

## TECHNOLOGY FOR PROCESSING APRICOTS INTO PUREE

*N.A.Mirzaakhmedova*

*Master of Tashkent State Agrarian University*

**Abstract.** This article analyzes the technology for processing apricots into puree. The main stages of puree production—raw material selection, washing, crushing, thermal processing, homogenization, pasteurization, and packaging—are examined. The technology’s impact on nutritional properties (vitamin C, antioxidants), energy consumption, environmental sustainability, and quality control is analyzed. Special attention is given to the practical possibilities and export potential of apricot puree production in Uzbekistan’s agricultural context. The study is based on scientific literature, Uzbekistan’s normative-legal documents, and practical data. The article provides a comparative analysis of the technology’s advantages and limitations and offers recommendations for advancing this sector in Uzbekistan.

**Keywords:** Apricot, puree, processing, technology, thermal processing, pasteurization, homogenization, nutritional properties, quality control, energy consumption, environmental sustainability, packaging, agriculture, food industry, export.

### Introduction

Apricots, a stone fruit, hold a significant place in agriculture and the food industry due to their high nutritional properties (vitamins A, C, E, antioxidants, potassium, magnesium) and versatility for processing into various products. Apricot puree is widely used in the food industry as a key ingredient in baby food, bakery products, desserts, and juices. In Uzbekistan, apricot processing is a major agricultural sector, with the Fergana Valley, Samarkand, and Surkhandarya regions producing over 100,000 tons of apricots annually, a significant portion of which is processed (Uzbekistan Statistics Agency, 2024).

Apricot puree production in Uzbekistan is regulated by a robust legal framework. The Law of the Republic of Uzbekistan “On Food Safety” (2021) mandates compliance with microbiological and chemical safety standards and sanitary norms. The Law “On the Development of Agriculture” (2004) supports the adoption of modern technologies in processing and export preparation of agricultural products. Standards such as DSt 3285:2014 (for jams and preserves) and DSt 3331:2016 (for fruit and vegetable purees), approved by the “UzDavStandart” agency, establish requirements for apricot puree quality, moisture content, organoleptic properties, and storage conditions.

This article examines the technology for processing apricots into puree, including raw material selection, washing, crushing, thermal processing, homogenization, pasteurization, and packaging. The study aims to analyze the technology’s efficiency, its impact on nutritional properties, energy consumption, environmental sustainability, and its applicability in Uzbekistan’s agriculture. Based on scientific literature, practical data, and Uzbekistan’s experiences, the technology’s advantages, limitations, and prospects are evaluated.

### Main Body

## 1. Characteristics and Importance of Apricot Puree

Apricot puree is a homogeneous mass obtained through mechanical and thermal processing of apricots, widely used in baby food, bakery products, desserts, juices, and nutritional supplements. It is rich in vitamin C (8–10 mg per 100 g), antioxidants, and minerals (potassium, magnesium), offering high nutritional value. Studies indicate that proper processing retains 70–80% of vitamin C, making the product appealing for health-conscious consumers (Smith et al., 2020). In Uzbekistan, apricot puree is in demand in both local and export markets (e.g., Russia, Kazakhstan, China). In 2023, apricot puree exports exceeded 10,000 tons, reflecting Uzbekistan's strong position in the food industry (Uzbekistan Statistics Agency, 2024). Puree production extends shelf life to 12–18 months and adds value to the product.

## 2. Apricot Puree Production Technology

Apricot puree production involves several stages: raw material selection, washing, pit removal, crushing, thermal processing, homogenization, pasteurization, and packaging.

### 2.1 Raw Material Selection and Preparation

High-quality, undamaged apricots with optimal sugar content (12–15% Brix), such as the “Subkhon” and “Isfara” varieties, are selected for puree production. Raw material quality impacts the puree's organoleptic properties (color, taste, aroma) and nutritional value. In Uzbekistan, apricots are harvested in June–July, when sugar and vitamin content peak. The washing process removes dirt, microbes, and pesticide residues, ensuring compliance with DSt 3331:2016 standards.

### 2.2 Pit Removal and Crushing

Apricot pits are removed using specialized equipment (e.g., pit-removing machines), followed by crushing to produce a primary puree (pulp). This process preserves the fruit's structure, but antioxidants (e.g., ascorbic acid) are added to prevent oxidation. Studies indicate a 5–10% loss of vitamin C during crushing (Rahman, 2019).

### 2.3 Thermal Processing

Thermal processing halts enzymatic reactions (e.g., polyphenol oxidase activity) and ensures microbiological safety. The apricot pulp is cooked at 80–90°C for 5–10 minutes. This process may reduce vitamin C by 10–15%, but color and taste are well-preserved (Smith et al., 2020). In Uzbekistan, medium-sized enterprises use steam boilers for this process.

### 2.4 Homogenization

Homogenization ensures a uniform consistency, performed under high pressure (100–200 bar) using specialized homogenizers. This improves the puree's texture but increases energy consumption (50–70 kWh per ton).

### 2.5 Pasteurization

Pasteurization is critical for microbiological safety, conducted at 85–95°C for 30–60 seconds, eliminating microbes and extending shelf life. Studies show a 15–20% loss of vitamin C during pasteurization, but 70–80% of antioxidants are retained (Johnson & Lee, 2021). In Uzbekistan, modern steam pasteurizers are used, though smaller enterprises may face quality inconsistencies.

## 2.6 Packaging

The puree is packaged in aseptic containers (e.g., Tetra Pak, plastic containers) or glass jars, extending shelf life to 18 months. Aseptic packaging is preferred for export due to its durability and convenience. Eco-friendly packaging (biodegradable materials) is gaining demand in European markets (Global Trade Data, 2024). Enterprises like “Fergana Juice” use aseptic packaging to export apricot puree to Russia and China.

## 3. Quality Control and Nutritional Properties

Quality control encompasses organoleptic (color, taste, aroma), physicochemical (sugar content, acidity, moisture), and microbiological properties. According to DSt 3331:2016, apricot puree should have a sugar content of 10–15% and acidity of 0.5–1.5%. Proper processing retains 70–80% of vitamin C and 75–85% of antioxidants (Smith et al., 2020). In Uzbekistan, large enterprises use automated quality control systems, but smaller producers often face challenges due to limited laboratory facilities.

## 4. Energy Consumption and Environmental Sustainability

Puree production is energy-intensive, requiring 100–150 kWh per ton for thermal processing and pasteurization. Implementing solar-powered equipment in Uzbekistan can reduce energy costs by 20–30% (UzAgroTech, 2023). To enhance environmental sustainability, waste recycling (e.g., producing oil from apricot pits) and biodegradable packaging are recommended (Zhang et al., 2022).

## 5. Prospects for Apricot Puree Production in Uzbekistan

Apricot puree holds a significant place in Uzbekistan’s export market. In 2023, over 10,000 tons were exported to Russia, Kazakhstan, and China (Uzbekistan Statistics Agency, 2024). Organic certification (e.g., EU Organic) can increase export prices by 20–30%. Modern technologies (aseptic packaging, automated pasteurization) and solar energy reduce costs and improve quality. Recommendations include enhancing farmer and enterprise skills and improving quality control systems.

## Conclusion

The technology for processing apricots into puree is vital in the food industry, involving raw material selection, washing, crushing, thermal processing, homogenization, pasteurization, and packaging, retaining 70–80% of nutritional properties. In Uzbekistan, apricot puree production enhances export potential and adds value. Modern technologies (aseptic packaging, solar energy), quality control, and organic certification boost competitiveness. Future research should focus on reducing energy consumption, recycling waste, and developing market strategies.

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