K found in legumes is known as phylloquinone. It plays an important role in blood clotting.
- **Folate:** One of the B-vitamins, also known as vitamin B9 or folic acid. It has various different functions in the body and is considered to be particularly important during pregnancy.
- **Copper:** Dietary intake of copper is often low in Western populations. Copper deficiency may have adverse effects on heart health.
- **Manganese:** A trace element found in most foods and drinking water. Manganese is poorly absorbed from soybeans because of their high phytic acid content.
- **Phosphorus:** Soybeans are a good source of phosphorus, an essential mineral that is abundant in the Western diet.
- **Thiamin:** Also known as vitamin B1, thiamin plays an important role in many body functions.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Ginger: is not only an extremely popular dietary condiment used for flavoring food but also an herb that has been used for thousands of years as a medicinal herb to treat a variety of ailments. Chemical and metabolic analyses have revealed that ginger comprises hundreds of compounds

and metabolites. The most extensively studied bioactive components include gingerols and shogaols, especially gingerol and shogaol, respectively. The content of each component is clearly dependent on the source and preparation of the ginger rhizome. Research interest in determining the role of natural compounds in preventing disease has increased markedly over the last few years. In spite of the abundance of research studies, many of the results are phenomenon based and provide data that are descriptive and observational rather than mechanistic. More studies are needed in animals and humans on the kinetics of ginger and its constituents and on the effects of consumption over a long period of time. Specific molecular targets and mechanisms of action need to be identified. Ginger clearly has a vast number of components and metabolites, many of which have not been studied in detail. The lack of standardization of ginger supplements is disconcerting, and whether consumption of high levels of isolated components (e.g.,gingerol) is advisable is uncertain. Gingerol or other ginger components might require inter-reactivity or dependency on other components in the whole food source to exert their positive effects. Research data indicate that ginger and its constituents accumulate in the gastrointestinal tract, which supports the many observations of ginger's effectiveness as an antinausea agent and as a possible colon cancer-preventing compound. Ginger acts as a potent antioxidant in vitro and ex vivo, but the data are not obvious for in vivo application and specific targets and mechanisms are lacking. Ginger appears to exert anti-inflammatory effects by suppressing COX-2 with subsequent inhibition of prostaglandin and leukotriene biosynthesis. On the other hand, the data supporting the effectiveness of ginger in alleviating pain and swelling associated with arthritis are somewhat conflicting. The most common use of ginger is to alleviate the vomiting and nausea associated with pregnancy, chemotherapy, and some types of surgery. The clinical data undoubtedly indicate that ginger is at least as effective, and may be better, than vitamin B6 in treating these symptoms. Again, mechanisms are lacking, but no reports indicate that ginger has any adverse side effects or that it can worsen illness in pregnant women or patients. Interest in ginger as an anticancer agent has markedly increased over the last few years and a direct protein target has been identified in colon cancer. Ginger also appears to reduce cholesterol and improve lipid metabolism, thereby helping to decrease the risk of cardiovascular disease and diabetes.

Recommendations

The research suggests that potential health sustainability driven from garlic, soy bean and ginger have contributed alot to lower blood pressure in hypertensive individuals, to regulate slightly elevated cholesterol

concentrations, and to stimulate immune system. The supplements are highly tolerated and may considered as a complimentary treatment option for hypertension, slightly elevated cholesterol and stimulation of immunity. Future long-term trials are needed to elucidated the effect of garlic, soy bean and ginger on cardiovascular morbidity and mortality.

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