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CAS JAMAICA

FOOD SAFETY NEWSLETTER

IN THIS ISSUE

A letter from the editor

Over the summer months, Jamaica has had an abundance of fruits such as mangoes, Otahiette apples, guineps and soursops. Some of our fruits have very short shelf lives. This is due to their high moisture content. Microorganisms thrive in environments that have high water activity as the water is readily available to microbes for growth. Different processing methods are utilized to extend the shelf life of our fruits and create value added products.

Traditional products made from fruits include juices, jams, jellies and marmalade. Other possibilities include the production of fruit leathers and fruit wines. Canning, pasteurization and dehydration are thermal methods utilized in the processing of fruits (Table 1). Non thermal methods such as freeze drying and high pressure processing preserve the nutritional and sensorial properties of fruits. These methods however require high capital expenditure and are not utilized locally. Vacuum frying is another method of processing that is currently being explored.

Recently there was a ban on the use of the artificial colourant FD & C red number 40 in foods by the Food and Drug Administration due to concerns that it may cause attention deficit/hyperactivity disorders (ADHD) and allergic reactions in children. Fruits are being considered as a source of natural colourants. The main pigments responsible for the colour of our fruits include chlorophyll, anthocyanins, betalaines and carotenoids (Table 2).

Challenges associated with the use of natural colourants is their availability, stability and solubility. Natural colourants are less stable than artificial colourants which are azodyes. Different methods may be utilized to enhance the stability and solubility of natural colourants such as metal complexation and co pigmentation.

Chlorophyll naturally contains iron (Fe) within its structure. By replacing iron with Copper (Cu), Copper chlorophyllin (Cu-Chl) is produced which has greater stability, exhibits bioactivity and is more hydrophilic.

There are many applications for fruits. They exhibit functional properties and are an excellent source of antioxidants, vitamins and minerals. Let's continue to explore the potential applications of our local fruits.

Table 1. Fruit products and methods utilized in processing

Fruit	Primary Processing Method	Product
Ackees	Thermal	Canned
Olives	Extraction	Oil
Grapes	Fermentation	Wines

Table 2. Pigments responsible for fruit colour

Pigments	Fruits
Carotenoids	Ackee, mangoes, pineapple, melons
Anthocyanins	Otahiette apples, grapes, pomegranate, strawberries
Chlorophyll	June plums, soursop
Betalaines	Prickly pear

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Mammea americana

By Nashana Murray

Mammea americana L., commonly known as mammee apple, is a tropical evergreen tree native to the Caribbean and parts of Central and South America, including Venezuela, Colombia, and northern Brazil. It belongs to the Calophyllaceae family and thrives in warm, humid lowland environments. In many Caribbean countries, including Jamaica, the tree is often cultivated in home gardens or as an ornamental plant, valued for its dense foliage and large, aromatic fruit.

The fruit of *M. americana* is a globular to oval drupe, typically 10–20 cm in diameter, with a thick, leathery brown skin. Inside, it contains a vibrant orange to yellow pulp surrounding one to four large seeds. The edible mesocarp is highly aromatic and has a unique flavour often described as a blend of apricot, honey, and spice. When ripe, the texture is smooth and juicy, making it suitable for fresh consumption, as well as for use in juices, jams, liqueurs, and other culinary preparations.

In Jamaica, the fruit is most commonly available during the summer months, typically from May through August, though regional variations in fruiting time can occur. Ripeness is important, as the flavour improves with maturity, and traditional practices generally favour harvesting fully ripe fruits for both taste and safety.

Despite its appealing sensory qualities and seasonal abundance, *M. americana* is underutilized in many regions. One of the primary barriers to its widespread consumption is concern over its potential toxicity. Scientific and anecdotal sources have reported the presence of bioactive compounds (particularly in the seeds and peel) including coumarins, mammein, and other lactones known for their pesticidal or antifungal properties [1,2,3].

However, the extent to which these compounds are present in the edible pulp is unclear, and much of the public perception surrounding its toxicity lacks part specific differentiation. This ambiguity reflects a broader pattern observed with other traditional foods that contain natural toxins in specific plant parts but are rendered safe through proper preparation and informed use. For *M. americana*, the lack of standardized toxicological data, processing guidelines, and public education may contribute to hesitance in both domestic and potential commercial contexts.

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Olive Oil: Liquid Gold

By Anissa Walters

Olive oil is a well-known vegetable oil produced from the fruit of the olive tree (Olea europaea), olives. As early as the 8th millennium BC, Neolithic people were collecting wild olives, which originated in Asia Minor, making it one of the oldest cultivated plants in history. The cultivation of the olive fruit can be traced back to the Mediterranean civilizations, including the Romans, Phoenicians, and Greeks, who grew these trees to harvest the fruits for juice extraction. The ancient Greeks developed the method of extracting oil from the juice. They were responsible for the expansion of olive trees in several parts of the world, such as Spain, France, Portugal, and North Africa. The Roman Empire also contributed to the spread and development of olive oil. Besides culinary uses, olive oil was used in ancient ceremonies for emperors and as a common medicine for various ailments. It was also used in religious rituals as a symbol of peace and divine blessing. In ancient Greece, athletes at the Olympic Games applied oil to their bodies before competing, and the winners were awarded with a wreath of olive oil and a wreath made from the olive tree. Several ancient civilizations, including Egyptians, Romans, and Greeks, also used it for cosmetic purposes as a standard practice.

Nowadays, olive oil is still used in similar ways as in the past, but with further research over thousands of years, modern society has optimized the ancient oil. This has led to widespread production and consumption of oil across other regions, including Asia, North America, South America, and the rest of Africa. Olive oil can be classified into different categories.:

·Virgin oils for Consumption

·Blended or refined olive oil, pomace oil, and virgin olive oils fit for Consumption

·Olive Oil Not Fit for Consumption

The categories of olive oil differ in grades, created by the extraction and refining methods used. These grades are determined by the International Olive Council (IOC), Codex Alimentarius, the United States Department of Agriculture (USDA), the California Olive Oil Council (COOC), and the European Union (EU). Common culinary grades include Virgin Olive Oil and Extra Virgin Olive Oil. Today, olive oil is widely used in many dishes and is valued for its health benefits and versatility. It has also been associated with conditions caused by excessive consumption. As mentioned earlier, olive oil is also utilized in the cosmetic industry to benefit skin and hair care. It is a common ingredient in body lotions, soaps, shampoos, and conditioners. In the pharmaceutical industry, olive oil is used in the production of ointments and as a carrier for certain drugs. Due to its popularity and demand, measures are implemented to promote food safety and quality control. However, adulteration and mislabelling continue to pose challenges for the industry.

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Potential Applications of Underutilized Berries

By Daina Barrett

Antioxidant properties are abundant in berries. Compounds with antioxidant mechanisms improve food's oxidative stability and scavenge free radicals [1]. Berries come with various pigmentations ranging in colour from red, purple, black, and white. Berries are an exceptional source of bioactive components and possess organoleptic properties such as unique taste, color, and odor. They are rich in vitamins and mineral content. They are utilized in the production of jams, juice and beverages, skincare products, and more.

The *Cissus verticillata* berries, also known as Princess Vine, are grown widely in Jamaica. They are from the Vitaceae family, an important food source for birds and animals. *C. verticillata* is native to the Americas, from Florida to Mexico to Argentina and Chile, including the West Indies [2]. *C. verticillata* was discovered by Nicolas Monardes in Mexico in 1571 and was first published in Europe under the name Carola Sancto in 1574 [2]. The *C. verticillata* berries are said to have a potential novel source of antioxidants [1]. This means they could be used to reduce the risk of cancer [1]. Known as "plant insulin" in Brazilian ethnopharmacy, these berries are primarily used to treat epilepsy, diabetes, and hemorrhage [3]. It is said that the berries are utilized in traditional medicine, exhibiting anti-inflammatory, antidiuretic, anticonvulsant, anti-influenza, and hypoglycemic properties [2].

The pigeon berry, or *Rivina humilis* L. (Phytolaccaceae), is a wild herbaceous bushy perennial plant that grows up to 120 cm (4 ft) tall and occasionally has woody roots. It can be found in colonies and different kinds of shaded soils [4]. Reports show that the berries are safe to consume, rich in nutrient content, and exhibit efficient biological activity [5].

R. humilis berries are referred to as dog blood in Jamaica. They are also known as redberry or bloodberry and are native to tropical regions. They contain the pigment betalain. The berry is said to be underutilized because they are not suitable for fresh markets [5]. The fruits can however be utilized in producing or preparing processed products. Some applications of *R. humilis* berry in food products include jams and preserves, juice, and beverages (RTS-Readyserve), wine and liquor, ice cream and frozen desserts, fruit leather and rolls, baked goods (cakes, muffins, cookies), and energy bars. These berries are also used in animal feeds, cosmetics, and pharmaceutical products.

Dehydration is a form of food preservation. It is one of the oldest unit operations used in the food industry. In this operation, the moisture content of the food is reduced to improve the product's shelf life. Food can be spoiled by food microorganisms or through enzymatic reactions within the food. Reducing moisture helps to prevent the growth of microorganisms and slows down enzymatic reactions in foods. Dehydration also imparts desirable features in food by enhancing the organoleptic quality of a food. This method is known for preparing fruits and vegetables for drying. A fruit leather, also called a fruit bar or fruit slab, is a dehydrated fruit-based confectionery dietary product; it is often eaten as a snack or dessert [3]. They have a shelf life of up to 9 months with preservatives and up to 2-3 months without preservatives. They are usually stored in a cool, dry place in the refrigerator. Fruit leather is convenient, flavorful, and healthy. These products are easy to pack and store, and they are typically low in calories, fat, and fiber [6]. It is made from fresh fruit pulp or a mixture of fruit juice concentrate after the dehydration.

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Fruits

T Y R R E B E U L B T S V E S
I R B J G E A S G T S Y G I A
U R N Y C R U J O G U A V A A
R E U G H E A M U L P E N U J
F B E O E L P P A S L E R A O
R W S L R F C J E P M R T F S
A A T L R L O O P G U I N W K
T R U T Y A G A P W U O E T M
S T G U I N E P S R O E E W O
A S S P A N Y E F E T O E M D
C E P M I S P K P S O O N Y A
K R E P H S C P O S R U O S C
E A O A P A A P P D C P L A O
E O O L J O I F E E L E E P V
S T A R A P P L E J H S M R A

Guineps
Jackfruit
Pineapple
June Plum
Ackee
Mangoes
Star Apple
Melon
Strawberry
Avocado
Cherry
Grape
Sweetsop
Blueberry
Starfruit
Apple
Soursop
Guava

easywordsearchmaker.com

Did you know?

Hypoglycin A, a chemical hazard is not only found in the ackee fruit but is also present in litchi. There have been reported incidents of lychee poisoning in India. In 2017, over 100 children died from consuming lychee on an empty stomach.

Litchi chinensis

Olive oil is extracted from the olive fruit which grows in the Mediterranean. It has also been referred to as liquid gold.

Olea europaea

The fruits of *Moringa olifera* are rich in antioxidants and are edible.

Moringa oleifera

Food Humour

How many chefs in the medieval times do you think were wrongfully executed due to the King's food tester(s) being allergic to the food?

Contributed by Javian Walker

OUTREACH INITIATIVES AT THE UWI

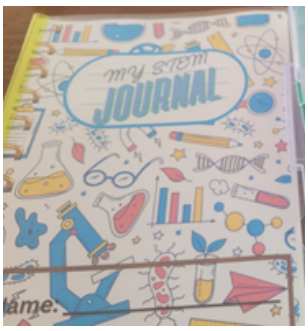
Open House, November 2024

Sun printing with cyanotype paper

Science Fair, May 2025

Students sampling cassava bread

Science kits prepared for students at Lister Mair Gilby High School



Dr. Ainka Brown, Dr Andrea Goldson-Barnaby and Ms Tainia Taylor prepared STEM kits for members of the Lister-Mair/Gilby High School (LMGHS) science club to use over the summer break. This initiative builds on the ongoing outreach partnership between LMGHS and the American Chemical Society (ACS) Jamaica Chapter at the UWI. The kits included a safety guide and the resources to conduct simple experiments to explore acids and bases. The students were also provided with a STEM journal to allow them to record their results and reflections

Morant Bay High School
April 2025

LR: Lloyd Watson, Daina Barrett, Andrea Goldson-Barnaby

Women Pioneers in STEM Education

Dr. Angie Lena Turner King

Dr. Angie King was one of the first African-American women to gain degrees in chemistry and mathematics. In 1927 she earned a Bachelor's degree in chemistry and mathematics from West Virginia State, graduating *cum laude* and a Master's degree in Physical Chemistry in 1931 from Cornell University. Two decades later (1955) she pursued doctoral studies in general education at The University of Pittsburgh, the first African-American woman to do so. She taught mathematics and chemistry at the high school level, and then spent her entire college teaching career at West Virginia State University. Dr King was a powerful influence on many of her students, which included Katherine Johnson (the central mathematician in the movie Hidden Figures), WVSU alumnae, class of 1937, and Jasper Brown Jeffries, a physicist and mathematician who would later work on the Manhattan Project in World War II. Jeffries earned his BS in 1933 from WVSU. She was a member of the American Chemical Society, the West Virginia Academy of Science, and the American Association of University Professors. Dr. King retired in 1980. She continued to live in her on-campus house at WVSC. She died on February 28, 2004, in Institute, West Virginia at the age of 99.

Solution