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Technical Bulletin

on

Processing Technology for Amla-Carrot Mouth Freshener

Rejaul Hoque Bepary, Kaushik Hazarika, Tabaruk Hussain, Abhijit Borah, Saurajyoti Baishya

ICAR-AICRP on Post-Harvest Engineering and Technology Centre
Department of Agricultural Engineering
Directorate of Research (Agri)
Assam Agricultural University, Jorhat-785013

Technical Bulletin

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Preface

“Food processing and value addition are important strategies for enhancing the utilization of agricultural produce, reducing post-harvest losses, and improving farmers’ income. Development of simple, low-cost, and easily adoptable technologies is therefore essential for promoting small-scale food industries and encouraging entrepreneurship among rural youth, women SHGs, and farmer producer organizations. Value-added products not only increase market value but also ensure the availability of nutritious foods throughout the year.

In recent years, consumer preference has shifted toward healthy and natural products due to increased awareness about the harmful effects of synthetic colours, artificial flavours, and preservatives. Mouth fresheners are widely consumed after meals in India for refreshing breath and supporting digestion. However, many commercially available mouth fresheners are sugar-coated and contain additives, offering limited nutritional value. This creates a need for developing functional mouth fresheners using natural, nutrient-rich ingredients.

Amla (*Emblica officinalis*), commonly known as Indian gooseberry, is an important fruit recognized for its high Vitamin C content and antioxidant properties. It contains polyphenols, tannins, and bioactive compounds that contribute to immunity boosting, digestive improvement, and overall health benefits. Although its nutritional richness, amla is not consumed widely in fresh form due to its sour and astringent taste. Processing amla into value-added products is an effective approach to improve its acceptability and utilization.

Carrot (*Daucus carota*) is another nutritious vegetable rich in beta-carotene (pro-vitamin A), dietary fibre, minerals, and natural pigments. Incorporation of carrot improves the colour, texture, and nutritional quality of food products. In addition, the use of traditional spices such as fennel, cumin, coriander, black pepper, and clove enhances the aroma, taste, and digestive properties of the product. These spices are well known for their carminative and antimicrobial effects, making them suitable ingredients for mouth freshener formulation.

This technical bulletin has been prepared to provide a standardized process for preparing a healthy Amla–Carrot based mouth freshener through blanching, spice roasting, mixing, drying, and hygienic packaging. The technology is simple, economical, and suitable for household as well as small-scale commercial production. It has good potential for commercialization due to increasing demand for herbal and functional food products. The bulletin is expected to serve as a useful guide for entrepreneurs, students, extension workers, and food processors for promoting value addition and developing nutritious, marketable products.”

Authors

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1. TITLE OF THE TECHNOLOGY

Processing Technology for Amla-Carrot Mouth Freshener

2. BACKGROUND AND RATIONALE

Mouth fresheners are widely consumed in India as a traditional post-meal product for improving breath freshness, enhancing taste sensation, and supporting digestion. They are commonly used in households, restaurants, and social gatherings due to their pleasant aroma and ability to mask unpleasant odours. Commercially available mouth fresheners are generally prepared using fennel seeds, sugar-coated ingredients, synthetic flavours, artificial colours, and preservatives. Although these products are popular, regular consumption may not provide significant nutritional benefits and may contribute to excess sugar and sodium intake. Therefore, there is an increasing demand for healthier, natural, and functional mouth fresheners prepared from nutrient-rich raw materials.

Amla (*Emblica officinalis*), also known as Indian gooseberry, is considered one of the richest natural sources of Vitamin C and contains high levels of polyphenols, tannins, and antioxidants. It is well known for its therapeutic value in Ayurveda and is widely associated with immunity boosting, anti-ageing, digestive improvement, and antimicrobial properties. Despite its nutritional potential, fresh amla has limited direct acceptability due to its strong sour and astringent taste. Converting amla into value-added products is an effective way to improve its utilization and reduce post-harvest losses.

Carrot (*Daucus carota*) is another nutritionally important vegetable rich in beta-carotene, dietary fibre, minerals, and natural pigments. Addition of carrot improves product colour, texture, and nutritional quality. Further, the incorporation of roasted spices such as fennel, cumin, coriander, black pepper, and clove enhances flavour, provides natural aroma, and contributes digestive and antimicrobial effects.

The development of an amla–carrot-based mouth freshener using blanching, spice roasting, drying, and hygienic packaging offers a simple, low-cost, and scalable technology. This product can serve as a healthy alternative to synthetic mouth fresheners while providing functional benefits and commercialization potential.

3. DESCRIPTION OF TECHNOLOGY

The developed product is a value-added, ready-to-eat Amla–Carrot mouth freshener prepared by blending blanched amla and carrot pieces with a specially formulated roasted spice mixture, followed by controlled drying and hygienic packaging. The product is designed to serve as a natural breath freshener as well as a digestive aid, providing both sensory appeal and nutritional benefits.

This mouth freshener contains amla (Indian gooseberry**)** as the major ingredient, which is well known for its high antioxidant activity, Vitamin C content, and medicinal importance. To improve

the palatability of amla and reduce its astringent taste, the amla pieces are subjected to blanching, which also helps in enzyme inactivation and microbial reduction. Carrot is incorporated to enhance the nutritional profile and provide natural carotenoids, dietary fibre, and an attractive colour. The carrot also contributes mild sweetness and improves the overall mouthfeel of the product.

4. RAW MATERIALS AND MACHINERIES REQUIREMENTS

4.1.Ingredients

The mouth freshener is prepared using nutritious amla and carrot as the main ingredients, enriched with a roasted spice mix of fennel, cumin, coriander, black pepper, and clove. Sugar, common salt, and black salt are added to provide a balanced sweet–salty–spicy taste, pleasant aroma, and digestive freshness.

Table 1: List of ingredients required for products

Ingredient	Quantity	Function / Role in Product
Amla	500 g	Provides Vitamin C, antioxidants, polyphenols, and gives characteristic tangy taste. Acts as a functional ingredient with health benefits like immunity boosting and digestive support.
Carrot	250 g	Adds beta-carotene (pro-vitamin A), fibre, and improves colour, texture, and nutritional value. Also reduces the strong sourness/astringency of amla.
Cumin (Jeera)	2 g	Provides warm flavour and digestive property. Acts as a natural carminative, reduces gas formation, and enhances aroma.
Fennel (Saunf)	6 g	Key ingredient for mouth freshener aroma. Gives sweet refreshing flavour, improves breath freshness, and supports digestion.
Coriander seeds	5 g	Adds mild pleasant flavour and acts as a natural antioxidant and digestive spice. Improves overall taste balance.
Black pepper	3 g	Provides slight pungency, enhances taste, and has antimicrobial and digestive stimulant properties.
Clove	1 g	Provides refreshing smell, acts as a natural antimicrobial agent, and helps in reducing mouth odour.
Sugar	12 g	Improves palatability by balancing sourness and saltiness. Provides mild sweetness and helps improve consumer acceptability.
Common salt	15 g	Enhances overall taste and acts as a mild preservative by reducing water activity. Improves flavour intensity.
Black salt	7 g	Provides typical digestive mouth freshener flavour. Acts as a carminative, enhances taste, and gives traditional Indian mouth freshener character.

4.2.Packaging Materials

The packaging material for Amla–Carrot mouth freshener should be moisture-proof and food-grade, such as LDPE/HDPE pouches, laminated pouches, or PET/HDPE containers, to ensure safe storage and extended shelf life. These packaging materials provide an effective barrier against moisture absorption, oxygen entry, and light exposure, which helps in preventing loss of flavour, colour deterioration, and microbial spoilage. Proper packaging also plays a crucial role in retaining the natural aroma of roasted spices and maintaining the crisp texture and overall quality of the product during storage and marketing.

4.3.Processing machinery requirements

The preparation of Amla–Carrot mouth freshener requires basic equipment such as washing tanks, cutting tools, blanching vessels, roasting pans, grinders, mixers, and a hot air dryer for moisture removal. For commercial production, machines like continuous washers, steam blanchers, cabinet dryers, ribbon blenders, and automatic filling-sealing units are recommended to ensure uniform quality and large-scale processing.

Table 2: List of machineries required for the product processing

Unit Operation	Machines/Equipment	Function
Washing of amla and carrot	Washing tank / basin	Removes dirt, dust, pesticide residues, and reduces microbial load.
Cutting and slicing	Stainless steel knife and cutting board / vegetable cutter-slicer	Used for uniform cutting of amla and carrot and removal of amla seeds. Ensures uniform processing.
Blanching	Blanching vessel / steam blancher	Inactivates enzymes, reduces microbial load, softens texture, improves drying efficiency and product stability.
Cooling	Cooling tray / clean basin	Stops further cooking and maintains colour and texture.
Roasting of spices	Tawa / roasting pan / roaster unit	Enhances aroma and flavour, reduces raw odour, improves spice quality.
Grinding of spices	Grinder / pulverizer / spice grinding machine	Converts roasted spices into fine powder for uniform mixing.
Mixing of ingredients	Mixing bowl / mixer / ribbon blender	Ensures uniform blending of blanched amla, carrot, and masala powder for consistent taste.
Drying	Hot air dryer / tray dryer / cabinet dryer (60°C)	Removes moisture to safe level, increases shelf life, prevents microbial spoilage.
Weighing	Digital weighing balance / weighing and filling machine	Ensures accurate measurement of ingredients and final product quantity.
Packaging	Manual packaging unit / pouch sealing machine / heat sealer	Seals product in airtight condition to prevent moisture absorption and contamination.

5. PREPARATION PROCESS OF AMLA-CARROT MOUTH FRESHENER

The preparation of Amla–Carrot mouth freshener involves a standardized sequence of washing, blanching, spice roasting, mixing, drying, and packaging. Initially, 500 g fresh amla is thoroughly washed with clean water to remove dirt and contaminants. The amla is then cut into small pieces, seeds are discarded, and the pieces are blanched in boiling water for 2 minutes to inactivate enzymes, reduce microbial load, and soften the tissue. Immediately after blanching, the amla pieces are cooled to stop further cooking and to retain quality. Similarly, 250 g of carrot is peeled, washed, and cut into small pieces followed by blanching for 3 minutes. The blanched carrot is then cooled immediately to preserve colour and texture. For preparation of flavouring material, tawa is heated at low flame and spices such as cumin (2 g), fennel (6 g), coriander (5 g), black pepper (3 g), and clove (1 g) are gently roasted to develop aroma and enhance flavour. After cooling, the roasted spices are ground into fine powder, and sugar (12 g), salt (15 g), and black salt (7 g) are added and ground again to obtain a uniform masala powder. The blanched amla and carrot pieces are mixed thoroughly, and the prepared masala powder is added gradually to ensure uniform coating. The mixture is then dried in a hot air dryer at 60°C until the moisture content is reduced to a safe level for storage, ensuring improved shelf stability and prevention of spoilage. After drying, the product is cooled to room temperature and packed in moisture-proof pouches or containers, sealed properly, and stored in a cool and dry place to maintain aroma, taste, and shelf life.

Figure 1: Amla-carrot mouth freshener

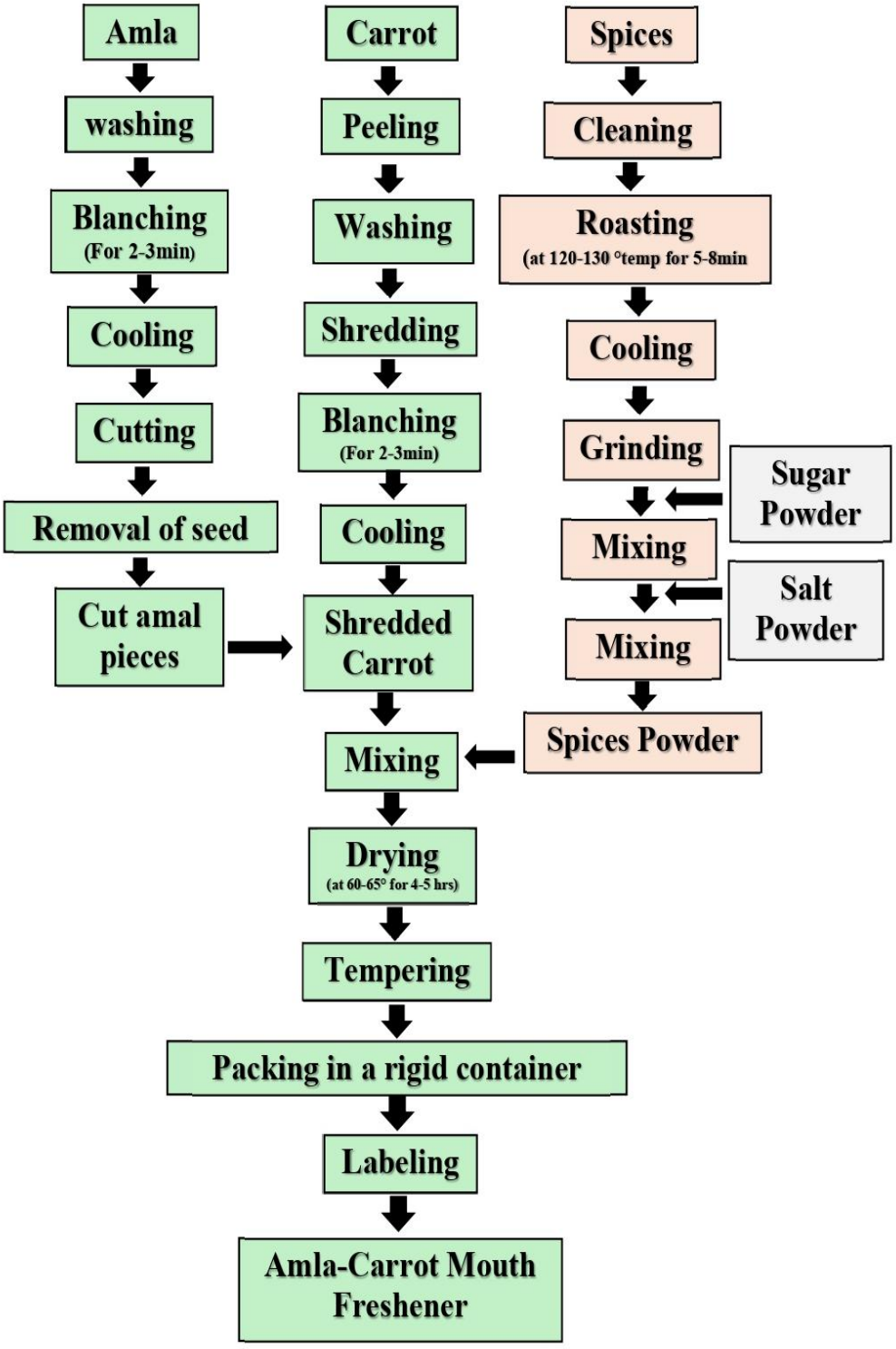

Figure 2: Process flowchart for the preparation of Amla-Carrot Mouth Freshener

6. PRODUCT QUALITY SPECIFICATIONS

6.1. Nutritional Quality

The developed Amla–Carrot mouth freshener is nutritionally rich due to the presence of amla, carrot, and roasted spices. The product contains 10% moisture, 3.5% protein, 10% crude fibre, and 240 kcal energy per 100 g. It is an excellent source of Vitamin C (120–200 mg/100 g), contributing about 188% of the recommended daily allowance (RDA) for adults. The product also provides significant dietary fibre (33% RDA), along with essential minerals such as iron (5.5 mg/100 g, 32% RDA) and calcium (120–180 mg/100 g, 15% RDA). Additionally, the presence of natural bioactive compounds ensures high antioxidant activity and contributes beta-carotene (1200 µg/100 g, 25% RDA), making it a functional and health-promoting mouth freshener.

Table 3: Nutritional quality of Amla-Carrot mouth freshener

Nutrient	Amount/100g	% RDA Fulfilled
Energy	240 kcal	12%
Protein	3.5 g	6%
Fat	2 g	3%
Fibre	10 g	33%
Calcium	150 mg	15%
Iron	5.5 mg	32%
Vitamin C	150 mg	**188%**
Beta carotene	1200 µg	25%
DPPH antioxidant Activity	70% inhibition	-
Total Phenolic Content (mg GAE/100 g)	500mg	-

6.2. Sensory Quality

The developed Amla–Carrot mouth freshener exhibited excellent sensory acceptability due to its pleasant colour, attractive aroma, and balanced taste. The product had a characteristic spicy and refreshing flavour dominated by fennel, cumin, and clove, along with a mild tanginess of amla. The taste was sweet–salty–spicy with a slight pungency from black pepper, providing a refreshing after-feel. The texture of the dried product was crisp to slightly chewy, making it suitable for chewing as a mouth freshener. Overall, the product showed good consumer appeal in terms of colour, flavour, taste, texture, and overall acceptability.

6.3.Cost

The total cost of amla-carrot mouth freshener is Rs 50/- per 50g of PET pack

7. USAGE

The product is ready-to-eat and can be consumed directly without any further preparation. A small quantity (5–10 g) may be taken after meals as a mouth freshener and digestive aid. It helps in improving breath freshness, enhancing digestion, and providing refreshing mouthfeel. The product should be stored in a cool, dry place and consumed within the recommended shelf-life period for best quality

8. SAFETY AND QUALITY CONSIDERATIONS

Safety and quality of the Amla–Carrot mouth freshener must be ensured by maintaining strict hygiene during processing, handling, and packaging. Fresh, sound, and mature amla and carrot should be selected and washed thoroughly using clean potable water to remove dirt and microbial contamination. Proper blanching of amla (2 minutes) and carrot (3 minutes steam) is essential to reduce microbial load, inactivate enzymes, and improve product stability. Spices should be clean, free from adulteration, and roasted at controlled low temperature to avoid burning and development of off flavour.

Drying should be carried out at 60°C until moisture content is reduced to a safe level (8–12%) to prevent fungal growth and spoilage. The dried product must be cooled before packaging to avoid moisture condensation inside the container. Packaging should be done in moisture-proof, food-grade containers or laminated pouches with proper sealing to protect the product from moisture absorption, oxidation, and aroma loss. Storage should be in a cool and dry place away from sunlight. Good Manufacturing Practices (GMP) and Good Hygienic Practices (GHP) should be followed throughout the process to ensure safe, high-quality, and shelf-stable product.

9. ADVANTAGES OF THE TECHNOLOGY

The developed Amla–Carrot mouth freshener technology has several advantages due to its simplicity, nutritional value, and market potential. It utilizes locally available and low-cost raw materials such as amla, carrot, and common spices, making it suitable for small-scale production. The product is rich in Vitamin C, antioxidants, dietary fibre, and beta-carotene, providing added health benefits along with mouth freshening action. The use of natural spices improves flavour, aroma, and digestive properties without the need for artificial additives. The processing method involves simple operations like blanching, roasting, drying, and packaging, which can be easily adopted by entrepreneurs, SHGs, and rural processing units. Controlled drying reduces moisture content, ensuring better shelf life and microbial safety. The technology also helps in value addition and reduction of post-harvest losses of amla and carrot. Overall, the product has high consumer acceptability and good commercialization scope as a healthy herbal mouth freshener.

10. SCOPE FOR COMMERCIALIZATION

The Amla–Carrot based mouth freshener has strong scope for commercialization due to the increasing consumer demand for healthy, herbal, and natural digestive products. The product can be marketed as a functional mouth freshener rich in Vitamin C, antioxidants, and fibre, offering a nutritious alternative to synthetic and sugar-coated commercial mouth fresheners. Since the raw materials such as amla, carrot, and spices are easily available in local markets, the technology is economically feasible and suitable for small-scale entrepreneurs, SHGs, farmer producer organizations (FPOs), and food processing units. The product has wide market potential in retail shops, supermarkets, hotels, restaurants, online platforms, and wellness stores. Attractive packaging in small consumer packs (50 g, 100 g) can enhance acceptability and sales. Additionally, the product can be diversified into different flavour variants (mint, ginger, lemon, honey) and positioned as a premium health snack or digestive supplement. With proper branding, FSSAI compliance, and shelf-life validation, the technology can support sustainable income generation and employment opportunities, particularly in rural areas.

11. TECHNOLOGY TRANSFER DETAILS

The technology for preparation of Amla–Carrot mouth freshener can be transferred to entrepreneurs, SHGs, FPOs, and small food processing units through training and demonstration programmes. The process involves simple unit operations such as washing, cutting, blanching, roasting of spices, mixing, drying at controlled temperature, and hygienic packaging, which can be easily adopted at household as well as commercial scale. Technology transfer may include supply of standardized processing protocol, formulation details, quality control guidelines, packaging recommendations, and shelf-life storage practices. Hands-on training can be provided on the use of equipment such as tray dryer, grinder, and sealing machine. The technology is suitable for rural and semi-urban areas because it requires low investment, locally available raw materials, and basic infrastructure. Proper guidance on FSSAI licensing, labeling requirements, and marketing strategy can further support successful commercialization of the product.

12. CONCLUSION

The developed Amla–Carrot mouth freshener is a nutritious, shelf-stable, and consumer-friendly product prepared using simple processing steps such as blanching, spice roasting, mixing, drying, and hygienic packaging. The product combines the health benefits of amla and carrot with the refreshing and digestive properties of traditional spices, resulting in a natural mouth freshener with good sensory quality. This low-cost technology has strong potential for adoption by small-scale entrepreneurs, SHGs, and rural processing units, offering scope for value addition, income generation, and commercialization.

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