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PRODUCTION OF ANNONA MURIATA JUICE AND DETERMINATION OF ITS PROXIMATE COMPOSITION.

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Abstract

Fruit Juice is the liquid naturally contained in fruit or vegetable tissue fruit and can be prepared mechanically by squeezing fresh fruits or fresh vegetables. Soursop juice is diuretic while other parts have antibacterial, anti- cancerous, astringent, sedative and other properties.The study was conducted to determine the proximate composition of soursop juice .The soursop juice was prepared using AOAC (1995) method and proximate composition was determined in terms of moisture, ash, protein, ether extract and crude fibre. The result shows thattheproximate composition contain moisture 30.39%,ash 2.52%,fiber 2.03%,fat 3.06% and carbohydrate 58.02%.The result of this research will highly be of an advantage to patients that have infections like urinary tract infection, wound infection, scuvry etc which soursop have being found to have given a final blow therefore it is recommended for consumption .

Keywords: Soursop Juice, Proximate Analysis, Fibre, Composition

Introduction

Soursop (AnnonaMuricata) also known as guanabana belonging to the family Annonaceae and indigenous to tropical North and South America is one of the exotic fruits prized for its very pleasant, sub acid, aromatic and juicy flesh. The fruit hardily grows in temperate countries (Janick et al, 1969) and was introduced in china, Australia and Africa (Anon, 1975) and thrives in the rain forest zone of West Africa (Glendhil et al, 1972). Observation showed that it grows throughout southern Nigeria and it is mostly eaten as fresh fruits.

According to Dalziel (1948), soursop has a pleasant aroma which is taken as desert or made into a refreshing beverage. It consists of a large heart-shaped edible fruit of various sizes. However, it is highly susceptible to spoilage, softens very rapidly during ripening and becomes mushy and difficult to consume fresh. Soursop is equally rejected at market because of external injury or uneven shape and size (Umme et al, 2001).

The economic and nutritional importance of fruits to Nigerians cannot be over emphasized. It is a major source of income for farmers who cultivate them for fresh. Soursop like other tropical fruits serves as a potential source of raw materials for fruit products such as juice, beverages, wines, jellies etc (Tressler and Ardel 2003).

Fruit Juice is the liquid naturally contained in fruit or vegetable tissue fruit and can be prepared mechanically by squeezing fresh fruits or fresh vegetables. Soursop juice is diuretic while other parts have antibacterial, anti- cancerous, astringent, sedative and other properties (Taylor 1998).

According to Hedick (2000), soursop juice serves as non-alcoholic beverage drinks for thirst quenching, for pleasure and for supplying vitamin especially vitamin c.

Vitamin c or ascorbic acid is one of the major nutrients in soursop fruit and other fruits and does great work in the body. Ascorbic acid plays an important role in the tissues as an anti-oxidant, curing of scurvy, intercellular cementing to build connective tissues and help in general body metabolism (Schneeman, 1990).

In Nigeria today, most of the juices made from natural sources have increased and the availability of fruits is short lived due to their seasonal and highly perishable nature. A large percentage of the fruits are consumed directly as they come from the orchards. Due to lack of appropriate storage facilities, up to 30-60% losses are recorded annually during peak harvesting seasons. In order to minimize these losses, there is need to preserve and store them from time of harvest through the period of scarcity, for the purpose of retaining them as foods, an article of trade and to make them available at off season period (Tressler et al, 1980).

Indonesian is known for using medicinal plants to overcome the health problems since a long time ago. One of medicinal plant is soursop (Annonamuricata Linn) with various health benefits which obtained from the fruit flesh, bark, flowers, root, seed and leaf (Mardiana and Adeanne. 2015) This plant is reported very useful in various health disease treatment such as preventing and treating cancer, treating hemorrhoid, reducing cholesterol, eliminating acne, fever, respiratory illness, malaria, liver, heart and kidney infection . Various studies have revealed about pharmacological activity of A. muricata L. such as antimicrobial, antiprotozoan, insecticide, larvicide, selective cytotoxicity to tumoral cells, anxiolytic, anti-stress, anti-ulceric, wound

healing, anti-icteric, hepatoprotective, hypoglycemic and antioxidant {Naspiah 2013]. Ethanol, water and n-hexane extract of soursop leaf show antioxidant properties by neutralizing free radicals using DPPH method [Hamid and Lawal 2017]. The benefits of A. muricata L. leaf extract are reported as an antioxidant and correlate with secondary metabolites [Gavamukulya and Fred). This is supported by research from phytochemical screening conducted, where the ethanol extract of A. muricata L. leaf contain compounds alkaloid, saponin, terpenoid, flavonoid, coumarin, lactone, anthraquinon, phenol, and phytosterol. Other reports that soursop plant has powerful phytochemicals, that is Annonaceousacetogeneins which are found only in Annonaceae family. These chemicals in general have been documented with antitumor, antiparasitic, insecticidal and anti-microbial activities. These acetogeneins are strong inhibitor of enzyme processes, that are found only in membran of cancerous tumour cells. The antioxidant activity is also related with their ability to quench reactive oxygen species such as singlet molecular oxygen and peroxyl radicals, thus acting as deactivators of excited molecules or as chain breaking agents respectively (Agu and okolie 2017]. Antioxidants are chemical compounds that can contribute one or more electrons to free radicals. So, as to neutralize the increase in free radicals, protect cells from the toxic effects produce and contribute the prevention of diseases . Antioxidant can protect the human body against damages which are caused by reactive oxygen compounds (ROS) and other free radicals. In addition, antioxidant can reduce oxidation of fats and oils, minimize process of damage in food, extend the usage period in food industry, increase the stability of fats that contained in food and prevent loss of sensory and nutritional quality. The role of antioxidant is very important in neutralizing and destroying free radical which can cause cell damage and also damage inside biomolecules. In small amounts, free radical can be neutralized by the body's enzymatic systems such as the enzyme catalase, glutathioneeperoxidase, superokside dismutase and glutathione-s-transferase. If amount of free radicals in body is excessive, antioxidants from outside the body are needed (exogenic) such as flavonoids, vitamin A, vitamin C and vitamin E . So as to improve public health, this paper is focused on production of Annonamuricata juice and determination of its proximate composition

Research Objective

In view of the fact that soursop is a seasonal fruit and as a fruit will also contain essential

minerals which are beneficial to man. The aim of this research is as follows.

i. Production of fruit juice from edible part of AnnonaMuricata (Soursop).
ii. To determine the proximate composition of Annonamuricata {Soursop}.

Materials And Methods

Materials

The following materials were used for the production and analysis:

- Fresh Soursop fruit
- Hand crowner machine
- Sterilize bottle
- Muslin cloth
- Electric blender
- Label
- Electronic balance
- Additives
- Muttle furnace
- Cotton wool heating mantle
- Oven
- Soxhlet apparatus
- Crucible with lid
- 250ml beaker
- Petrort stand with clamp
- Leibig condenser
- Conical flask
- Fitter paper
- Double spring clip
- 500mlkleldahi flask
- Spatula
- Forceps
- Fume cupboard
- Adapter
- Distillation
- Flask
- Atomic absorption spectrometer (AAS)
- Wash bath

Collection and Identification Of Sample

The fresh fruits were bought from different markets in Oko in Orumba- North Local Government Area of Anambra State. The fruits were identified by Dr. S.I Okeke, a taxonomist in Department of Science Laboratory Technology Federal Polytechnic, Oko in AnambraState.

Juice Production

The method that will be adopted is according to Fisher et al (1976).

i. About 100g of the fruit was washed under running tapwater, handpeeled and deseed.
ii. The soursop fruit pulp was blended with electric blender having added

about a litre of water to extract the juice.

iii. The extracted juice was first filtered or strained with muslin cloth.

iv. It was later re-filtered to collect the clear juice.

v. Some additives was added which includes citric acid to acidify the juice, sugar to add taste, carboxyl methyl cellulose (CMC) as a stabilizer and sodium benzoate as the preservative.

vi. The juice was bottled into a sterilized bottle and will be crowned using hand crowner machine.

vii. The bottle juice was pasteurized at 60^0c for 30 minutes in a pasteurizer.

viii. The bottle juice was later placed in refrigerator for storage.

In summary, the production process that was involved is outlined in fig 1 below:

Collection

↓

Weighing

↓

Juice extraction

↓

Juice formulation

↓

Bottling and corking

↓

Pasteurizing

↓

Cooling and Packaging

Fig 1: Flow chart that will be used for the production of AnnonaMuricata(Soursop)

Juice C Fisher et al 1976)

Methods For Proximate Analysis

1 Moisture Content Determination

The method described by AOAC (1995) was adopted. The method is based upon the removal of water from the sample and its measurement by loss of weight.

A clean crucible was weighed and dried in the Oven (W_1): 1.0g of the sample was weighed into the crucible (W_2) and dried at 100^{o}C for some minutes the crucible was then transferred, from the oven to desiccators, cool and reweighed (W_3). The percentage (%) moisture content was calculated from:

% Moisture Content = $\frac{W_{2-W_3}}{W_{2-W_1}}$ x $\frac{100}{1}$

Crude Protein Determination

Kjeldahl method was used (AOAC, 1995). This method was divided into three (3) namely: digestion, distillation and titration.

Digestion: Approximately 0.1g of ground air dried tigernut sample was weighed into clean dried Kjeldahl flask for digestion and 0.1g (Copper tetraoxosulphate (iv) crystal. 0.5g sodium teraoxosulphate (iv) crystal and 25ml of concentrated H_2SO_4 acid was added into the flask and some glass beeds were added into the flask content as an anti-bumping agent. The Kjeldahl flask and its content was transferred to the digesting chamber in a fume cupboard and was digested. Digestion continued constant rotation of the digestion flak until it changes colour (that is form black to light blue). The digestion flak was allowed to cool. The digest was made up to 100ml using distilled water and shaking vigorously to a homogenous solutions.

Distillation: Out of the homogenous solution of the digest. 20ml was transferred into a distillation flask using a pipette. Then 20ml of 40% sodium hydroxide solution was added carefully down the side of the flask through a funnel. After this, 50ml of 2% boric acid solution was pipetted into a receiving flask and two drops of methyl red indicator was added. The distillation unit was fitted such that the condenser was connected to the receiving flask through a funnel then 2% Boric acid solution was pipette reoccurring flask and two drops of methyl red indicator added the distillation unit was fitted such that the condenser was connected to the receiving flask with a glass tube and the condenser cooled with constant supply of cold water from tap. Also, the tip of the glass tube was immersed in the boric acid. The distillation unit was then heated on a heating mantle for about 35 minutes until the pink solution of the boric acid turned blue and the volume increased to about 100ml by the distillate.

Titration: Ten millilitres (10ml) of the distillate was titrated against 0.1N hydrochloric acid to a colourless end point. A blank solution was also titrated to get recorded, the percentage crude protein was calculated as follows.

% crude protein = % Nitrogen x 6.25

Where % Nitrogen = $\frac{28 \times ut - vb}{100\ W_o}$

V_t = titre volume of sample

V_b = titre volume of blank

W_o = weight of sample

Ash content Determination

The AOAC (1995) method was used, the porcelain crucible was dried in an oven at 100^{o}C for 10mins, cooled in a desiccator and weighed (W_1). Two gram of the sample was placed into the previously weighed porcelain crucible and reweighed (W_o) and the placed in the furnace for few hours at 600^{o}C to ensure proper ashing. The crucible

containing the ash was removed cooled in the desiccator and weighed (W_3). The ash content was calculated as %.

% = Ash content = $W_3 - W_1$ x 100

W_2-W_1

Fat Content Determination

The fat content was determined as in the AOAC (1995). A clean, dried 500ml round bottom flask containing few anti-bumping granules were weighed (W_1) and 150ml ethanol and normal –haxane was weighed transferred into the flask fitted with soxhlex extraction apparatus. The round bottom flask and a condenser were connected to the soxhlet extractor and cold water circulation was put on. The heating mantle was switched on and the heating are adjusted until the solvent was refluxing at a steady rate. Extraction was carried out for an hour. The round bottom flask and extracted oil was cooled and the weighed (W_2). % crude fat content =

$W_2 - W_1$ x 100

Weight of sample

Determination of Crude Fibre

The method described by AOAC (1995) was used 2.0g of the finely ground sample was weighed out into a round bottom flask. 100ml of 1.25% suphuric acid solution was added and the mixture boiled under a reflux for 30mins. The hot solution was quickly filtered under suction. The insoluble matter was washed several times with hot water until it was acid free. It was quantitatively transferred into the flask and 100ml of hot 1.25% sodium hydroxide (NaOH) solution was added and the mixture boiled again under reflux for 30minutes and quickly filtered under suction. The soluble residue was dried to constant weight in the oven at a 105^{oC}cooled in a desiccators and weighed sample furnance at 300^{o}C for about 30 mins cooled in the desicators and reweighed (C_2), the loss in weight of sample of incineration = $C_1 - C_2$

% crude fibre = $\frac{C_1 - C_2}{\text{Weight of original sample}} \times \frac{100}{1}$

Determination of Carbohydrate

The total carbohydrate content was determined by difference. The sum of the percentage moisture, ash, crude fat, crude protein, crude fibre was subtracted from 100 (mutter and Tobin, 1980). Total carbohydrate = 100 –(% moisture + % Ash+% fat + % protein % fibre).

Result And Discussion

Soursop fruit is useful as a processed product due to its high pulp recovery and many flavor compounds, particularly rich volatiles. Some constraints to processing are: 1) short storage life of the soursop fruit; 2) fragile peel; 3) uneven ripening of soursop fruit which makes the selection for processing tedious; 4) loss of flavor by thermosensitive processing methods; and 5) the need to inactivate the enzymes in soursop pulp. One hundred grams of raw soursop fruit yields 66 calories.The nutritional composition content consist ofmoisture 30.39,ash 2.52,fiber 2.03,fat 3.06 and carbohydrate 58.02. The citrate concentration in soursop juice is higher (8.82 g/L) than in WHO/UNICEF Oral Rehydration Salt (ORS) preparation standard (2.9 g/L) in the form of presidium citrate dehydrate.

Conclusion And Recommendation

On evaluating proximate composition of soursopjuice , it is concluded that soursop juice has a good nutritive value, it is a good source of fibre and minerals, and low moisture content can increase its shelf life. Soursop juice has good nutritive value and source of fibre and minerals, and low moisture content will increase its shelf life.The Juice is diuretic while other parts have antibacterial, anticancerous, astringent, sedative and other properties (Dai et al, 2006). Soursop like other tropical fruits serves as a potential source of raw materials and for fruit products such as juice, beverages, wine, jellies, jampuree, power fruit bars and flakes. It also provides a source of nutrients and play important role in the diet of many people living in the tropics by raising its nutritional value through the provision of essential minerals and vitamins.The result of this research will highly be of an advantage to patients that have infections like urinary tract infection, would infection, scurvy etc which soursop have being found to have given a final blowthere fore it is recommended for consumption.

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