DESIGN, DEVELOPMENT OF WAX APPLE HERBAL NANOPARTICLES

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Abstract

Wax apple is a fruit which has a lot of health benefits and it's veritably easy to consume no efforts are taken. The extracts of the fruits, flower and bark have potent free revolutionary scavenging, antioxidation, anti-mutation and anticancer conditioning. The wax apple is an immunostimulant and antibacterial medicine in traditional drugs. It is an important tropical cash crop in Southeast Asian countries. Its scientific name is Syzygium samarangense, but it is more commonly known as Java apple. This whole plant parts are useful and have some importance to it. The growth and development of this fruit is sometimes very low due to low photosynthesis supply at early growth stages. Exportation of this plant can be tough. But with the help of advanced herbal and medicinal technology, we can make use of this fruit. This review paper has information about the wax apple with its phytoconstituents and therapeutic properties.

Keywords: *wax apple, tropical tree, java apple,*

Introduction

Wax apple or Java apple (Syzygium samarangense) is a species of flowering plant from the family Myrtaceae, it is native to an area that includes the Greater Sunda Islands, Malay Peninsula and the Andaman and Nicobar Islands, It was introduced in prehistoric times to a wider area and now widely cultivated in the tropics. syzygium samarangense is a tropical tree growing to 12 metres (39 ft) altitudinous. The leaves are elliptic, but rounded at the base; they're sweet when crushed. The flowers are white to unheroic-white,2.5 cm (1in) periphery, with four petals and multitudinous stamens. When develop, the tree is considered a heavy deliverer, yielding a crop of over to 700 fruits. When the fruit is ripe, the fruit will puff outwards, with a slight dint in the middle of the underpart of the" bell". Healthy wax apples have a light luster to them. It doesn't taste like an apple, and it has neither the scent nor the viscosity of an apple. Its flavor is analogous to a snow pear, and its liquid-to- meat rate is similar to a watermelon. Wax apple (Syzygium samarangense) is an important tropical cash crop in Southeast Asian countries, including Thailand, Malaysia and Taiwan.Safed jamun is better known by a plethora of English names including wax apple, love apple, java apple, Semarang rose-apple and wax jambu. The wax apple is an immunostimulant and antibacterial medicine in traditional drug. The excerpt from leaves of wax apple contains numerous composites including condensed tannins, flavonoids, ellagitannins and phenolic acids, and exhibits a conspicuous antioxidant exertion. This fruit has many health benefits for example Reduce Toxicity, Boost Immunity, Control Diabetes, Treats Diarrhea, Maintains a Healthy Heart, Maintain Healthy Bones and Teeth, Treats Celiac Disease, Reduced

risk of strokes, Presence of niacin boosts HDL, Prevents Cancer and many more. Many brands use wax apple in their products as skin care, health supplements, and food products, and also use it traditional food like pickles and salad, today world is leading towards more natural ways and natural elements to add in the diet or in medicines and wax apple is perfect to work with because there are many health benefits jam packed in it. As we know that wax apple scientific name is Syzygium samarangense, and it is commonly known as Java apple but Meanwhile it seems people can get confuse it with Water Apple, water apple fruit is scientifically known as Syzygium aqueum, also known as Rose Apple or Watery Rose and these two fruits are diffferent.

Figure1: wax apple fruit
Photo Credit: Nitali Johori

The Consumption of the fruit

It is ideally suited to raw and cooked applications but is most commonly eaten fresh, out of hand, with the core removed. Raw tomatoes can be served with salt or sugar for added flavour or sliced and added to salads. Additionally, they can be sautéed, boiled, and preserved for sauces, or served as a topping for ice cream, pancakes, and French toast. Thai wax apples pair well with onions, garlic, chillies, mint, lemon, fennel, cheeses, and greens such as romaine and spinach. Thai wax apples should be stored in a cool, dry, and well-ventilated place for a couple of days also it can be eaten as salad and slightly sauteed .in some parts of the tropic area it is also consumed as pickle. this fruit doesn't need a lot of efforts to take pre care of the fruit.it is easy to handle and clean also.

The Botany of wax apple

The tree is generally cultivated throughout the tropical lowlands in South East Asia where it's believed to appear from. The rubric Syzygium consists of about 1100 tropical species. The title of the jambu air fruits is as follows (Morton, 1987) Kingdom Plantae, Sub Kingdom Tracheobionta (Vascular shops), Super Division Spermatophyta (Seed shops) Division Magnoliophyta (unfolding shops), Class Magnoliopsida (Dicotyledons), Order Myrtales, Family Myrtaceae, Genus Syzygium, Species Syzygium samaragense (Blume) Merr. & Perry. Common names ofS. samarangense include wax jambu, wax apple, java apple (English); jambu semarang, jambu klampok (Indonesian); jambu air mawar(Malay); makopa(Filipino); chomphu-kaemmaem, chomphu- khieo(Thai); roi(Vietnamese); bellfruit(In Taiwan)(Verheij and Coronel, 1991). Moneruzzaman etal. (2012a) reported that the different cultivars of wax apple varied markedly with respect to their morphological and physiological characteristics and that appeared to be due to their inheritable differences.

Ecology and distribution of wax apple

The fruit tree, although nearly fully unknown outside Southeastern Asia, is an

economically important fruit crop in Taiwan. The 'Pink cultivar represents 99 of the planted area in Taiwan. The regular blooming time for 'Pink' is around March in Taiwan (Young, 1951). still, 'Pink' blooms and sets fruit nearly time- round after unfolding. As a result, fruits at different growing stages could be set up in different vineyards, different trees and indeed on the same tree. Located at the center of origin, Indonesia has a huge quantum of variety with great diversity. Pale Green, Dark Red, Light red and Green are the four major Indonesian kinds. Fruit product is non seasonal, still the peak ages are in March to April and November to December. The major wax apple cultivars in Thailand are Phet Jin Da, Number one, Phet Sam Phran, Dang Indo, Phet Nam Pueng, Thub thim chan. Fruits can be gathered all the time round. Despite its name, this cultivar produces fruits varying from pink to deep red, depending on environmental and artistic conditions. It has been also reported that the photosynthetic yield had a strong correlation with the fruit biomass among the three cultivars. Jambu madu Red and Masam manis pink cultivars are comparatively better than 'Giant herbage' cultivar if cultivated under South Asian conditions. Wax apple grows stylish in areas with a fairly long dry season. This doesn't mean that this species is failure-resistant. The species bear a dependable water force and are frequently planted along aqueducts or ponds. Current distribution ranges from India through South- East Asia to the Pacific islets (the Malay apple features in Fijian tradition).S. samarangense is (Chang etal., 2003). Now, the tree is cultivated throughout the tropics as far as east of Hawaii, as well as Central and South America. lately, wax apple has come a popular fantastic fruit in western countries because the combination of apple- suchlike terseness, watery sweet and low- acid taste and the aroma of roses (FAO, 2005). Presently, wax apple civilization also spread in Indonesian islet of Java, Philippines, Thailand and other Southeast Asian countries (Fig. 2). China's Guangdong, Hainan, Fujian, Guangxi, Yunnan and Sichuan businesses (independent regions) has a small area of civilization. civilization in Taiwan, the largest species of its topmost profitable value for the black plum wax apples and black diamond wax apple. The most popular among the three species grown in SouthEast Asia

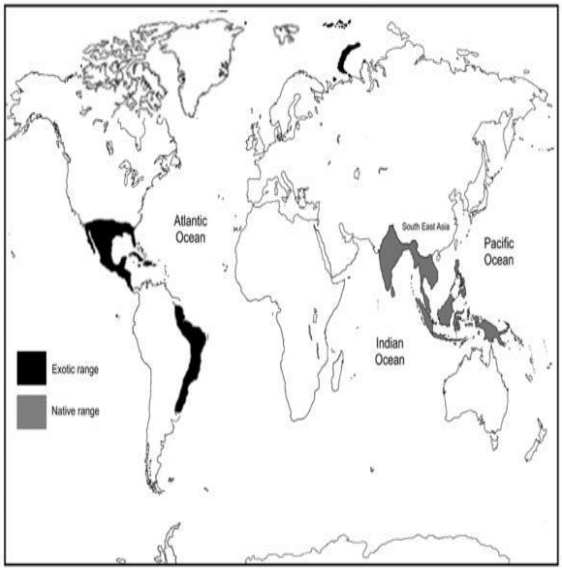

Figure 2: Location of wax apple cultivation in native and exotic range.

Figure 3 : Growing stages of a wax apple

Figure 4 Blooming flower of wax apple

Growth and flowering of trees

The trees of S. samaragense are cultivated in home auditoriums , frequently planted along driveways and paths as well as cultivated in small effects. The trees grow well in fairly wettish tropical Tableland areas up to 1200 m in elevation. They also grow stylish in areas with a fairly long dry season (Nakasone and Paul, 1998). still this doesn't mean that the tree is failure-resistant. In fact it requires a dependable force of water and is frequently planted along small gutters, aqueducts or ponds(Hakim and Panggabean, 1992). The tree is 3- 15 m altitudinous, with short and crooked box, 25- 50 cm periphery, frequently fanned near the base and with wide, irregular cover. The growth and development of this fruit is sometimes get hinder and slow down due to low photosynthates supply at early growth stages. Leaves are contrary, elliptic to elliptic- oblong, 10- 25 cm x 5- 12 cm, coriaceous with thin periphery, crystal dotted, rather explosively Sweet when bruised; petiole thick, 3- 5 mm long. The wax apple is a heavy patron on well fertilized good soils, and can produced further than 200 clusters per tree, with 4- 5 fruits in each cluster at maturity. Wax apple generally flowers early or late in the dry season; the flowers appear to be tone-compatible and the fruit ripens 40- 50 days after anthesis. Inflorescences are terminal and in axils of fallen leaves, 3- 30-unfolded; flowers 3- 4 cm in periphery, calyx- tubeca.1.5 cm long, ventricose at apex, lobes 3- 5 mm long; petals 4, orbicular to spathulate, 10- 15 mm long, unheroic-white; stamens multitudinous, up to 3 cm long; style up to 3 cm long.

The fruit

The fruit is basically bell-shaped.The bottom part of the bell somewhat looks like a little beard it is hair basically the dried up remnants of the flower's stamen and it is easily removed with a blast of

water. it is a good practice to wash it with water before storing it or eating it because ants can take shelter in that part.The fruit can range from about 5–8 cm long in size. It does not taste like an apple and has neither the fragrance nor the density of an apple. Inside the fruit it is white fleshy and dense from the outside and fluffy, songy mesh from the inside.The fruit is a little crisp, refreshing and juicy

Centrally it is fluffy stuff surrounding the seeds.The outer layer is loaded with flavour it is light sweet-sour, mildly sweet.similar to an Asian pear. and the liquid-to-flesh ratio of the wax apple is comparable to a watermelon.Talking about the colour according to the varieties colours may differ range from white, pale green, green to red, pink, red, purple, deep purple and even black.The skin has waxy texture and it gets easily damage and so the commercial transport is hard and challenging for this fruit.The fruit can get sunburned in the early developing stage. Fruit color is considered to be one of the important external factors in determining fruit quality.

Seed

Seeds are 0–2, mostly suppressed, globose, up to 8 mm in diameter and **Propagation is** By seed, air-layering, grafting or by budding.

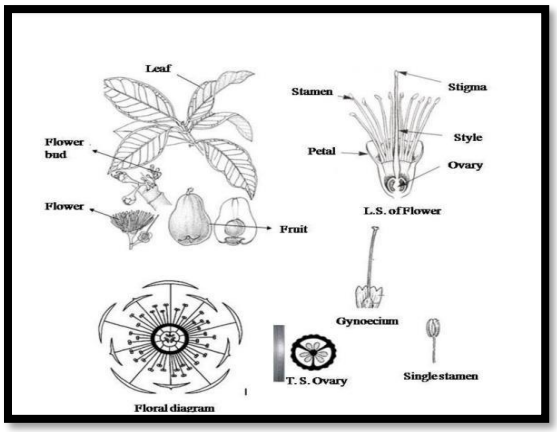

Figure 5 Floral and fruit diagram of wax apple

Polination

Three systems of breeding exist – apomictic, self-pollination and cross-pollination, and a variety of insects can serve as pollinators for example honey bees seem to be the major visitor of this flower.

Propagation

The plant can be grown from the seed and propagation method It gets quickly grown by propagation method a rooted branch can be grown as a whole plant when put in a water container and some soil. At the very starting stage, strong sunlight can cause problems on leaves. It prefers moist warm climates (above 18°C and not below 7°C) up to 1000m, and can withstand some dry conditions provided there is an adequate water supply. Extreme high and low temperatures inhibit the colour development of the fruit . Seeds are recalcitrant but germinate readily. Marcotting, cuttings and budding are also used.

figure 6 propagation of apple wax seedling

Nutrition Facts

1. Rich in Vitamin C These fruits are said to be rich in Vitamin C, which is important for boosting impunity and conformation of collagen for keeping the skin looking youthful. A 100 gram portion of wax apple contains22.3 micrograms of Vitamin C(as per USDA data).

2. Rich in Dietary Fibre White jamuns or rose apples are said to be rich in salutary fibre, which may help cover against common digestive troubles like diarrhoea and flatulence. Salutary fibre is also good for regulating blood sugar and helps in weight operation.

3. Rich In Vitamin A One of the most important nutrients for eye health is Vitamin A, which is set up in cornucopia

4. Rich in Calcium The most important nutrients for teeth and bones is calcium, which rose apples are rich in. A 100 gram of rose apple contains 29 micrograms of calcium(as per USDA data).

5. Rich in Potassium Rose apples contain good quantities of the nutrient potassium, which is important for maintaining fluid and electrolyte balance in the body,also has high water content(93 gm per 100 grams) and may help in stay hydrated.[17][18][19]

Wax apples are a low–fat and rich in water content in every 100g that is medium size of wax apple Contents

Table1 nutrition values of wax apple

Nutrients	values
energy	105kj
Sugar	6.7 g
Magnesium	5 mg
Cholesterol	0 mg
Dietary fibre	1.0g
Carbohydrates	5.70 g
Potassium	123 mg
Total Carbohydrates	5.7 g
Protein	0.6g
Phosphorus	8 mg
Thiamine(b1)	0.020 mg
zinc	0.06 mg
Riboflavin(B2)	0.030 mg
Protein	0.60g
Niacin (B3)	0.800 mg
Iron	0.07 mg
Vitamin C	22.3 mg
Vitamin A	340 mg
calcium	29 mg
Total Fat 0.3 g	
Sodium	0 mg

Phytoconstituents

Wax apple is rich in flavonoids, tannins, phenols, steroids, as well as alkaloids.

Flavonoids

Flavonoids are a vital group of naturally occurring polyphenolic compounds having antioxidant, anti-inflammatory,

antidiabetic, and antiallergic activities. Methanol extract of S. aqueum leaves contained 87 different compounds rich in flavonoids, for example, myricetin rhamnoside, myrigalone-G pentoside, quercetin galloyl-pentoside and cryptostrobin. Flavonoid compounds from S. campanulatum n-hexane and S. corticosum chloroform leaf extracts showed strong antiproliferative activity against human colorectal carcinoma cells. The total flavonoid content was determined by using an aluminium chloride colourimetric assay. 250 µl of the extract was suspended in 1.25 ml of distilled water and then 75 mg of 5% NaNO2 solution was added. After the incubation for 40 min, the absorbance was read spectrophotometrically at 510 nm. The concentration of total flavonoid content was calculated according to the equation obtained from a quercetin standard curve and was expressed as mg of quercetin equivalent (QE) per 100 g of dried sample.

Phenolic content

Powdered wax apple was uprooted for 2 h with 80 methanol at room temperature on an orbital shaker, set at 200 rpm. Total phenolic content of the methanolic excerpt was assayed using the Folin- Ciocalteu reagent. The excerpt (100 µl) was mixed with0.5 ml of 10 Folin- Ciocalteu reagent at room temperature for 3 min, followed by the addition of 2 ml of 10 sodium carbonate result. Gallic acid was used as standard. The quantum of total phenolic content was calculated as mg of gallic acid coequals (GAE) per 100 g of dried sample.

Anthocyanins

The anthocyanin content of the extract was measured using a pH differential method. The extract was diluted with two difference buffers; 0.025 M potassium chloride buffer pH 1 and 0.4 M sodium acetate buffer pH 4.5, respectively, the absorbance was measured by spectrophotometer at 510 and 700 nm after incubation for 15 min at room temperature, The amount of total anthocyanin content was found as mg of cyanidin 3-glucoside equivalents (CGE) per 100 g of dried sample using a molar absorptivity of cyanidin 3-glucoside of 26,900 L/mol.cm and molecular weight of 449.2 g/mol.

HPLC fingerprint

HPLC fingerprint For the bioactive compounds in the powdered wax apple. Analysis of the wax apple extract revealed the presence of gallic acid and quercetin in the powdered form. Gallic acid was found to be 4.11 ± 0.18 µg/g of dried powder, compared to 0.17 µm of dried apple extract. The concentration of these bioactive compounds was determined by comparing the retention times and UV spectra of the two samples with identical standards.[24]

Determination of Soluble Carbohydrates and Total Sugar

The total answerable solids (TSSs) value was determined at 25 °C with an Atago 8469 hand refractometer (AtagoCo.LTD., Tokyo, Japan) and expressed as ° Brix. Glucose, fructose, and sucrose were estimated at 25 °C with the HI 96811 digital refractometer (Hanna instruments) and expressed as probabilities. Total answerable sugar was determined using the phenol- sulfuric system. Determination of Soluble Carbohydrates and Total Sugar The total answerable solids (TSSs) value was determined at 25 °C with an Atago 8469 hand refractometer (AtagoCo.LTD., Tokyo, Japan) and expressed as ° Brix.

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Determination of Vit-C, Polyphenolic Compounds, and Pigment Concentration

Total ascorbic acid (vit-C) content was determined using the method modified by Hashimoto and Yamafuji. The total phenolic contents (TPC) of wax apple fruits were determined with the Folin-Ciocalteu assay, as described by Singleton and Rossi. Total flavonoid content (TFC) was determined with the aluminum chloride colorimetric assay, using catechin as a standard. The chlorophyll and carotene contents of the leaves and fruit were determined using the methods described by Hendry and Price. The total anthocyanin and carotenoid contents of the hydrophilic extracts were measured using the pH-differential method with cyanidin-3-glucoside used as a standard.

Alkaloids

Alkaloids are naturally being organic composites, which correspond of at least one nitrogen snippet and also have a wide range of pharmacological conditioning similar as antibacterial, anticancer, analgesic, antihyperglycemic, and antimalarial S. cumini seeds are reported to contain alkaloid, jambosine, and showed antidiabetic effect(33). There are colorful composites insulated from different corridor of Syzygium species similar asS. cumini,S. polyanthum, andS. Aromaticum. Methanol excerpt ofS. cordatum fruit pulp and seed contains alkaloids.

Glycosides

Glycosides are the composites in which a sugar is bound to another functional group via a glycosidic bond and numerous shops save chemicals as inactive form of glycosides. It has several pharmacological conditioning, including antiarrhythmic and antihyperglycemic.- Trihydroxy-3-methylacetophenone-2-O-β-d-glucoside, a new acetophenone, was insulated from the flower kids ofS. Aromaticu. S. cumini seeds contained glycoside jambolin or antimellin and showed an antidiabetic effect by inhibiting the diastatic conversion of bounce into sugar(39). There are a many composites set up in different corridor ofS. species similarS. cumini andS. Polyanthum.

Tannins

Tannins are polyphenolic biomolecules that have antioxidant, antimicrobial, antinutritional, anticancer, and cardioprotective properties. Methanol extract of S. aqueum leaves contained less number of tannin compounds (e.g. galloylquinic acid; Sobeh, [44] S. cumini contained very little amount of tannin compounds in different parts of the plants such as leaf extract (e.g. nilocetin) and seed extract (e.g. corilagin; [45]S. samarangense methanol leaf extracts also contained galloylquinic acid and quinic acid.

Therapeutic uses of wax apple

1. **Controls Diabetes**

Wax apples have Jambosine, an alkaloid emulsion that's salutary for cases with diabetes. This is because it blocks or regulates the exchange of bounce into sugar in the body. So do not forget to include wax apple in your diet if you're a r rdiabetic case.

2.**Prevents cancer**

Wax apples have an active quantum of organic composites and are rich in Vitamin C and A. These rudiments can prop prostate cancer and bone cancer. The seeds of rose apples are also an amazing result to aid diarrhea and vomiting. Wax apple or rose apple also has the capability to boost one's impunity.

3.**Helps in Digestion**

The rich source of fiber content in rose apples makes it great for regulating the food passage

through the digestive tract in our body. This helps to relieve stomach constipation and other

digestive-affiliated health problems.

4. **Treats Bladder Infections**

People witnessing bladder infections should include wax apples in their diet. Bladder

infections may frequently do due to bacteria getting into the urethra. Since the fruit is rich in

chemical composites, it helps in flushing out poisons.

5.**Strengthen Bones**

Calcium is always good for bones and rose apples have strong calcium content to maintain

bone health. Consumption of 100 gram serving of rose apples can give 29 mg of calcium. It's veritably good option to include rose apple in your diet.

For skincare and cosmetics

tropical or subtropical fruit is best resource for cosmetics developers. It is a target for developing cosmetic ingredients[49]. Antioxidant ingredients, including vitamin C, have a close relationship with the efficacy of suppressing wrinkles and melanin production and inflammatory skin diseases on the face and skin and can be applied to various cosmetic. In this study, the DPPH radical scavenging, ABTS radical scavenging, DMPD radical scavenging, nitrite scavenging, and ferrous- ion chelating exertion of the hot- water excerpts of splint and branch of S. samarangense were anatomized. The splint and branch of S. samarangense were uprooted with distilled water at 65 ℃. In addition, cupric reducing antioxidant capacity, reducing power assay, ferric reducing antioxidant power(FRAP), total phenol contents, and total flavonoid content were also measured.

When performed HPLC point analysis was to confirm the standard factors for the antioxidant efficacity of the Jeju wax apple excerpt. Since myricitrin and ρ- coumaric acid has been reported as the constituents in the Syzygium factory that are effective antioxidant agents, they were used as standard substances. Using the conditions described in the experimental section, myricitrin and ρ- coumaric acid were well resolved from the wax apple excerpt with excellent peak shapes. Considering these results, we suggested that Jeju wax apple excerpts be considered possible antioxidant campaigners for topical operation

Fertilization

Abundant water content in wax apples is also good for maintaining healthy feathers and digestion and can increase the sense of mood or happy for those who consume them.

adding fertility presumably still infrequently hear that guava can maintain and increase fertility for men. Wax apples contain vitamin C are known as antioxidants can maintain healthy body cells, including maintaining healthy sperm cells that have been damaged.

Maintaining eye health.

Wax apple for Maintain Healthy Bones and Teeth

Vitamin A is salutary to your sight. It's what allows you to see at night, like when you're playing outdoors and the streetlights come on Your eyes are suitable to acclimate and see duly thanks to vitamin A. This vitamin also aids in your capability to see colours. Like vitamin D, vitamin A also helps your body to fight off sickness by boosting your vulnerable system. Maintains bones and teeth Necessary for bone health because they contain calcium to a certain chance which helps to maintain healthy teeth and bones as well as help osteoporosis. Magnesium, phosphorus, and potassium which play vital places in bone conformation and keeping the teeth healthy are also present in reasonable quantities.[56] You can find vitamin A in oranges, cantaloupe, carrots, sweet potatoes, kale, collard flora, and spinach. Drinking plenitude of milk will also boost your body's situation of vitamin A. This is one of the most important vitamins to consume on a diurnal base. It's vital in keeping your epoxies, bones, and blood vessels in good working condition. Vitamin C also helps you heal. When you fall down and get a cut or a scrape, vitamin C helps your injuries feel more and stop hurting briskly. In a analogous way, vitamin C helps your body repel infections and makes it harder for ails, like the flu, to harm your body. To give your body the vitamin C it needs to eat a lot of citrus fruits, like cantaloupe, strawberries, tomatoes, broccoli, kiwi, and sweet red peppers. Iron is another mineral that helps your body to be strong. When your body takes in iron, it uses it to make haemoglobin, which is a protein your red blood cells need in order to do their job. Red blood cells are responsible for carrying the oxygen you breathe by through your lungs to all of the other corridor of your body that need it. Iron also helps your body make myoglobin, another protein that helps your muscles admit oxygen

Let us see its over all benefits:

Java apples are special in such a way that they contain water, vitamins and minerals that serve as detoxifiers. This implies that they help to clean up the body system naturally by removing poisonous substances or the performing goods from the body. It improves skin health The presence of certain factors with anti-fungal and microbial goods in the apple makes it useful in precluding and curing skin infections. The leaves can be squeezed and rubbed on the skin as it provides cooling goods on skin conditions similar as smallpox and itching. Its vitamin C content has an effective part to play in collagen conflation

Repairs body tissues, Regular consumption of this apple can help repair body tissues or damaged cells in the mortal body because it has a high quantum of vitamin C content.

Maintains a healthy heart The flesh of the apple contains epicatechin that helps greatly to low down high blood pressure.

Good for body hydration Hydration is the major process that sustains mortal life because implicit loss of fluid can be life-hanging . Java apple helps to keep the body doused due to the quantum of water content in it.

By hydrating the body, it keeps the body temperature normal, flushes waste products from the body because of good urine product and keeps the body always

lubricated. Java apple helps keep pregnant women hydrated. There are ineluctable health conditions similar as nausea and vomiting which can cause dehumidification. Conclusively, it contributes to maintaining fluid balance which is the major aspect of homeostasis in living organisms

The analgesic, antidepressant andanti-inflammatory parcels were delved in a study named, " Evaluation of analgesic,anti-inflammatory and CNS conditioning of the methanolic excerpt of Syzygium samarangense leaves, '' by Mollika et al. The results of the trials show that the methanolic excerpt of Syzygium Samarangense leaves may be used as an indispensable or supplementary herbal remedy analgesic,anti-inflammatory andanti-depressant. In another study named, "Syzygium samarangense unpredictable oil painting Inhibited Bacteria Growth and Extracellular Protease of Salmonella typhimurium, '' by Folorunso et al, an assessment was done on the unpredictable oil painting of Syzygium samarangense to see if it can inhibit bacteria growth. The reports from this study show the promising benefits of the unpredictable oil painting uprooted from the dried leaves ofS.samarangense as an antimicrobial agent

The methanolic excerpt of Syzygium samarangense leaves may be used as an indispensable or supplementary herbal remedy analgesic,anti-inflammatory andanti-depressant. In another study, an assessment was done on the unpredictable oil painting to see if it can inhibit bacteria growth. The reports from this study show the promising benefits of the unpredictable oil painting uprooted from the dried leaves of S.amyrangense as an antimicrobial agent.

In a study named, "Anti-proliferative and apoptotic conditioning of syzygium samarangense (wax apple) fruits prize against mortal a549 lung cancer cell lines, '' by THAMPI et al, the methanol excerpt at different attention were tested against A549 mortal lung cancer cell lines for cell viability or cytotoxicity. The methanol excerpt, through morphological analysis using PI staining procedures, showed that the excerpt was suitable to spark cell death through apoptosis indeed at low attention. When it's in season, it's always a admixture of Malay apple(Syzygium malaccense), water apple(Syzygium aqueum) and Rose apple(Syzygium jambo). Whichever bone you see, eat. They're each good. Don't forget that the leaves are also medicinal.

Name	**Java apple (Rose Apple)**
Scientific Name	Syzygium samarangense
Family	Myrtaceae
Order: Kingdom:	Myrtales Plantae
Native	Bangladesh to the Solomon Islands. It is commonly and widely cultivated in Malaysia, Indonesia, Thailand, Cambodia, Laos, Vietnam and Taiwan

Common Names	Java Apple, Java Roseapple, Mountain Apple, Samarang Rose Apple, Wax Apple, Wax Jambu, cloud apple, jambu air, bell fruit, Jamaican apple, Royal apple
Health Benefits and treating	Good for LDL cholesterol Reduce Toxicity,Boost Immunity,Control Diabetes,Fights free radicals repairs the damage,Beneficial for skin,Aid in Digestion,Prevents Cancer,Prevents muscle cramps ,Maintains a Healthy Heart, Treats Bladder Infections, Prevents Constipation, Treats Diarrhea, Good for Pregnant Women, Maintain Healthy Bones and Teeth, Treats Celiac Disease, Reduced risk of strokes, Presence of niacin boosts HDL,Increase fertility
Plant Growth Habit	Evergreen Tree
Plant Size	deep, loamy soil is considered ideal for the rose apple but it is not too demanding, for it flourishes also on sand and limestone with very little organic matter
Bark	Pinkish-gray in color, and flakes readily

Leaf	Opposite, elliptic to elliptic-oblong, 10–25 centimeters (4–10 in) long and 5–10 centimeters (2–4 in) broad, base cordate, apex obtuse to slightly acuminate, coriaceous with thin margin, pellucid dotted, 14–19 pairs of nerve, rather strongly aromatic when bruised
Inflorescence	Inflorescences are terminal and in axils of fallen leaves, 3–30-flowered
Flower	Fragrant, 3–4 cm in diameter, calyx-tube 1.5 cm long, 4-lobed, ventricose at apex, lobes 3–5 mm long; petals 4, orbicular to spathulate, 10–15 mm long, yellow white; stamens numerous, up to 3 cm long; style up to 3 cm long
Pollination	apomictic, self-pollination and cross-pollination, and a variety of insects like honey bees Temp 25-30 C 7-11 at the day of blooming
Fruit Shape & Size	Bell shaped, crowned by the fleshy calyx with incurved lobes, 3.5–5.5 cm × 4.5–5.5 cm, waxy and glossy, in various hues
Taste of fruit	Sweet-sour or sweet

Color of fruit	White to greenish white to pink, red, maroon and dark purple
Fruit Skin texture	Very thin and waxy
Flesh	White spongy, juicy, aromatic, mildly sweet and crisp
Seed	0–2, mostly suppressed, globose, up to 8 mm in diameter
Propagation by	By seed, air-layering, grafting or by budding
Plant Parts Used	Whole Tree can be used
Exportation of furit	Quite changing
Phytochemical	phenolics, flavonoids and several antioxidant compounds,vitamin A and C,Carbohydrates, Sugar
external factors in determining fruit quality	Fruit color is considered to be one of the important external factors in determining fruit quality
Season of fruit	May to September November to March

Table - Basic information about wax apple

Conclusion

There are many health benefits associated with wax fruit. It contains many vitamins, minerals, and phytoconstituents. It also has traditional nutritional value. Depending on the environment and the care taken, it may be difficult to grow sometimes. We have a high probability of getting good pharmaceutical and therapeutic results from this nature's gift. The present findings encourage further research into the isolation and identification of S's active components. Research on samarangense fruit pulps in order to understand their mechanism of action in vivo in order to develop treatments for diseases and disorders, the mechanism of action of Samarangense fruit pulps in vivo, which may allow the development of numerous treatments.

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