Review

Cashew apple utilization in Nigeria: Challenges and prospects

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Cashew apple, a juicy fruit, rich in vitamins and minerals, is still a highly underutilized fruit in Nigeria. Cashew apple can be processed into a variety of products, such as juice, quash, syrups, jam, candy, wine alcohol, vinegar and dietary fiber. Although various research works have been carried out on cashew apple, and its nutritional qualities, a number of challenges may still be responsible for it's under utilization. There is a lack of knowledge and skills in the processing and post-harvest management of cashew apple and its products. This results in a large amount of wasted material from Cashew nut processors in Nigeria. Other challenges may include unavailability and affordability of cashew apple handling and processing technologies, and low level of cashew apple consumption as a result of its inherent astringent compounds. Constant training and retraining of processors, collaboration between cashew nut processors and cashew apple processors, mass production and affordability of such simple and adaptable technologies will go a long way in addressing these challenges.

Key words: Cashew apple, cashew utilization, challenges and prospects.

INTRODUCTION

Cashew (Anacardium occidentale L.) is a very popular and widely propagated tree in Nigeria. It is often propagated for the economic importance of the nut it produces as well as the “cashew apple” or pseudo-fruit which is actually a swollen stalk leading to the nut. Cashew trees are enjoyed for their fruit during its fruiting season and as a sun shed at off season. Its fruit consists of a nut and an apple which is attached to the stalk of its tree. Cashew apple is juicy and rich in vitamins and minerals. According to Augustin (2001), the moisture content of cashew apple ranges from 85 to 89%, while its protein content was put at 0.2 and 0.1% for fat content, 11.6% carbohydrates and 0.9% crude fiber. Its mineral content was found to be 261 mg /100 g while vitamins such as thiamin - 0.02 mg/100 g, niacin - 0.5 mg/100 g, nicotinic acid - 0.4 mg/100 g and vitamin A - 39 IU were...
also found to be present in cashew apple.
Cashew apple, a potentially useful nutritional source, is
almost entirely wasted during current standard
processing methods (Abdul and Peter, 2010). In Nigeria,
much attention has been placed on cashew nut and
cashew nut processing while very little attention is placed
on its apple. Often times, cashew nut processors in
Nigeria harvest fresh and ripe cashew fruit just for its nut,
while the apple is left to rot away. However, cashew
apple can be processed into a variety of products with
high economic and nutritional value in Nigeria.

PRODUCTS FROM CASHEW APPLE

The cashew apple can be processed into a variety of
products such as Juice, Quash, Syrup, Jam, Candy,
Wine, Alcohol, Vinegar and Dietary fiber. Well-developed
current technologies exist for the production of these
preparations.

Cashew apple juice

Simple pressing of cashew apple can yield good quality
juice. Extraction can be done by using cashew juice
expeller, screw press, basket press or hydraulic press to
maximize juice collection. The juice can be prepared by
pressing, filtering using a muslin cloth and pasteurizing.
The juice can be used neat or by blending with other fruit
juices. From the Preliminary investigation carried out in
the National Centre for Agricultural Mechanization (NCAM), Ilorin, Kwara State, 100% cashew apple juice
from same fruit variety pasteurized at different
temperatures and time resulted in slight differences in
flavor and color. This is a good indicator of possible
varieties of its juice. The cashew apple juice can be
blended with lime juice, orange juice or pineapple juice at
a ratio of 3 to 1 and served chilled.

Cashew apple syrup

Simple boiling of cashew apple juice above boiling point
of water can yield good quality cashew syrup. 750 ml of
cashew apple syrup can be prepared using 1 kg of
cashew apple. The juice obtained from the cashew apple
can be cooked under brisk stirring with or without any
additive until it turns to syrup. Preliminary investigation
carried out in the National Centre for Agricultural
Mechanization (NCAM) shows that cashew juice can be
prepared into syrup without any additive or osmotically
active agents, and can stand ambient storage for over six
months and stability tests are ongoing as at the time of
this review. Cashew apple syrup usually has a sharp
sweet taste and good aroma.

Alcohol from cashew apple

The cashew apple can also be used for alcohol
production. The mean recovery of alcohol from cashew
apple is reported to be about 1.5%. This underscores the
huge economic potential of cashew apple that is currently
being wasted. Neelakandan and Usharani (2009)
produced alcohol from cashew apple juice using
immobilized Saccharomyces cerevisiae yeast. Medicinal
properties of cashew alcohol are reported by Augustin

Dietary fiber

Fibrous residue left after extraction of juice can be dried
and used in foods as dietary fiber. After extraction of
juice, the chaff can be soaked in water to remove the
residual juice; it is then dried and milled into powder.
Experimental trials are currently ongoing in the National
Centre for Agricultural Mechanization (NCAM) aimed at
blending dried cashew fiber with high calorie foods as a
means of reducing diet calorie intake.

CHALLENGES AND PROSPECTS OF CASHEW
APPLE UTILIZATION

Although a variety of research works have been carried
out on cashew apple and its nutritional qualities despite
its low level utilization, a number of challenges may still
be responsible for its continued underutilization. There
however, exist windows of opportunities that could
enhance its product diversification, consumption and
general acceptability.

Lack of knowledge and skill

Lack of knowledge and skills in the processing and
management of cashew apple products is the major
limiting factor in the utilization of cashew apple in Nigeria.
There is a lack of awareness on cashew apple products,
as such, rural dwellers and food processors know little
about its potential uses and possible economic value.
Lack of knowledge on the post harvest handling and
preservation of cashew apple to ensure all year round
production could be another limiting factor for industrial
food processors. Since cashew is a seasonal and highly
perishable fruit, constant training and retraining of
processors on its preservation techniques such as
osmotic drying, freeze drying, and how best to process it
into viable economic products is necessary.

**Cashew apple consumption**

Cashew apple is generally not a much loved fruit in Nigeria. A variety of reasons such as its bleaching effect on white fabrics and its high acid and tannin content could be responsible for this. According to Suganya and Dharshini (2011), cashew fruit is not readily consumed in its raw state due to its high content of astringent compounds.

Its fragile and soft nature especially when ripe, with its high perishability could be another factor that affects its acceptability. However, with proper processing techniques, these challenges can be addressed. Various processing methods leading to a variety of cashew products have been reported by Tran et al. (2014), Suganya and Dharshini (2011) and Abdul and Peter (2010). There is a high market potential for cashew apple products in Nigeria if properly processed.

**Wastage by cashew nut processors**

Cashew apple is often considered waste material in cashew nut processing industries. Most cashew nut processors in Nigeria rarely engage in cashew apple processing; often times, the nuts are removed while the apples are wasted. This is a major challenge for domestic processors. However, collaboration between cashew nut processors and cashew apple processors can help address this challenge.

**Unavailability and affordability of cashew apple handling and processing technologies**

Various research works carried out on cashew apple have revealed its nutritional qualities, variety of products and high economic value, however, processing technologies and equipment for commercial production are not readily available. This clearly limits processing of cashew apple juice at a commercial scale, and only small scale and homemade production occurs. Mechanization of agricultural processes has been identified as the backbone for sustainable food sufficiency (Azogu, 2013). Any attempt at addressing the issues of food security in Nigeria must necessarily concentrate on efforts to make simple technologies available, and stimulate adoption of such technologies among our peasant farmers who remains the main driver of agricultural production. Such cashew apple technologies should begin with simple tools that will arrest the problem of damage and injury to the cashew apple during harvest. A real commitment to the utilization of the currently wasted cashew apple resource would also include large scale motorized temperature/pressure controlled juice extractors that will result in minimal process loss to large scale thermal processing pots and storage containers. Mass production and affordability of such simple and adaptable technologies will go a long way in addressing this issue.

**CONCLUSION**

Cashew apple can be processed into a variety of products, with high economic and nutritional value, to improve food security in Nigeria. Though cashew apple is not a much loved fruit in Nigeria, there are windows of opportunity that could be utilized to enhance product diversification, consumption and general acceptability. Public awareness can be increased through marketing campaigns targeted towards both rural dwellers and urban food processors highlighting the potential and possible economic value. Government agencies such as the National Centre for Agricultural Mechanization (NCAM) and other Agro-equipment manufacturers should make available simple processing technologies for commercial production, and encourage collaboration between cashew nut processors and cashew apple processors. These steps will go a long way in addressing the underutilization of cashew apple in Nigeria.

**Conflict of Interests**

The authors have not declared any conflict of interests.

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