IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Studies On Process Standardization Of Sugarless Amla Candy

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ABSTRACT

The goal of the current inquiry is to standardise the method used to make Amla Candy using sorbitol. Sorbitol was also used in place of sugar entirely. Conclusion: 02% alum pretreatment and sorbitol syrup concentration treatments (45, 50, and 70 Bx) were found to be effective for enhancing candy quality. Additionally, cabinet tray drying (60°C) was chosen for commercial viability based on chemical composition and organoleptic evaluation. The finished candies can be safely kept in a standing bag for up to two or three months without losing any of their sensory quality characteristics. This sorbitol-based amla candy has a wealth of nutraceuticals, has a low calorific value, and offers extra health advantages. So one of the forthcoming value-added food products could be the created Amla candies. They might have a healthy commercial market and be able to draw diabetic people's attention.

KEYWORDS: Indian gooseberry, Phyllanthus emblica, sorbitol-based candy, sugar-free candy, and diabetic candy are some examples of candies.

INTRODUCTION

A deciduous tree in the Phyllanthaceae family, Phyllanthus emblica is also referred to as emblic, emblic myrobalan, myrobalan, Indian gooseberry, Malacca tree, or amla. Southern Asia and the tropics make up its natural habitat. Banarasi, Chakaiya,Hathijhool, Bansi Red, Pink-tinged, and NA-7 are the principal amla kinds. One of the oldest fruits in India, amla is known as a "wonder fruit for health" due to its special characteristics. Since the beginning of time, it has been used as a significant medicinal tool, and both the ayurveda and unani systems of medicine commonly advocate it because of its beneficial synergistic effects. The amount of vitamin C in it (478.56 mg/100 ml) is the greatest. It also contains tannic acids, calcium, iron, protein, sugar, phosphorus, carbs, and vitamin C. Alkaloids, phenolic compounds, amino acids, and carbohydrates make up the majority of the ingredients in amla. Additionally, compared to apples, the fruit has a far higher concentration of most nutrients and amino acids. When used as a food ingredient, sorbitol offers three potential advantages over sugar.

First off, because dental bacteria cannot ferment the sugar alcohols, they do not encourage the growth of tooth caries. Second, they are suitable for diabetics since they create a lower glycemic reaction than sucrose. Third, most sorbitol contains less calories than sugar (2.6 kcal/g) (Kroger, Meister, & Kava, 2006) [12]. Glucose extracted from starch and from inverted sugar is hydrogenated to create sorbitol, which has roughly 60% of the sweetness of sucrose (Zumbé, Lee, & Storey, 2001). Sorbitol is a chemical compound that is produced commercially. It is becoming more popular to employ sorbitol in drying processes to prevent browning and as a humectant (Zimmermann, 1989) [31], which could result in dried goods with higher humidity but the same water activity. Amla fruit exports from India are estimated to exceed 500 tonnes. 39 Amla fruit has more than 18 chemicals that have been found to have anti-proliferative effects on uterine and stomach cancer cells. It works primarily by increasing the activity of Natural Killer (NK) cells in different tumour cells.[13] The amla fruit's emblicanin A and B are said to have potent anti-oxidant and anti-cancer capabilities. A medium-sized amla tree with an 8-meter growth potential and a slightly bent trunk. Branchlets are 10–20 cm long and finely pubescent. Along the branchlets, amla leaves are delicately and closely spaced. Amla leaves resemble pinnates and are incredibly small, plain, and attached to branchlets at the base. Amla has a tart, bitter, and astringent flavour, and the edible fruit is a fantastic source of fibre. In India, amla is a highly widespread plant. Northern India's plains and semi-arid areas are excellent places to find it growing. The fruits are available from October through May, and during that period they are also gathered and preserved in great quantities to be available for the rest of the year.

Stephen came up with the phrase "NUTRACEUTICAL" by fusing the words "nutrition" and "pharmaceutical." [1] Defelice, MD, founded and served as chairman of New Jersey's Innovation in Medicine in 1989. Nutraceuticals, in his opinion, are foods or components of foods that have health advantages and are used to cure or prevent disease. [2] The father of modern medicine, Hippocrates (460–377 BC), famously said, "Let food be thy medicine and medicine be thy food" in order to establish the connection between healthy meals and their medicinal advantages. Additionally, nutraceuticals have been created to cure a number of illnesses, including colon cancer, diabetes, and Alzheimer's disease. The components of nutraceuticals are made up of biological substances that easily degrade, including proteins, peptides, hormones, and herbal extracts. The fruits, which are sour, astringent, bitter, acrid, sweet, and anodyne, are used in folk medicine. Cooling, ophthalmic, carminative, digestive, stomachic, laxative, dyspepsia, aphrodisiac, rejuvenative, diuretic, antipyretic, and tonic are a few of the positive effects that it can exert. They are helpful for vitiated conditions of tridosha, diabetes, cough, asthma, bronchitis, cephalalgia, ophthalmopathy, dyspepsia, colic, flatulence, hyperacidity, peptic ulcer, erysipelas, skin diseases, leprosy, haematogenesis, inflammations, anaemia, emaciation, hepatopathy, jaundice, diarrho (Hair tonic). Amla is also said to have antioxidant, anti-inflammatory, analgesic, antipyretic, and restorative characteristics. It is also said to have hepato, cardiac, nephro, and neuroprotective benefits.

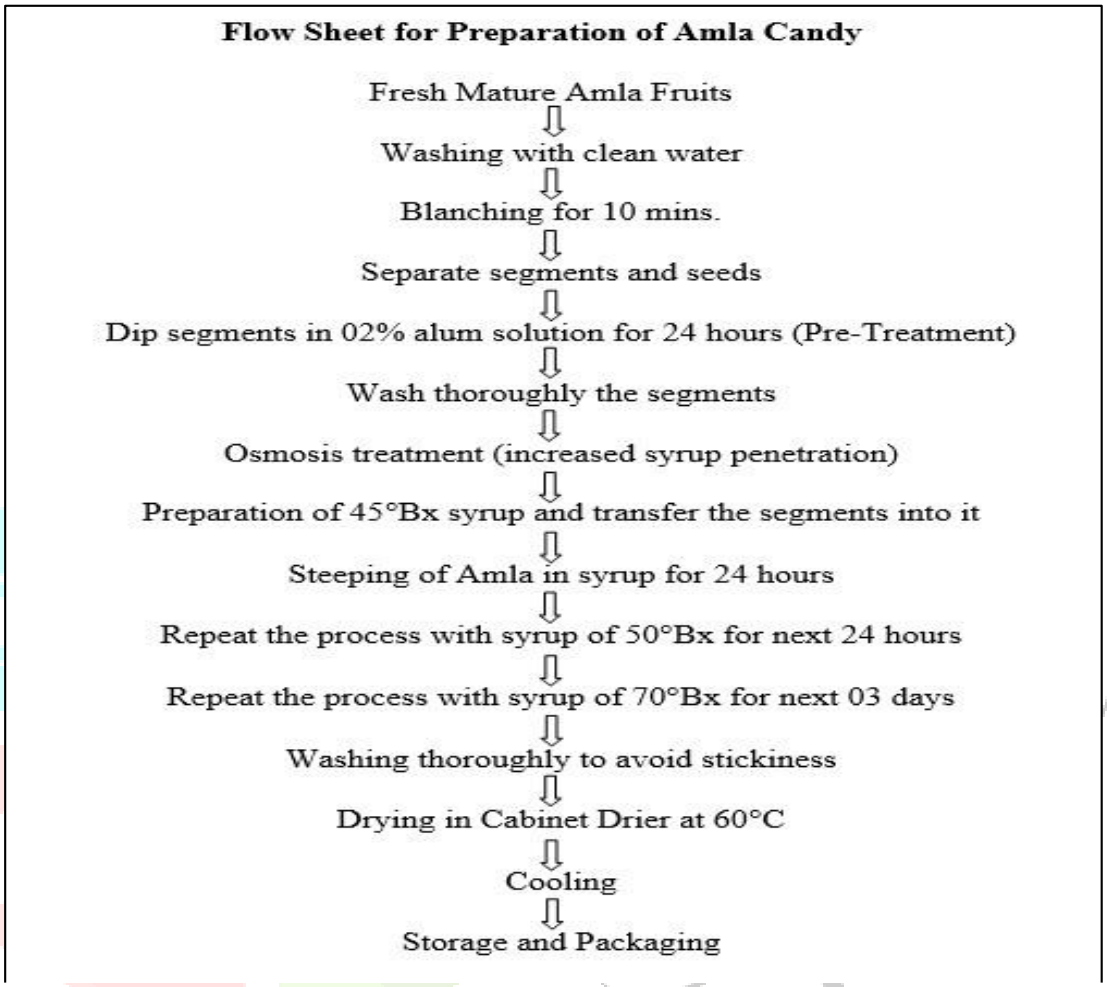
MATERIALS AND METHODS

Amla fruits (Var. Krishna) that had just been harvested were purchased from a nearby market. Krishna type is chosen for making sweets because it has a moderate keeping quality (Pathak et al., 2003) [24]. The local market supplied the sorbitol, sugar, and alum needed for the manufacture of the product. For the purpose of the investigation, the proper packaging supplies, standing pouches of 250 gauge, were purchased from a local market.

PREPARATION OF AMLA CANDY

For the production of Amla Candy, healthy, disease-, pest-, and bruise-free Amla fruits were chosen. Fruits were then properly cleaned by being washed under running water. Fruits were blanched for 10 minutes in boiling water. Geetha and coworkers (2006) [6] Following that, the segments were divided and the seeds were taken out, as suggested by Kumar et al. (2001) [13]. The segments were blanched and soaked in 02% alum solution for a day. The following day, proper washing was done to get rid of any alum remains. According to the procedure outlined by (Tandon et al., 2006) [25], the product was made by dipping the segments in progressively higher concentrations of sugar syrup at room temperature until equilibrium at 70°B was established. Initially, 45°Bx sugar syrup was made, and pre-treated segments were added to it. The segments were removed from the syrup after 24 hours of soaking, and the same syrup was heated to a concentration of 70°Bx before being chilled and added to the fruit. The item was retained for the following three days. On the fourth day, the osmosed

segment was taken out of the syrup and properly washed to eliminate any remaining surface syrup and prevent sticking. The portions were evenly spaced out across the aluminium trays. Additionally, drying was done in a cross-flow cabinet tray dryer at 60°C with an air velocity of 1.2°M/s. The product was taken out of the dryer and allowed to cool to room temperature once it had reached a sufficiently dry and leathery texture. It was kept, sealed, and packaged right away. The goal of the research project is to examine the effects of switching from regular cane sugar to the natural sweetener sorbitol.



FORMULATION OF RECIPE OF AMLA CANDY

The process involved three syruping treatments: a first one at 45 Bx for 24 hours, a second at 50 Bx for the following 24 hours, and a third at 70 Bx immersed for 72 hours.

Syruping Treatment	◦ Brix	Steeping Period
1st	45	24 hours
2nd	50	24 hours
3rd	70	72 hours

RESULTS AND DISCUSSION

Amla fruit's physical-chemical and nutritional characteristics For the purposes of the experiment, Krishna variety amla fruit was chosen for the creation of amla candy. It is due to the fact that, according to Nayak et al. (2009) [16] who based their report on the observations made on several biochemical characteristics and organoleptic quality, variant Krishna is most suitable for the creation of quality product sweets. Table 2 displays the physical features of fresh fruit.

TABLE 2: PHYSICAL CHARACTERISTICS OF AMLA FRUIT

Parameters	Observations
Colour	Light Greenish Yellow
Diameter (cm)	3.78
Height (cm)	3.50
Fruit weight (g)	15.58
Seed weight (g)	1.40
Pulp weight	90% of the fruit weight

Each value is an average of three determinations

The colour of the chosen Amla fruit is a pale greenish yellow, and this colour will be well reflected in the finished sweets. The weight of the pulp was determined to be 90% of the weight of the 15.58g amla fruit.

The information in Table 2 is consistent with that found by Indian Medicinal Plants (1997) [10], which explained that the Phyllanthus Emblica fruit is spherical, pale greenish yellow, and appears to be much harder than it actually is. The fruit also has a sour flavour. Fruits are plump, light yellow, and have six hidden vertical ridges that enclose six triangular seeds.

AMLA CANDY (C1) & SORBITOL BASED AMLA CANDY (S1)

According to Table 4, the S1 sample had the largest water loss (43.40%) and solid gain (39.55%) following the first syrup treatment. Because sorbitol has a lower molecular weight than other osmotic agents, this is the case. Sorbitol, a low molecular weight osmotic agent, enhanced the osmotic pressure gradient and consequently the water loss (Phisut et al., 2013) [20]. Higher molecular weight solutes only showed a slight, gradual inward migration, but low molecular weight solutes considerably penetrated the fruits. It is possible to understand this effect in terms of the respective solute diffusivities (Torreggiani et al., 1993). A crucial step in the osmosis process for the partial removal of water from fruit tissue and the addition of solute by immersion in hypertonic solution is the use of sorbitol in the creation of candies. Solute type, solute concentration, and osmosis time have the biggest impacts on this. According to Tortoe, (2010) [27], when choosing the solution, which was observed in the present investigation, the precise effect of the osmotic solution is of major relevance. This actually depends on the size and molecular weight of the solute in the alternative osmotic agent.

TABLE 4: EFFECT OF SYRUP CONCENTRATION ON SUGAR

Sample	After 1st Syrup Treatment			After 2nd Syrup Treatment			After 3rd (day) Syrup Treatment		
	Syrup Conc. (°B)	WL* (%)	SG** (%)	Syrup Conc. (°B)	WL* (%)	SG** (%)	Syrup Conc. (°B)	WL * (%)	SG** (%)
C 1	45	19.85	16.20	50	26.65	22.35	70	40.45	36.50
S 1	45	23.70	18.20	50	30.95	25.10	70	43.40	39.55

ORGANOLEPTIC QUALITY OF PREPARED AMLA CANDY

To determine if a particular syrup concentration is suitable for making amla candy, a 9-point hedonic scale was used to evaluate the organoleptic quality of various quality features. Table 5 shows the average results of the organoleptic evaluation. The results of the sensory evaluation revealed that the osmotic agent and syrup concentration (by altering Bx) had a substantial impact on how well consumers perceived the quality of the product. In comparison to sugar-based candy samples, sensory scores for the S1 sample were shown to be higher for all metrics. The highest score in overall acceptability (9.5) indicated that judges had a high level of acceptance for it.

TABLE 5: ORGANOLEPTIC QUALITY OF PREPARED AMLA CANDY

Samples	Appearance	Colour	Taste	Flavour	Texture	Overall Acceptability
C1	8.5	8.0	8.5	8.2	8.2	8.5
S1	9.0	9.2	9.5	9.5	9.0	9.5
SE ±	0.126	0.128	0.128	0.115	0.113	0.115
CD at 5%	0.35	0.35	0.35	0.32	0.312	0.32

INGREDIENTS

1. 7 amla or gooseberries
2. 1cup grated jaggery
3. 3 tablespoons of aamchur powder
4. 1 teaspoon of cumin powder
5. ½ or ¼ teaspoon of hing
6. ½ teaspoon blacksalt
7. ½ teaspoon of ginger powder
8. 1 plate powdered sugar

METHOD OF PREPARATION OF AMLA CANDY

• Place the amla in a pan with a half cup of water, and then boil it for a few minutes until it becomes mushy.

• Cut the amla fruit into small pieces after draining and removing the seeds.

• Place the amla in a blender and process until a paste forms.

• Place the amla paste in a pan and simmer it for five minutes.

• Mix the amla and jaggery thoroughly until the jaggery dissolves, then add one cup of grated jaggery.

• Once the amla and jaggery mixture has thickened, add 3 tablespoons of aamchur powder, 1 teaspoon cumin powder, 12 or 14 teaspoon hing, 12 teaspoon black salt, either a pinch or 12 teaspoon of ginger powder, and stir everything thoroughly for 12 to 15 minutes, or until all the powders have dissolved.

•When the mixture starts to thicken, remove it from the heat, place it on a dish, and let it cool.

•Make little balls from the ingredients and roll them in your hands' palms.

• After that, roll a dish of powdered sugar over the amla candies.

Amla candies are prepared.

BENEFITS OF AMLA CANDY

• Amla is beneficial for enhancing vision. It lessens eye redness, itchiness, and wetness. Vitamin A is abundant in it. It lessens the chance of macular degeneration brought on by ageing.

Due to the high concentration of vitamin C in amla, regular ingestion helps strengthen your immune system. Alkaloids, flavonoids, and polyphenols are also present in significant amounts. Amla raises your haemoglobin level and red blood cell count, purifying your blood in the process.

• Amla also contains a lot of antioxidants, which work to combat the free radicals that cause premature ageing.

• Amla treats acidity and assists with digestion. It aids in controlling bowel movements and could ease symptoms of illnesses including irritable bowel syndrome.

• It strengthens defences against respiratory illnesses including a cough, cold, sore throat, etc.

Amla also contains beta-carotene and vitamin E, both of which are antioxidants.

• Consume amla or use shampoos containing amla if you desire glossy hair. It aids in strengthening hair.

• It helps to maintain healthy, moisturised skin; it enhances liver function; it increases vitality; and it gives off energy.

• Consuming amla candy on a regular basis will assist to prevent wrinkles, fine lines, dark spots, and premature ageing.

• Amla berries contain soluble fibre that dissolves quickly in the body, which slows down how quickly your body absorbs sugar. This may lessen blood sugar peaks. Amla berries also improve blood lipid and glucose levels in those with type 2 diabetes.

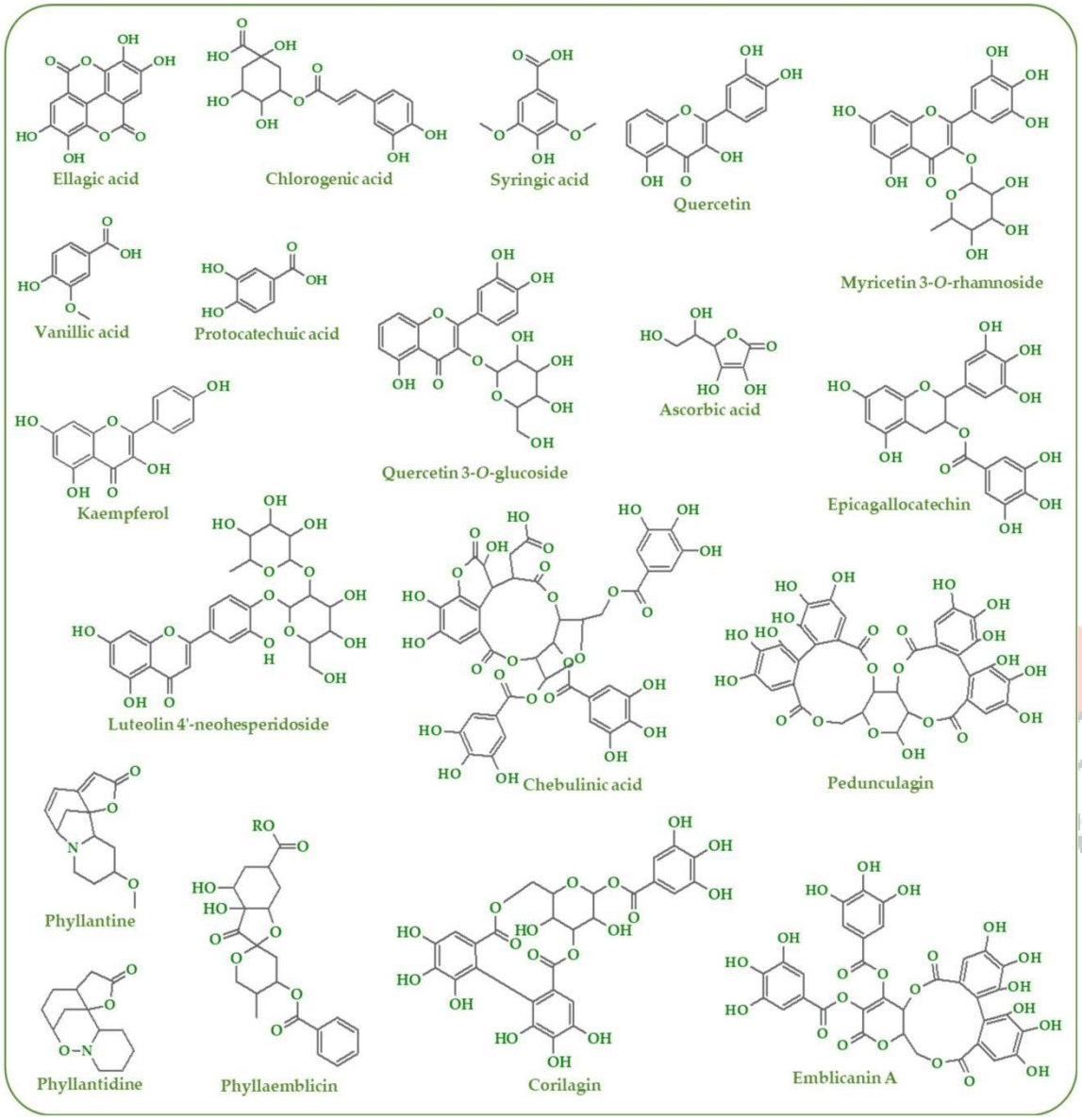
• Amla's phytonutrients and antioxidants protect brain cells from free radical damage, which can impair memory. The high vitamin C content of amla aids in the body's production of norepinephrine, a neurotransmitter that may help dementia patients with their cognitive abilities.

TRADITIONAL USES

Amla is used in a number of maladies by the Ayurvedic, Siddha, and Unani medical systems of India, as well as by Tibetan, Sri Lankan, and Chinese systems of medicine. It is utilised to postpone processes associated to senescence and degeneration and is regarded as a rasayana (rejuvenator)4. The fruits, which are sour, astringent, bitter, acrid, sweet, and anodyne, are used in folk medicine. Cooling, ophthalmic, carminative, digestive, stomachic, laxative, dyspepsia, aphrodisiac, rejuvenative, diuretic, antipyretic, and tonic are a few of the positive effects that it can exert. They are helpful for vitiated conditions of tridosha, diabetes, cough, asthma, bronchitis, cephalalgia, ophthalmopathy, dyspepsia, colic, flatulence, hyperacidity, peptic ulcer, erysipelas, skin diseases, leprosy, haematogenesis, inflammations, anaemia, emaciation, hepatopathy, jaundice, diarrho (Hair tonic). 28 Amla is also said to have antioxidant, anti-inflammatory, analgesic, antipyretic, and restorative properties. It is also said to have effects on the liver, heart, kidneys, and nervous system.

PHYTOCHEMICALS USED IN AMLA:

Amla has been discovered to have abundant phytochemistry that is dispersed throughout the plant (fruits, leaves, and roots). The majority of secondary metabolites are polyphenols (Figure 1), of which many substances from phenolic acids, flavonoids, tannins, other phenolics, and derivatives have been described in various investigations.



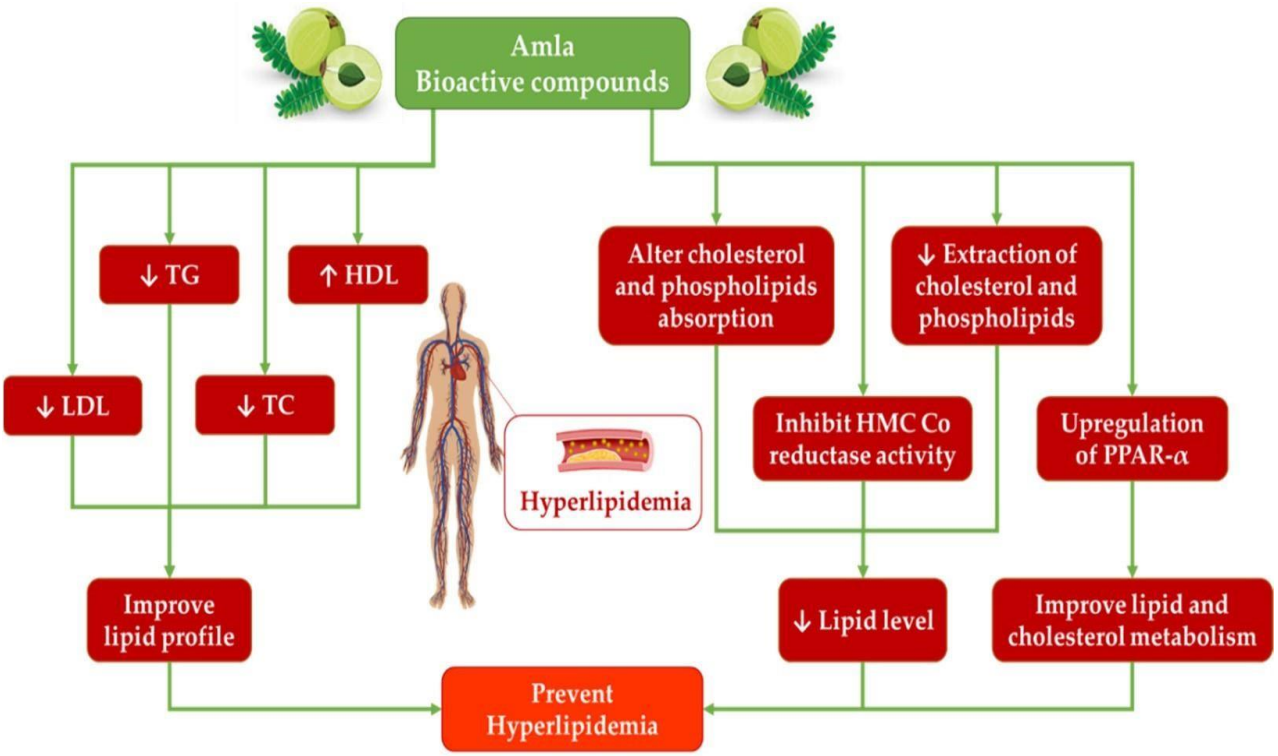
EMBLICA OFICINALIS

Amla, often referred to as Emblica oicinalis, is the most significant medicinal plant used in Indian medicine. It is a member of the Euphorbiaceae family. It is very nutrient-dense and a major nutritional source of vitamins, minerals, and amino acids, including vitamin C. The entire plant, especially the fruit, is utilised for medical purposes. The fruit has a reputation for curing illnesses like colds and fevers. Additionally, it functions as a digestive, stomachic, refrigerant, anti-inlammatory, diuretic, hair and liver tonic, and refrigerant. It shields against dyspepsia and peptic ulcer.

MECHANISM OF ACTION

When E. oficinalis is administered, elevated levels of lipids including cholesterol and triacylglycerides in serum and the liver are significantly reduced. Genes involved in lipid and cholesterol metabolism have their transcription controlled by peroxisome proliferator-activated

receptors (PPAR). The hepatic PPAR protein level is significantly raised by oral dosing of E. oicinalis [18]. It suggested that by reducing oxidative stress during the ageing process, E. oicinalis may be able to prevent age-related hyperlipidaemia. Significant reductions in total cholesterol (TC), low-density lipoprotein (LDL), triglyceride (TG), and LDL are seen after using E. oicinalis, but significant increases in high-density lipoprotein levels are also seen. According to the aforementioned findings, it is advised that adding E. oicinalis to the already used hypolipidemic medication will significantly reduce the risk of atherosclerosis and coronary artery disease.



NUTRITIONAL COMPOSITION OF AMLA

A significant source of carbs, amla fruits have >70 g/100 g dry weight (DW) of carbohydrates (Table 1). Along with the levels of protein, fat, and minerals including iron, calcium, and phosphorus (which range from 2.0 to 4.5, 2.1 to 3.1, and 0.2 to 0.6 g/100 g DW, respectively), fibre is another important component (7.2-16.5 g/100 g DW) [7–12]. Numerous studies have linked the cultivar to variations in the amla fruit's chemical make-up. Ascorbic acid is a further crucial element present in amla fruit (vitamin C). Studies evaluating various amla varieties have shown values ranging from 193 to 720 mg/100 g [8–12]. While the ideal recommended daily intake has not yet been established due to the urgency of new factors from modern civilization, several governmental health organisations throughout the world have developed Recommended Dietary Allowance (RDA), which ranges from 40 to 110 mg of vitamin C per day [13]. The health authorities in Australia and China have also recommended a daily consumption of 190–220 mg. . This means that the daily need for vitamin C can be met by eating a serving amount of at least 100 g of fresh amla fruits (2–3 pieces) from any of the kinds listed in Table 1. In contrast, P. emblica L. juice can have

CONCLUSION

The goal of the current inquiry is to standardise the method used to make Amla Candy using sorbitol. Sorbitol was also used in place of sugar entirely. Conclusion: 02% alum pretreatment and sorbitol syrup concentration treatments (45 Bx, 50 Bx, and 70 Bx) were found to be effective for enhancing candy quality. Additionally, cabinet tray drying (60 C) was chosen for commercial viability based on chemical composition and organoleptic evaluation. The finished candies can be safely kept in a standing bag for up to two to three months without losing any of their sensory quality characteristics. This sorbitol-based amla candy is a nutraceutical-rich food that has low calories and offers additional health advantages due to its significant mineral content. So one of the forthcoming value-added food products could be the created Amla candies. They might have a healthy commercial market and be able to draw in clients of all ages.

Thus, it is ultimately determined that the processing method created for making amla candy is technologically and economically viable and may therefore be used commercially.

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