Comparative Phytochemical and Proximate Analysis of Pumpkin (*Cucurbita Maxima*)and Water Melon Fruit (*Citrilus Lanatus*)

BY

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COMPARATIVE PHYTOCHEMICAL AND PROXIMATE ANALYSIS OF PUMPKIN (*Cucurbita maxima)* AND WATER MELON FRUITS (*Ctitrillus lanatus*)

BY

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A PROJECT

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B.Sc. PLANT SCIENCE AND BIOTECHNOLOGY

DECEMBER, 2019.

DECLARATION

I hereby declare that this project is written by me and it has not been presented before in any institution for a bachelor degree except for quotations and summaries which have been duly acknowledged.

.....
Umma Umar Jangebe

2/12/2019
Date

CERTIFICATION

This project entitled "Proximate Comparative Phytochemical and proximate analysis of Pumpkin (*Cucurbita maxima*) and Water melon (*Citrillus lanatus*)" meets the regulation governing the award of Bachelor of Science of the Federal University Gusau and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This project is dedicated to my beloved husband and parents for their never ending support, and prayers. I pray to the Almighty God, to grant them eternal peace in their life and in hereafter.

ACKNOWLEDGEMENTS

My greatest gratitude to Allah most merciful, most beneficent who all praise and love is from and unto him alone. I will forever give him all my praise and affection for seeing me through the tedious journey of achieving this academic pursuit. May the peace and blessing of Allah be upon our Holy prophet Muhammad (S.A .W) and his household (Amin).

I feel deep sense of gratitude to my supervisor Mal Hassan Usman for his guidance during the period of writing this project. My appreciation also goes to Mal. Ibrahim of Biochemistry laboratory for his immense suggestion and guidance during the period of conducting my practicals.

My sincere appreciation to my mother, my husband, and my entire family whose prayers and support financially and morally have graced my effort. I also appreciate the contribution and encouragement of all my friends, course mates and family i thank you all.

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ABSTRACT

Watermelon (*Citrullus lanatus*), botanically considered as a fruit, belongs to the family Cucurbitaceae.. The purpose of this research was to evaluate the fruit of *Ctitrillus lanatus And Cucurbita maxima* with the aim of quantifying chemical information that might serve as a guide to exploit its potential and benefits for human nutrition. The Phytochemical screening showed the presence of flavonoids, saponins, Saponin glycoside, Cardiac glycoside and Anthraquines in watermelon. The proximate compositions were determined according to the perspectives methods. Proximate analysis of the samples revealed that it contained in watermelon 6.48 ± 0.023 moisture contents, while in pumkin 65.40 ± 0.52. In watermelon 3.84 ± 0.48 protein, while in pumpkin 2.24 ± 0.009. In watermelon 8.71 ± 0.068 lipids, while in pumpkin 1.85 ± 0.0256. in watermelon 1.24 ± 0.002 fibre, while in pumpkin 1.3 ± 0.026. and the total carbohydrate in watermelon 84.25 ± 0.35 while in pumpkin 24.7 ± 0.031 respectively. This study work contributes to the development of nutritional database of edible plants worldwide. In conclusion, fruits sample of *Ctitrillus lanatus And Cucurbita maxima* can be an excellent source of nutrients and antioxidant components.

CHAPTER ONE

1.0 Introduction

Watermelon (*Citrullus lanatus*), botanically considered as a fruit, belongs to the family Cucurbitaceae. It is native to Kalahari desert of Africa but nowadays, it is also cultivated in tropical regions of the world, (Fraser, 2006). In the pages of history, its first harvest was documented 5000 years ago in Egypt that later spread to other part of the world (Fraser, 2006). Presently, China is the top producer followed by Turkey, United States, Iran and Republics of Korea (Dane, 2008). Watermelon is a valued source of natural antioxidants with special reference to lycopene, ascorbic acid and citruline. These functional ingredients act as protection against chronic health problems like cancer insurgence and cardiovascular disorders. Lycopene is characterized by its distinctive red color in fruits and vegetable (Fraser, 2006). During the last few decades, presence of appreciable quantity of lycopene in watermelon has motivated the farmers/growers to cultivate high red flesh varieties. Overall, twelve hundred cultivars of watermelon are produced worldwide while the four most promising cultivars are picnic, icebox, yellow flesh and seed less (Dane, 2008). This review article intends to enlighten the readers regarding rich nutritional profile of the watermelon with special focus on lycopene and its therapeutic aspects like prevent oxidative stress, cancer, hypercholesterolemia, diabetes and macular disorders (Abreen *et al.*, 2014).

The watermelon was cultivated in ancient Egypt and verified by David Livingstone (the noted missionary explorer) in the 1850s when he found great tracts of watermelon (called kengwe) growing wild in the Kalahari desert and semitropical regions of Africa (Amaowo

2000). Even today, in semi-desert districts of Africa watermelons are cultivated as an important source of water during dry periods. Watermelon was widely distributed throughout the remainder of the world by African slaves and European colonists (Fraser, 2006). It was carried to Brazil, the West Indies, Eastern North America, the islands of the Pacific, New Zealand and Australia. Written records indicate that watermelons were cultivated in Massachusetts as early as 1629, before 1664 by the Florida Indians, in 1673 in the Midwest, in 1747 in Connecticut (from seeds that originated in Russia), in 1799 by Indian tribes along the Colorado River and in 1822 in Illinois. Watermelons are currently grown on all continents throughout the warm regions of the world (Amaowo, 2000).

1.1 Statement of the Research Problem

Cucurbits varieties are used for different purposes either for nutritional or medicinal purposes, but little is known about their nutritional and pharmacological activity. There is need for the evaluation of phytochemical and proximate analysis of cucurbits varieties.

1.2Aims and objectives

1.2.1 Aims

To determine the phytochemical and proximate contents of pumpkin and watermelon fruits

1.2.2 The objectives

1. Determine the phytochemicals contents of pumpkin and watermelon fruits

2. Evaluate the proximate contents of pumpkin and watermelon fruits

1.3 Justification

Naturally, cucurbits varieties possess the ability to provide nutrients, there by promoting good health and preventing diseases and also reduce oxidative damage associated with many diseases. Therefore, the evaluation of the phytochemical and proximate analysis of cucurbits varieties remains an interesting and useful task especially in preventing nutritional deficiency diseases.

CHAPTER TWO

2.0 Literature Review

2.1 Description of Watermelon

Watermelon (*Citrullus lanatus*) is a warm, long-season crop. Watermelon has been marginally competitive in the 2000 to 2003 production seasons as a vegetable crop. Production has declined in the past years. Some decrease has been the result of increased yields (Abreen *et al.,* 2014). However, much of the decline was the result of reduced consumer demand, leading to the sale of poor-quality melons (Essien, 1994). Efforts at many research stations have helped reverse the trend toward reduced per capita consumption of watermelon. To show a profit, a grower must produce good yields of high-quality melons, something that can be obtained only with careful management. Watermelon is now widespread in all tropical and subtropical regions of the world and is mostly grown for fresh consumption of the juicy and sweet flesh of mature fruit.

Locally known in the country as legapu (Setswana) it is one of the most popularly grown fruit vegetables in the country today during summer. The culture of watermelons goes back to prehistoric times. The watermelon was cultivated in ancient Egypt and verified by David Livingstone (the noted missionary explorer) in the 1850s when he found great tracts of watermelon (called kengwe) growing wild in the Kalahari desert and semitropical regions of Africa. Even today, in semi-desert districts of Africa watermelons are cultivated as an important source of water during dry periods (Dane, 2004). Watermelon was widely distributed throughout the remainder of the world by African slaves and European colonists. It was carried to Brazil, the West Indies, Eastern North

America, the islands of the Pacific, New Zealand and Australia. Written records indicate that watermelons were cultivated in Massachusetts as early as 1629, before 1664 by the Florida Indians, in 1673 in the Midwest, in 1747 in Connecticut (from seeds that originated in Russia), in 1799 by Indian tribes along the Colorado River and in 1822 in Illinois. Watermelons are currently grown on all continents throughout the warm regions of the world (Amaowo 2000).

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2.2.1 Botanical Classification of Watermelon

Kingdom	*Plantae*
Subkingdom	*Tracheobionta*
Division	*Magnoliophyta*
Class	*Magnoliosida*
Order	*Cucurbitales*
Family	*Cucurbitaceae*
Genus	*Citrullus*
Species	*Citrullus lanat*

2.2.2 Botanical Description of Watermelon

The watermelon is an annual that has a prostrate or climbing habit. Stems are up to 3 m long and new growth has yellow or brown hairs. Leaves are 60 to 200 mm long and 40 to 150 mm wide. These usually have three lobes which are themselves lobed or doubly lobed. Plants have both male and female flowers on 40-mm-long hairy stalks. These are yellow, and greenish on the back. This plant is listed on the Threatened Species Programme of the South African National Biodiversity Institute (AOAC, 2008). The watermelon is a large annual plant with long, weak, trailing or climbing stems which are five-angled (five-sided) and up to 3 m (10 ft) long. Young growth is densely woolly with yellowish-brown hairs which disappear as the plant ages. The leaves are large, coarse,

hairy pinnately-lobed and alternate; they get stiff and rough when old. The plant has branching tendrils. The white to yellow flowers grow singly in the leaf axils and the corolla is white or yellow inside and greenish-yellow on the outside (El-adawy, 2007). The flowers are unisexual, with male and female flowers occurring on the same plant (monoecious). The male flowers predominate at the beginning of the season; the female flowers, which develop later, have inferior ovaries. The styles are united into a single column. The large fruit is a kind of modified berry called a pepo with a thick rind (exocarp) and fleshy center (mesocarp and endocarp). Wild plants have fruits up to 20 cm (8 in) in diameter, while cultivated varieties may exceed 60 cm (24 in). The rind of the fruit is mid- to dark green and usually mottled or striped, and the flesh, containing numerous pips spread throughout the inside, can be red or pink (most commonly), orange, yellow, green or white (Johnson, *et al.*,2012).

2.2.3 Origin and Distribution of Watermelon

Watermelon is now widespread in all tropical and subtropical regions of the world and is mostly grown for fresh consumption of the juicy and sweet flesh of mature fruit. Locally known in the country as legapu (Setswana) it is one of the most popularly grown fruit vegetables in the country today during summer. The culture of watermelons goes back to prehistoric times. The watermelon was cultivated in ancient Egypt and verified by David Livingstone (the noted missionary explorer) in the 1850s when he found great tracts of watermelon (called kengwe) growing wild in the Kalahari desert and semitropical regions of Africa(Ene-obong, 2001). Even today, in semi-desert districts of Africa watermelons are cultivated as an important source of water during dry periods. Watermelon was widely distributed throughout the remainder of the world by African slaves and European

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2.2.4 Cultivation of Watermelon

Watermelons are tropical or subtropical plants and need temperatures higher than about 25 °C (77 °F) to thrive. On a garden scale, seeds are usually sown in pots under cover and transplanted into well-drained sandy loam with a pH between 5.5 and 7, and medium levels of nitrogen. Major pests of the watermelon include aphids, fruit flies and root-knot nematodes. In conditions of high humidity, the plants are prone to plant diseases such as powdery mildew and mosaic virus. Some varieties often grown in Japan and other parts of the Far East are susceptible to fusarium wilt. Grafting such varieties onto disease-resistant rootstocks offers protection (Rzelek, 2010). The US Department of Agriculture recommends using at least one beehive per acre (4,000 m 2 per hive) for pollination of conventional, seeded varieties for commercial plantings. Seedless hybrids have sterile pollen. This requires planting pollinizer rows of varieties with viable pollen. Since the supply of viable pollen is reduced and pollination is much more critical in producing the seedless variety, the recommended number of hives per acre (pollinator density) increases to three hives per acre (1,300 m 2 per hive). Watermelons have a longer growing period than other melons, and can often take 85 days or more from the time of transplanting for the fruit to mature. Farmers of the Zentsuji region of Japan found a way to grow cubic

watermelons by growing the fruits in metal and glass boxes and making them assume the shape of the receptacle (Alquézar, 2009). The cubic shape was originally designed to make the melons easier to stack and store, but cubic watermelons may be triple the price of normal ones, so appeal mainly to wealthy urban consumers. Pyramid-shaped watermelons have also been developed and any polyhedral shape may potentially be used, (Obiola, 2011).

2.2.5 Watermelon Cultivar Groups

A number of cultivar groups have been identified: Citroides group (syn. C. lanatus subsp. lanatus var. citroides ; C. lanatus var. citroides; C. vulgaris var. citroides) DNA data reveal that C. lanatus var. citroides Bailey is the same as Thunberg's bitter wooly melon, C. lanatus and also the same as C. amarus Schrad. It is not a form of the sweet watermelon C. vulgaris and not closely related to that species(Alquézar, 2009). The citron melon or makataan - a variety with sweet yellow flesh that is cultivated around the world for fodder, and the production of citron peel and pectin. Lanatus group (syn. C. lanatus var. caffer) C. caffer Schrad. is a synonym of C. amarus Schrad. The variety known as tsamma is grown for its juicy white flesh. The variety was an important food source for travellers in the Kalahari Desert. Another variety known as karkoer or bitterboela is unpalatable to humans, but the seeds may be eaten. A small-fruited form with a bumpy skin has caused poisoning in sheep. Vulgaris group this is Linnaeus's sweet watermelon; it has been grown for human consumption for thousands of years. C. lanatus mucosospermus (Fursa) Fursa This West African species is the closest wild relative of the watermelon. It is cultivated for cattle feed. Additionally, other wild species have bitter

fruit containing cucurbitacin. C. colocynthis (L.) Schrad. ex Eckl. & Zeyh., C. rehmii De Winter, and C. naudinianus (Sond.) Hook. (Ngoddy,2011).

2.2.6 Health Benefits of Watermelon

Red watermelon playing an important role in preventing cancer, because it contains lycopene (Lycopene is acknowledged which helpful to prevent cancer). Also, it can help in preventing skin, lung, breast, stomach and other types of cancer by up to 40%. Better eyesight watermelon contains vitamin C and vitamin A which are good for our eyes. Contains alkaline water, in a watermelon basically 92% is alkaline water; it is good for stomach especially for those who are suffering from ulcers. Reduces bad breath. Good for the kidney. It can clean our kidneys and bladder. Person who suffering from infected urine he should eat water melon and drinking water to reduce germs in the bladder. Besides, water melon leads to remove kidney stones. Helpful in gout. Watermelon is powerful energy drink. Water melon is helpful in preventing stroke and heart attack. It is helpful in decreasing blood pressure. Reinforce sex drive (Munro, 1973).

2.3 Description of Pumpkin

A pumpkin is a gourd like squash of the genus Cucurbita and the family Cucurbitaceae which also include gourds. It commonly refers to cultivars of any one of the species Cucurbita pepo, Cueurbitamitta, Cucurbita mayima and is native to North America. They typically have a thick, orange or yellow shell, creased from the stem to the bottom, containing the seeds and pulp. A pumpkin leaves is an important food for many people. It is a very vulnerable because most parts of the plant can be eaten and are rich in nutrients (Md, 2015). Pumpkin is easy to grow and one plant in garden can supply pumpkins and

green leaves throughout the year. They row all round the world for a variety of reasons (Md, 2015).Pumpkin belongs to the family with scientific name Cucurbitaceae. They do not need much cooking after once they are planted. They can be grown throughout the pacific even on a toll. Pumpkin plants grow easily from ether the leaves or cutting roots. There are many different varieties of pumpkin which differ in flavour, texture, colour and storing quality. Pumpkin grow beat in loose and rich soil. The site of an old nebbish heap is good place or site for growing pumpkins. Brushing the flowers gently with a feather or brush will help to produce more pumpkin (Mandel, 2005).

2.3.1Botanical Classification of Pumpkin

Kingdom:	Plantae
Phylum:	Spermatophyta
Subphylum:	Angiospermae
Class:	Dicotyledonae
Order:	Violales
Family:	Cucurbitaceae
Genus:	Cucurbita
Species:	Cucurbit

2.3.2 Taxonomy of Pumpkin

All pumpkins are winter squash: mature fruit of certain species in the genus Cucurbita. Characteristics commonly used to define "pumpkin" include smooth and slightly ribbed skin, and deep yellow to orange color, white pumpkins had become increasingly popular in the United States. Other colors, including dark green (as with some oilseed pumpkins), also exist (Mandel, 2005).*C. pepo* pumpkins – the two bright orange ones in center right, and squashes *C. maxima*, all others Cucurbita species fall into two main groups. The first group are annual or short-lived perennial vines and are mesophytic, i.e. they require a more or less continuous water supply. The second group are perennials growing in arid zones and so are xerophytic, tolerating dry conditions (Mandel, 2005). Cultivated Cucurbita species were derived from the first group. Growing 5 to 15 meters (16 to 49 ft) in height or length, the plant stem produces tendrils to help it climb adjacent plants and structures or extend along the ground. Most species do not readily root from the nodes; a notable exception is *C. ficifolia*, and the four other cultivated mesophytes do this to a lesser extent. The vine of the perennial Cucurbita can become semiwoody if left to grow. There is wide variation in size, shape, and color among Cucurbita fruits, and even within a single species. C. ficifolia is an exception, being highly uniform in appearance (Mandel, 2005). The morphological variation in the species C. pepo and C. maxima is so vast that ts various subspecies and cultivars have been misidentified as totally separate species. The leaves of *Cucurbita moschata* often have white spots near the veins, (Lamant, 2001).The typical cultivated Cucurbita species has five-lobed or palmately divided leaves with long petioles, with the leaves alternately arranged on the stem. The stems in some species are angular. All of the above-ground parts may be hairy with various types of

trichomes, which are often hardened and sharp. Spring-like tendrils grow from each node and are branching in some species. C. argyrosperma has ovate-cordate (egg- shaped to heart-shaped) leaves. The shape of C. pepo leaves varies widely. C. moschata plants can have light or dense pubescence. C. ficifolia leaves are slightly angular and have light pubescence. The leaves of all four of these species may or may not have white spots (Lamant, 2001).

2.3.3 Origin and Distribution

The word pumpkin originates from the word pepon which is Greek for "Large melon". The French adapted this word to Pompon, which the British changed to Pumpion and later, American colonists changed that to the word we use today, "pumpkin" (Jayaprakasha, 2001). The origin of pumpkins is not definitively known, although they are thought to have originated in North America. The oldest evidence, pumpkin- related seeds dating between 7000 and 5500BC were found in Mexico. Pumpkin are squash like fruit that range in size from less than 1 pound (0.45 kilograms) to over 1,000 pounds (450 kilogram). Since some pumpkins, the names are frequently used interchangeably. In general, pumpkin stems are more rigid, prickly, and angular (with an approximate five-degree angle) than squash stems which are generally softer, more rounded, and more flared where joined to the fruits (Jayaprakasha 2001).

2.3.4 Pumpkin Cultivation

Pumpkins are grown all around the world for a variety of reasons ranging from agricultural purposes (such as animal feed) to commercial and ornamental sales of the seven continents, only Antarctica is unable to produce pumpkins. The biggest

international producers of pumpkins include the United States, Canada, Mexico, India, and China. The traditional American pumpkin used for jack-o-lanterns is the Connecticut Field variety. In the United States A pumpkin patch in Winchester, Oregon as one of the most popular crops in the United States, in 2017 over 680,000,000 kilograms (1.5 billion pounds) of pumpkins were produced. The top pumpkin-producing states include Illinois, Indiana, Ohio, Pennsylvania, and California. According to the Illinois Department of Agriculture, 95% of the U.S. crop intended for processing is grown in Illinois (Harbone, 1993). Nestlé, operating under the brand name Libby's, produces 85% of the processed pumpkin in the United States, at their plant in Morton, Illinois. In the fall of 2009, rain in Illinois devastated the Nestlé crop, resulting in a shortage affecting the entire country during the giving holiday season (Goda, 2007). Pumpkins are a warm-weather crop that is usually planted in early July. The specific conditions necessary for growing pumpkins require that soil temperatures 8 centimetres (3 in) deep are at least 15.5 °C (60 °F) and that the soil holds water well. Pumpkin crops may suffer if there is a lack of water or because of cold temperatures (in this case, below 18 °C or 65 °F; frost can be detrimental), and sandy soil with poor water retention or poorly drained soils that become waterlogged after heavy rain. Pumpkins are, however, rather hardy, and even if many leaves and portions of the vine are removed or damaged, the plant can very quickly re-grow secondary vines to replace what was removed. Pumpkins produce both a male and female flower; honeybees play a significant role in fertilization. Pumpkins have historically been pollinated by the native squash been *Peponapis pruinosa* , but this bee has declined, probably at least in part to pesticide (imidacloprid) sensitivity, and today most commercial plantings are pollinated by honeybees. One hive per acre (4,000 m 2 per

hive, or 5 hives per 2 hectares) is recommended by the U.S. Department of Agriculture. If there are inadequate bees for pollination, gardeners often have to hand pollinate. Inadequately pollinated pumpkins usually start growing but abort before full development. Giant pumpkins See § Pumpkin festivals and competitions below. Giant pumpkins at a "heaviest pumpkin" competition "Giant pumpkins" are a large squash (within the group of common squash *Cucurbita maxima)* that can exceed 1 tonne in weight. The variety arose from the large squash of South America through the efforts of botanical societies and enthusiast farmers, (Goda, 2007)..

2.3.5Health Benefit of Pumpkin

Many people think of pumpkins as little more than a Halloween decoration or a Thanksgiving pie filling. However, it may be time to rethink this plump, nutritious orange plant. Pumpkin is a highly nutrient-dense food (Harbone, 1993). It is rich in vitamins and minerals but low in calories. Pumpkin seeds, leaves, and juices all pack a powerful nutritional punch (Kreft, 2007). There are many ways pumpkin can be incorporated into desserts, soups, salads, preserves, and even as a substitute for butter. A range of pumpkin products is available for purchase online (Fenko, 2009). This MNT Knowledge Center feature is part of a collection of articles on the health benefits of popular foods. It will explore the health benefits and nutritional content of pumpkins, as well as ways to include more in the diet, (Harbone, 1993).

2.3.6 Fast Facts on Pumpkins

- The potassium contained within pumpkins can have a positive effect on blood pressure.

- The antioxidants in pumpkin could help prevent degenerative damage to the eyes.
- Avoid canned pumpkin pie mix, as it typically contains added sugars and syrups.
- Uncut pumpkins should be stored in a cool, dark place for up to 2 months.
- Pumpkin puree or canned pumpkin can be used as a replacement for butter or oil in baking recipes.
- Pumpkin has a range of fantastic health benefits, including being one of the best-known sources of beta-carotene.
- Beta-carotene is a powerful antioxidant. It also gives orange vegetables and fruits their vibrant color. The body converts any ingested beta-carotene into vitamin A.
- Consuming foods rich in beta-carotene may reduce the risk of developing certain types of cancer, offer protection against asthma and heart disease, and delay aging and body degeneration.
- Many studies have suggested that eating more plant foods such as pumpkin decreases the risk of obesity and overall mortality.
- It can also help prevent diabetes and heart disease, and promote a healthy complexion and hair, increased energy, and a healthful body mass index (BMI).
- Pumpkins are also a powerful source of fiber.

Regulating blood pressure: Eating pumpkin is good for the heart. The fiber, potassium, and vitamin C content in pumpkin all support heart health (FAO, 1993).Studies suggest that consuming enough potassium may be almost as important as decreasing sodium intake for the treatment of hypertension, or high blood pressure. Decreasing sodium intake involves eating meals that contain little or no salt. Increased potassium intake is

also associated with a reduced risk of stroke, protection against loss of muscle mass, and preservation of bone mineral density. Reducing the risk of cancer. Research has suggested a positive relationship between a diet rich in beta-carotene and a reduced risk of prostate cancer. Beta-carotene has also been shown to hold back the development of colon cancer in some of the Japanese population (FAO, 1993).

CHAPTER THREE

3.0 Materials and Methods

3.1 Study Area

This research was carried out at Biochemistry Laboratory, Federal University Gusau.

3.2 Sample Collection

The samples (fresh pumpkin and watermelon) werecollected or obtained from Gusau Central Market Zamfara state. Each collected sample was immediately transported in cleaned polythene bags to the laboratory prior to analyses.

3.2.1 Sample Preparation

The fresh pumpkin and watermelon werewashed and then rinsed with distilled water in order to remove contaminants. The sampleswheresliced and left in oven dried for two (2) days and grounded using a mortar and pestle.

3.3 Determination of Proximate Contents

3.3.1 Determination of ash content

Lignite a clean crucible in a hot furnance for one minute, and remove the crucible and cool in a dessicator and weigh as W1. Weigh 2g of the grinded samples were put in the empty crucible and weigh as W2. Heat the crucible containing the sample in a muffle furnance at 550°C to 600°c for 5 hours to burn off all the organic matter, remove the crucible, cool in a dessicator and weigh as W3. The percentage of ash content was determined using the formula below:

W1 = weight of empty crucible after heating in gram

W2 = weight of 2g of the sample and empty crucible before heating in a muffle furnance

W3 = weight of 2g of the sample and empty crucible after heating in a muffle furnance

3.3.2 Determination of Moisture Content

Clean and dry empty dish in an oven at 80°C for about 30 minutes and weigh as W1. Weigh 2g of the grinded sample and pour into the dish, then weigh as W2, place the dish containing the sample in the hot air oven and dry at 105oc for 24 hours. Cool in a dessicator for 20minutes and weigh as W3, the procedure was repeated, drying for about 3hours for each subsequent drying until a constant value is obtain. The percentage moisture content was determined using the formula below:

W1 = Weight of empty crucible after heating in oven

W2 = Weight of empty crucible and 2g of the sample after heating in oven

W3 = Weight of empty crucible and 2g of the sample after heating in muffle furnance

3.3.3 Determination of Crude Fiber

Weigh 2g of the powdered sample and place in a conical flask, add 20 ml of distilled water, 20 ml of 10% H2SO4 and then boil for 30 minutes to maintain constant volume, filter with muslin cloth and rinse with warm water, use a spatula to scrap the sample into flask, add 20 ml of 10% Na0H and then boil for 30 minutes. Filter with muslin cloth, then ethanol was used to rinse the sample once more, allow to dry and scrap the residue into a crucible. Place the crucible in an oven to dry at 105oc for 1 hour and then weigh as W1.

Again put the crucible in a muffle furnance to ash for 2 hours at 550oc, cool in a dessicator and weigh as W2. The percentage of crude fiber was determined using the formula below:

W1 = weight of sample and crucible after heating in an oven

W2 = weight of sample and crucible after heating in muffle furnance

W3 = weight of the sample

3.3.4 Determination of Crude Lipid

Set up the soxhlet apparatus and weigh 2g of the sample, place into a thimble which was dried weigh as W1. Weigh the thimble containing the powdered sample as W2, cover the mouth of the porous thimble with cotton wool so as to distribute the dropping organic solvent. Place the thimble into the extraction chamber and add organic solvent. Heat the flask for 5-6 hours, then remove the flask and evaporate the organic the organic solvent finally weigh the extraction flask containing the oil.

Calculation

W1 = weight of sample and filter paper after extraction

W2 = weight of sample and filter paper before extraction

W3= weight of sample

3.3.5 Determination of Crude Protein

Digestion: 2g of the samples were weighed into a kjeldahl flask containing 0.8g of catalyst mixture and antibumping granules. 20ml of concentrated sulphuric acid was slowly added and placed on a heating mantle. Digestion was carried out for 6 hours till contents were colorless. The flask is allowed to cool and the content wsa transferred to a 100ml volumetric flask and the volume was made up to the mark with distilled water.

Distillation: 10ml of 2% boric acid will be pipetted into a 100ml conical flask. 4 drops of screened methyl red indicator was added to the contents. 10ml of the dilute sample was taken and transferred into the distillation apparatus followed by 15ml of 40% NA0H (sodium hydroxide) solution. The mixture was distilled for 40 minutes ensuring that the end of condenser well inside the contents of the receiver.

Titration: the distillate was titrated with 0.2ml HCL to end point. Correct titer value was obtained by a blank titration.

Calculation

$$\%N = \frac{TV \times NA \times 0.014 \times DF \times 100}{\text{Weight of sample} \times \text{ml of sample}}$$

Tv = Titrevalue

0.1 = concentration of HCL (normality of HCL)

0.014 = nitrogen factor (constant)

50 = dilution factor of distilled water (H2o)

100 = constant

2 = weight of the sample in gram

10 = mill of aliquate

3.3.6 Determination of Carbohydrate

% carbohydrate = 100 – (% ash + % moisture +% crude fiber + % crude lipid + % crude protein).

3.4 Qualitative Analysis of Phytochemical Constituent

3.4.1 Test for Alkaloid

The presence of alkaloid was determined as described by Harborne 1999; Trease and Evans 2000. A portion of the plant powder (5g) was reacted with a few drops of hagers reagent (1.0 cm3) and another 5g portion was treated with wegners reagent (1.0 cm3) turbidity or precipitate with either of these reagents was taken as an evidence for the presence of alkaloids(Harbone, 1973).

3.4.2 Test for Tannins

Ferric chloride solution 5% ferric chloride solution was added drop by drop 2-3ml of the extract and the colored produced was noted. Condensed tannins usually give a dark green color; hydrolysable tannins give blue- black color (Harbone, 1998, Trease and Evans, 1978).

3.4.3 Test for Saponnins

5ml of the extract were placed in a test tube + 5ml of water and sharked strongly, the whole tube was filled fronth that lasts for several minutes (Harbone, 1973, Wall, *et, al.*, 1954).

3.4.4 Test for Flavonoids

3ml aliquot of the filtrated and 1ml of 10% NaOH sodium hydroxide, if a yellow color is developed this indicates the possible presence of flavonoid compounds (EL-Olery *et,al.*, 1994, Harbone, 1973).

3.4.5 Test for Glycosides

5ml of 50% H2so4 was added to 5cm³ of the extracts in a test tube. The mixture is heated in boiling water for 15minutes. Cool and neutralize with 10% NaOH, add 5ml of fehling's solution isadded and the mixture was boiled. A brick- red precipitate was observed which indicate the presence of glycosides (Harbone, 1973).

3.4.6 Test for Cardiac Glycoside

To one of herb extract two ml of 3.5% ferric chloride solution were added and allowed to stand for one minutes. Or 1 of conc H_2SO4 was carefully poured down to the wall of the tube so as to form a lower layer. A reddish brown ring the interface indicates the two layer presence cardiac glycoside (Harbone, 1973).

3.4.7 Test for Steroids

This was carried out according to the method of Harbone 1999. 5ml of the extract is dissolved in 2ml of chloroform, 2ml of sulphuric acid was carefully added to form lower layer. A reddish brown color at the inter face indicate the presence of a steroidal ring.

3.4.8 Test for Saponin Glycosides

To 2.5ml of the extract was added 2.5ml of fehing's solution A and B. a bluish green precipitate showed the presence of saponnin glycosides (EL-oley *et al.*, 1994).

3.4.9 Test for Balsams

The extract was mixed with equal volume of 90% ethanol. 2 drops of alcoholic ferric chloride solution was added to the mixture. A dark green colour indicates the presence of balsams (EL-oley *et al.*, 1994).

3.4.10 Test for Anthraquines

0.50 of each plant extract was shaken with 10ml benzene, and 5ml of 10% ammonia solution was be added. The mixture was shaken and the presence of a pink, red, or violet color in the ammoniacal (lower) phase indicates the presence of anthraquinones.

3.4.11 Test for Volatile Oils

1ml of the fraction was mixed with dil. HCL. A white precipitate was formed which indicated the presence of volatile oil (Evans 1980).

3.5 Statistical Analysis

Data obtained was statistically analyzed using descriptive statistics on SPSS statistical software plat form, and values were express as mean ± standard deviation of the triplicate values.

CHAPTER FOUR

4.0 Results

The phytochemical analysis of watermelon and pumpkin is shown in table 4.1. The following parameters are present in both the watermelon and pumpkin; flavonoids, saponinand saponin glycosidecarde. Cardiac glycoside and anthraquinine are present in watermelon but absent in pumpkin. Glycoside, alkaloid, tannins, steroid, balsam and volatile oil are absent in both the watermelon and pumpkin.

Table 4.1: Qualitative Phytochemical Analysis of Water melon and Pumkin

Parameters	Water Melon	Pumpkin
Flavonoid	+	+
Tannins	-	-
Saponins	+	+
Glycoside	-	-
Cardiac glycosides	+++	-
Saponin glycoside	+++	++
Alkaloids	-	-
Steroids	-	-
Balsams	-	-
Anthraquines	+	-
Volatile oil	-	-

Table 4.2: Proximate Composition of Water melon and Pumkin

The result of the proximate composition of the watermelon and pumpkin is shown in table 4.2. Carbohydrate with value of 84% has the highest percentage in the watermelon, followed by the following; crude lipid, having (8%), ash content 6%), crude protein (3%) and crude fiber (1%). Carbohydrate with (25%) value has the highest in the pumpkin, followed by the following in ascending order of magnitude; ash content (6%), moisture content (24%), crude protein (2%), crude fiber and crude lipid with (1%) value.

Table 4.2: Proximate Composition of Water melon and Pumkin

Composition on	Water Melon and	Pumpkin
Ash Content	6.48±0.023	65.40±0.52
Moisture Content	2.6±0.07	4.51±0.031
Crude Protein	3.84±0.48	2.24±0.009
Crude Fiber	1.24±0.002	1.3±0.026
Crude Lipid	8.71±0.068	1.85±0.0256
Total Carbohydrate	84.25±0.35	24.7±0.031

The result of proximate analysis and standard deviation in tabular form

CHAPTER FIVE

5.0 Discussion, Conclusion and Recommendation

5.1 Discussion

5.1.1 Qualitatve-Phytochmicals

The results of qualitative phytochemicals analysis of Water Melon and Pumpkin fruits presented in Table: 1 showed that the water melon contains high amount of saponins glycosides, cardiac glycosides, flavanoids, saponins and Anthraquines while tannins, glycosides, alkaloids, steroids, balsams and volatile oil are absent which are vital for health benefit through cells signalling thereby reducing mortality rates observed in people consuming high levels of plant base food (Hertog, 1993). While pumpkin contain only flavanoids, saponins glycosidesand saponins, the other parameters like volatile oil, tanins, balsam, Anthraquinines, are all absent according to the result obtained.

5.1.2Proximate Composition of water melon and pumpkin

The result of proximate composition of water melon and pumpkin was measured. The total carbohydrates content is high 84.25±0.35% (pumpkin) and 24.7±0.031% (watermelon), followed by the crude lipid 8.71±0.068% (pumpkin) and 1.85±0.0256% (watermelon), crude protein 3.84±0.48)pumpkin and 2.24±0.009% (.water melon), ash content 2.6±0.07%, (pumpkin) and 4.51±0.031% (watermelon). The moisture content is high 65.40±0.52% (watermelon) and 65.40±0.52 (pumokin) when compared with Haiwan 5.38±0.012 0n *Ipoema batatas*, crude fiber is low 1.3±0.026 (watermelon) and 1.24±0.00 (pumpkin) also compared to that Haiwan 1.5±0.1 Table: 2

5.3 Conclusion

From the result obtained it can be stated that of water melon and pumpkin contain high amount of proximate composition and some phytochemicals, this indicate that water melon and pumpkin can serve as medicinal purpose for certain disease conditions and also can provide energy support for the metabolic activity of the body.

5.4 Recommendations

Based on the finding of this study, the following recommendations are made:

1. Due to the proximate and phytochemical contents and of water melon, it is there by recommend to be consumed daily.
2. Further research should be carried proximate and phytochemical content of water melon and pumpkin.
3. I also recommend that various storage conditions should be used to further ascertain its effect on proximate and phytochemical content of water melon and pumpkin.

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