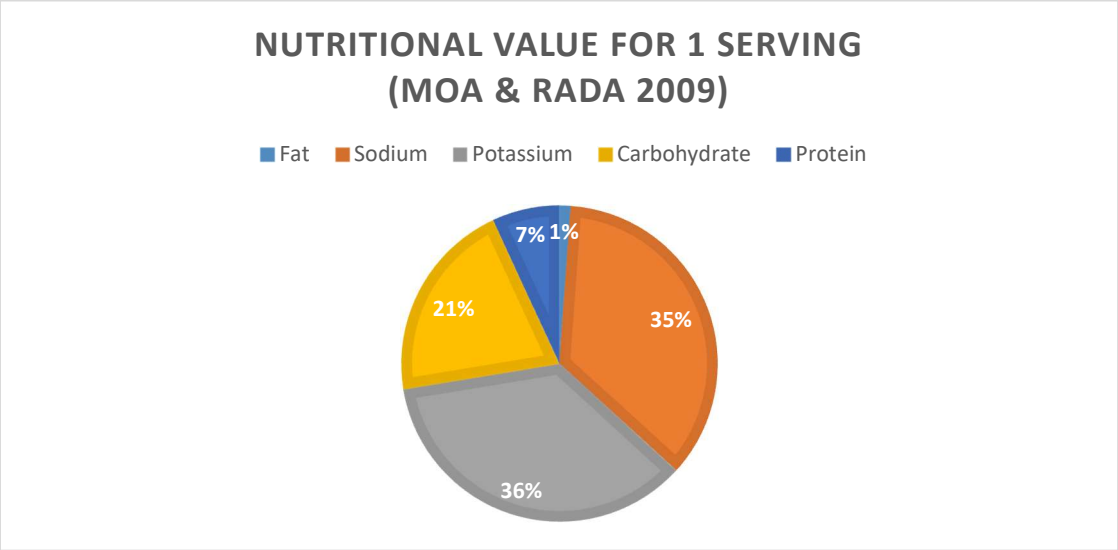
Dasheen

Overview

Dasheen or Taro (*Colocasia esculenta* L) is large and herbaceous perennial a fast-growing crop t hat matures within 9 months. It can be identified by its frilly, heart-shaped leaves that grow at t he end of long and stout petioles. This crop was first grown in Asia, found its way around the gl obe. Both the root and the leaves of this plant can be eaten and is used in many cuisines around the world.The leaf, stalk and corm can be eaten; however, the main part marketed is the corm. Dasheen is a resilient crop, but radiation, temperature and water availability affect the total yiel d and the time taken to reach maturity. Dasheen has the added ability to tolerate waterlogged conditions due to its ability to transport oxygen from its leaves to its roots; it requires an annual average rainfall is at least 2500 mm and temperatures between 21 °C and 27 ° for optimum pro duction.

Dasheen is often time considered as the potato's hairy and "unfortunate-looking" cousin. Dasheen is actually a staple in the diets of many cultures around the world. In Hawaii, it's transformed into "poi," a traditional dish of mashed dasheen and water, and served to guests or fed to babies. Dasheen chips whether baked or fried provides a health gluten free alternative to other processed chips. In Jamaica small quantities are used to make dasheen chips. The corm is rich in carbohydrates and is mainly eaten boiled. The young shoots and leaves are also used as a vegetable.



Boiled Dasheen

Nutrition Facts

Serving Size: 1 cup of pieces

Amount Per Serving	
Calories from Fat 3	
Calories 212	
	% Daily Values*
Total Fat 0.38g	**1**%
Saturated Fat 0.077g	**0**%
Polyunsaturated Fat 0.156g	
Monounsaturated Fat 0.03g	
Cholesterol 0mg	**0**%
Sodium 694mg	**29**%
Potassium 1004mg	
Total Carbohydrate 49.91g	**17**%
Dietary Fiber 7.7g	**31**%
Sugars 0.75g	
Protein 2.83g	

Vitamin A 2%	Vitamin C 9%
Calcium 8%	Iron 6%

* Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Health benefits

Reduces risk of diabetes – The dietary fiber in dasheen can help regulate insulin and glucose levels in your body, and prevent your blood sugar from spiking.

Improves vision health – Antioxidants cryptoxanthin and beta-carotene in dasheen help keep free radicals at bay, reducing your risk of macular degeneration and cataracts.

Helps keep skin healthy – Vitamins A and E are vital to skin health. Adding taro to your diet may help reduce blemishes and wrinkles and give your complexion a healthy glow.

Bolsters your immunity – The high vitamin C levels in taro helps stimulate your immune system to produce more white blood cells, which can defend your body from pathogenic organisms.

Heart health – Aside from its dietary fiber, the potassium in taro is essential for maintaining your cardiovascular function. It helps control your heartbeat, relieve stress on the arteries and keep blood pressure in check.

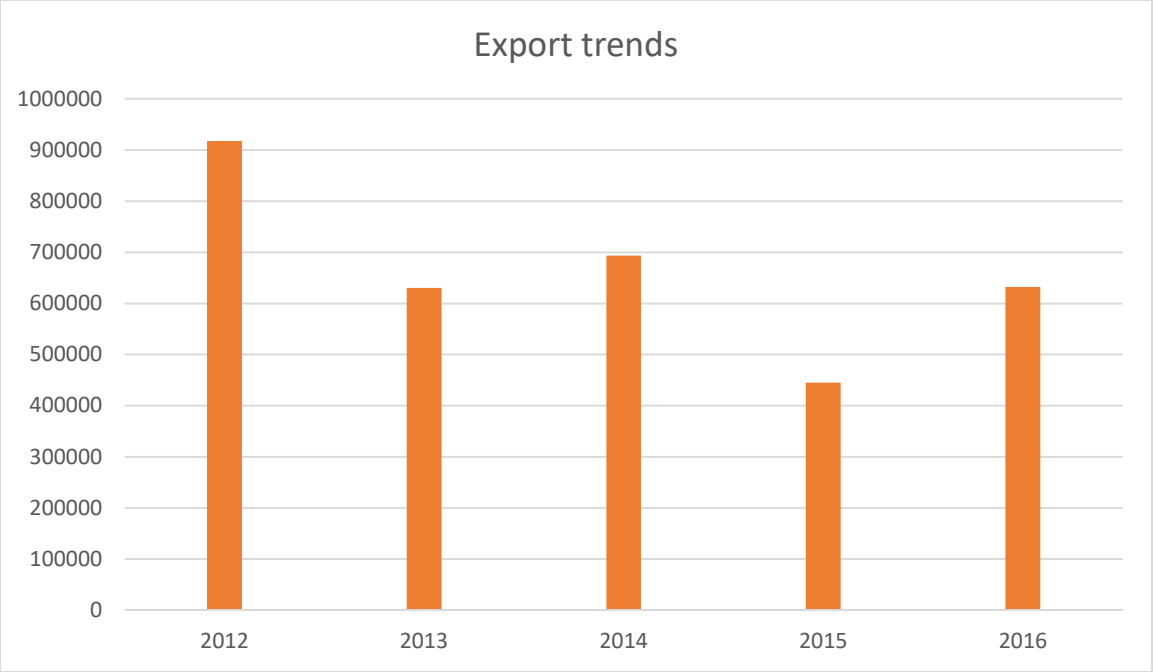
Increases circulation - The presence of the essential minerals, namely iron and copper, prevents Anemia and improves circulation which in turn, helps to increase the metabolic activity, growth of new cells, and general oxygenation of the body, which results in the organs and systems functioning at their optimal level.

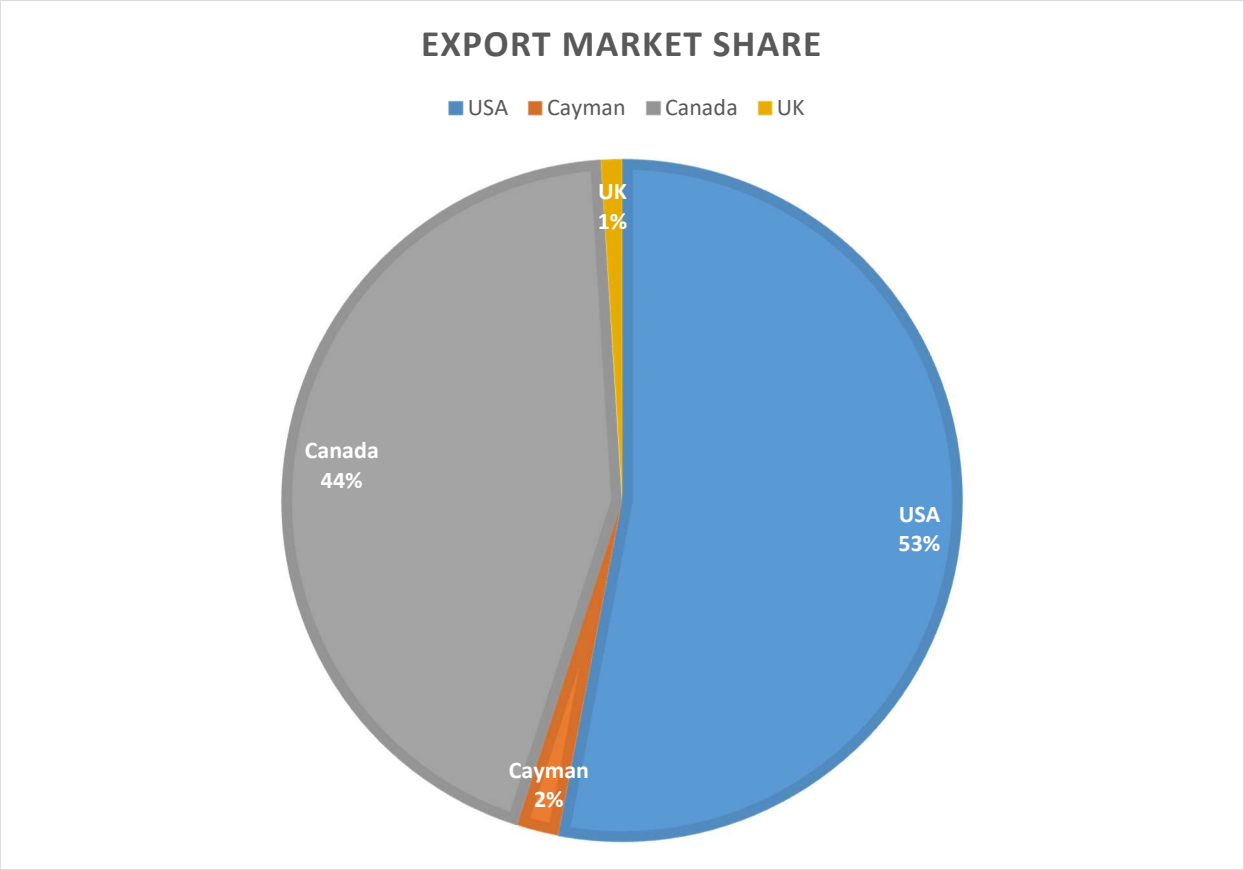
Improves digestive health – The high level of dietary fiber found in taro root makes it very important for supporting our gastrointestinal health by helping to prevent certain conditions such as excess gas, bloating, cramping, constipation, and even diarrhea. Cancer prevention – The high levels of vitamin A, C, and various other phenolic antioxidants found in taro root boost our immune system and help eliminate dangerous free radicals from our system. Cryptoxanthin,

which is found in taro root, is directly connected to a lowered chance of developing both lung and oral cancers.

Export Trends

Year	Kg's	Ja. $	US $
2012	917827	$147,746,847.00	$1,663,011.00
2013	630596	$159,952,445.00	$1,563,398.00
2014	693770	$154,804,505.00	$1,395,348.00
2015	444963	$119,865,308.00	$1,024,396.00
2016	632445	$187,167,050.00	$1,493,493.00





The major players in the trade

Dasheen enters the local fresh and export markets (Europe, USA & Canada) and small volumes to the processing industry for the production of chips. The main countries that account for the largest volume of the dasheen exported from Jamaica are the USA and Canada with Cayman and the UK accounting for the remaining export.

Apart from Jamaica other Caribbean islands are also involved in the trade of dasheen to UK, US and the other markets in the Caribbean region. Other main players in the export market at Dominica and St. Vincent.

Export Trends

Description	Kg	J$	US$	Country
Dasheen fresh or naturally dried	167,318	47,895,206	410,133	CANADA
Dasheen fresh or naturally dried	7,473	2,595,145	22,247	Cayman Islands
Dasheen fresh or naturally dried	5,184	1,523,878	12,964	United Kingdom
Dasheen fresh or naturally dried	223,983	58,420,329	499,070	United States of America
Dasheen artificially dried	1,720	617,657	5,315	Canada
Dasheen artificially dried	91	34,997	301	Cayman Islands
Dasheen artificially dried	2,255	607,301	5,256	United States of America
Dasheen, nesoi, chilled or frozen	91	30,269	259	Canada
Dasheen, nesoi, chilled or frozen	215	311,647	2,605	United States of America
	408,330	112,036,429	958,148	

Cost of Production

NAME : Dasheen	Local
Hectares:	0.4
HARVEST: Days	210 days
Expt. Yield : kg/ 0.4 ha	5450
C.O.P. / kg : $	21
Projected Selling :	32
Expected Earnings	$174400
ROI	52%

Cultural practices

Treatment: Suckers and small corms are immersed in a solution containing 90 ml household bleach in 45 liters of water for 15 to 20 min. Dust cut surface with fungicide/insecticide mixture.

Planting methods:

- Suckers: Select from vigorous, healthy growing plants, remove all dead material, roots and soil. The upper 2-4 cm of the corm should be intact having a base diameter of 5cm to 7 cm and weighing 150gm to 250 gm.
- Small corms or 'bullheads':

  After selecting the larger corms for sale, the smaller corms can be used as planting material.

Planting density: Planting depth, spacing, soil type and rainfall pattern can all affect the size an d shape of the corm.

- Spacing and depth:

  55 cm x 55cm (15,000 plants/ha) with a planting depth of 15 cm in lowland conditions.

  90 cm x 90 cm (10,000 plants/ha) with a planting depth of 15 cm in high rainfall conditions.
- Under flooded conditions, corms or suckers are planted by hand in puddled soil covered with 2-3 cm of water and subsequently flooded.

Weed control: Dasheen pots must be kept wees free during the first 3 months of growth. During land preparation, Round-Up or Gramoxone may be used to control weeds. Shielded sprays of

Gramoxone at a rate of 2.5 L/ha are recommended for the control of weeds before canopy formation. Weeding should be manual and carried out as necessary.

Disease management - The following diseases may affect dasheens:

- Taro Leaf Blight (Phytophthora spp.) A fungus which can be controlled with a copper fungicide.
- Brown leaf spot – (Cladosporium colocasiae.) A copper fungicide can be used to manage Leaf spot.
- Shot hole leaf spot – (Phyllostica spp.) Proper field husbandry can help to control this problem.
- Corm rot: (Phytophtora and Pythium spp.): Death of young plants, wilting, stunting, chlorosis and subsequent collapse of the whole plant. Dip plants in, as well as drench th e land with copper fungicides.
- Soft rot: Fusarium oxysporium causing a whitish-grey spongy soft rot with a brown margin. Foliage wilts and plants collapse. Can be controlled using a soil fungicide and good field management.
- Dasheen Mosaic Virus- rogue plants, remove away from fields and destroy plants.
- Root Knot nematode – (Meloidogyne spp.) can be controlled with a nematicide or dip planting material in 100°C water for 50mins.

Pest management

Monitoring

- Routinely scout fields by walking in a V or X pattern & check leaves for presence of insects.
- Inspect leaves particularly on the under surface of the leaves, within leaves that are starting to unfold and at the base of the younger petioles.
- When a threshold of 1 nymph/5 plants has been reached chemical control is warranted.
- Caterpillars feeding on the lamina can be controlled by hand-picking or using biological Chemicals.

Cultural

- Crop Rotation: Rotate with non-host crops. If possible relocate crop to a new area on lan d not previously cultivated in dasheen but with an unrelated crop e.g. corn
- Sanitation: Remove all infested plants in the field and surrounding areas during crop rotation

Biological control

- The egg predator Cyrtorhinus fulvus (Hemiptera: Miridae) (Fig. 8&9) has successfully controlled Tarophagus spp. in many parts of the Pacific.
- C. fulvus is unlikely to reduce populations sufficiently to prevent the spread of alomae and bobone virus diseases.

Chemical control

- Taro beetle: (Ligyrus); controlled using Malathion ®

- Aphids in the dry months. Can be controlled with Cypermecthrin ® and/or Diazinon ®
- For taro plant hopper Tarophagus sp. –

1. Dip all planting material for 10 –15 minutes in insecticide solution of malathion, or diazi non.
2. Drench young infested plants with imidacloprid (Confidor®) or thiamethoxam (Actara®)
3. Apply to infested leaves lambda -cyhalothrin (Karate Zeon®), carbaryl (Sevin®), indoxicarb (Caprid®), abamectin (Newmectin®/Cure®) or azadirachtin (Neem-X®).

- Rotate insecticides of different chemistries to reduce development of resistance.
- Read & follow instructions as stipulated on the pesticide labels
- Use a surfactant (sticker) in order to increase effectiveness of the insecticides.
- Promote control by encouraging natural enemy population
- Apply treatments in the early morning or evening and when it is not windy.
- Care should be taken when applying pesticides to protect human & environment health & trade.

Fertilizer requirements - A soil test should be done to determine fertilizer types and rates and also any limestone requirements. The following fertilizer recommendations can be useful:

- NPK MgO (15:8:12 +2) applied at 2 and 8 weeks after planting at 57 g/pl. in a circle 18 cm from the base of the plant.

  2. 112 kg/ha N, 13-26 kg/ha P and 48-96 kg/ha K applied in a split dose at planting and 3-4 months later.

- Nitrogen deficiency: uniform yellowing of the lamina and development of a purple colour along the petiole.

  Potassium deficiency: Marginal chlorosis of the leaves, roots die.

  Zinc deficiency: Inter-veinal chlorosis, narrow leaves and cupping of the leaves.

Moulding

Mould 1-2 weeks after the first application of fertilizer 15-30 cm around the base of the plant in upland dasheen production.

Harvesting

The maturity period is 6-7 months after planting in drier areas and 9-10 months in wetter areas. Tubers can be harvested using a fork. Leaves turn yellow, dry and shrivel at maturity.

Post-Harvest preparation

Prepare the corms by removing the soil and fibrous roots. Sort by size and clean in running water within 4 hours after harvest. Treat with Ridomil MZ (14 gms/23 liters of water) for 2-3 minutes to prevent fungal attack or use a solution of household bleach (19 ml bleach in 10 liters water).

Ideal Soil Type for Dasheen

There are two (2) types of dasheen based on the production environment; dryland and wetland . Wetland dasheen produces many basal suckers which are broken off during reaping leaving op en “eyes” that are prone to spoilage. Dryland dasheen produces fewer of these basal suckers an d therefore are not prone to spoil so easily. As a result, exporters prefer the dryland dasheen. The best soils being sandy clay loams that are well drained with pH: 5.5 - 6.5 – which is difficult to achieve in flooded conditions and temperatures of 25-27° C (hot, humid conditions).

Major Suppliers in the Markets

Large quantities are purchased by exporters destined for Europe, USA, and Canada. Jamaica competes with St. Vincent, Trinidad and Dominica for these markets. As it relates to the United Kingdom and the USA, specifications have been laid out detailing the very appearance of the Dasheens that should be exported to these countries. For the United Kingdom, all varieties are permitted as long as they are rounded and symmetric appearance, not elongated nor have any deformity on them. Only corms with double head are allowed but they must weigh more than 1 kg or 2.5 lb. Corms with triple or quadruple corms were prohibited. The United States only accepted those varieties of dasheen that were cylindrical in shape.

There are two varieties of dasheen (Colocasia esculenta) grown locally in Trinidad: "Blue Metal": the corm boils to a light to dark blue colour after cooking and "White Dasheen" which cooks white. In the Caribbean there are other types such as: Common/purple, white; soufe, noir, madere, bunlong.

- Common Dasheen is predominantly grown in Dominica for export to the UK. This Cultivar forms a single corm, which tends to be oval shaped. This variety suckers the least, resulting in it having the least scars. The flesh is light blue in colour after cooking.
- The Noir dasheen is also cultivated in Dominica. It is not considered suitable for export because it produces the most suckers and gives low yields.
- The White dasheen is the predominant cultivar grown St. Vincent. It is exported to both the UK and US markets.

Price on International Market

Country	JMD$ /Kg
Canada	$286
United Kingdom	$293
United States of America	$260
Cayman Islands	$347

Form Exported

Dasheen is exported in three different forms, namely fresh or naturally dried, artificially dried, chilled or frozen.

Acres deeded to be planted to produce the quantity demanded on the international market

The initial investment cost for an economical return is $185,000.00 for 1.0 hectare of dasheen production. Expected yield is 17045 kg per hectare under optimum conditions. The crop matures in 7– 9 months when the aerial shoot begins to dry down. After the central corm is reaped, the suckers are removed and can be replanted. In addition the removal of the top of the corm can be used as planting material.

Requirements for Export

Dasheen corms sold for the export trade must be free from all insects e.g. mealy bugs and from excess soil. The end must be cut clean leaving about 1.5 cm on the corm. All hairs and scale leaves must be removed therefore cleaning the corm, leaving it fairly smooth and well trimmed. The shoot must be cut off close to its base leaving a small area of exposed corm tissue.

Corms are transported in crocus bags to the packaging house where they are washed and dipped in a fungicidal solution to retard spoilage during transport to the overseas market. The corms are air-dried and then placed in carton boxes packed with coir dust.

For exports to the USA, the specifications are that they should be washed, leaves should be trimmed to within two inches from where it joins the flesh of the corm but the corm should not be cut into. The produce should be packed into nylon, mesh bags with air holes and no more

than 25 kg (50lb). The minimum and maximum weight of individual corms should be 1.2 kg (3 lb) and 3.0 kg (6 lb) respectively. The material used for labelling should be made of plastic and properly fastened to the bag. On the side of the label, the Importers name, address, and the quantity of dasheen must be clearly printed while on the other side the Supplier's Name and address must be printed. All information on the label must be printed as handwritten labels are not acceptable. The corm be at seven months old maturity, free from mould and must be firm and free from softening. No post-harvest treatment should be applied to the corms prior to export.

For the UK, the specifications are that they should be unwashed but free from soil clods. The leaves should also be trimmed to within two inches from where it joins the flesh of the corm but the corm should not be cut into. 25% of the total weight should be large weight corms, 50% medium corms and 25% small corms. The produce should be packed into white, banana-type cartons with stapled base plate and each carton should contain 18 kg (40lb) net with an extra 1 kg (2 lb) to allow for shrinkage. The cartons should be lined with a plastic liner that should completely wrap the corms. The minimum and maximum weight of individual corms should be 0.5 kg (1 lb) and 4.0 kg (8 lb) respectively. The label should be placed on one short side of the carton with the Importers name, address, and the quantity of dasheen (18 kg or 40 lb) clearly printed on it. On the long side of the carton the Supplier's Name and address must be clearly printed. All information on the label must be printed as handwritten labels are not acceptable. The corms be at six months old maturity, free from surface mould and must be firm and free from softening. Small cormel attachment scars and tail cuts are acceptable as the maximum

signs of damage. As it related to post-harvest treatment, dasheens may be harvested up to two days before shipment date and must undergo treatment with Ridomil MZ58 at a concentration of 14g in 5 gallons of water for 5 seconds. Regardless of the harvest date, the corms must be treated within 6 hours of harvest.

S.W.O.T Analysis for Dasheen

Strengths	Weaknesses
• Available markets • Year round production • Production can be timed to meet demand. • Good planting material available. • Low investment cost. • High yielding. • Grown in a range of climatic conditions. • Versatile in providing a variety of products. • All parts of the plant are useful.	• Susceptible to infestation by insects, pests and diseases. • Temperature and water availability affect the total yield and the time taken to reach maturity. • Poisonous in uncooked state. • Low genetic base • Short shelf life
Opportunities	**Threats**
• New market opportunities • Use in local pharmaceutical industries • New dasheen products eg, flour, puddings, breads • Possibility of the development of new varieties that are more resilient. • Introduction to new areas of cultivation to increase production.	• Dasheen crops are affected by a number of weeds, insects, pests and diseases. • New suppliers in the market causing increased competition. • Post-harvest diseases may affect stored corms.