FOOD PROCESSING

Towards Sustainable Growth Opportunities

Sector Profile

Food Processing Machinery

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Preface

Food processing sector is one of the largest employment providers in the organized manufacturing sector with 12.41% employment in the total registered/organized sector as per the report of Annual Survey of Industries (ASI), 2022-23. There are large number of incorporated entities in food processing sector providing employment opportunities and as per the latest National Sample Survey (NSS 73rd, Round 2015-16), there were 24.59 lakh food processing enterprises in the unregistered segment, making up over 98% of all units. The large and medium enterprises, forming 2% of the units, contribute to 60-65% of the production value. Overall, the sector contributes to 7.66% of total manufacturing sector gross value added (GVA) and has seen robust growth of 10-11% in the last decade.

India is one of the largest producers of Milk, Fruits & Vegetables, Wheat, Rice, spices etc. Overall agriculture exports stood at Rs. 4.2 lakh crore in fiscal 2025 and imports stood at Rs. 3.1 lakh crore. The share of processed food exports in agri-food exports increased substantially from 13.7% in 2014-15 to 23.4% in 2023-24.

The industry on an average spends 0.5 to 1.5% of its revenue towards capital expenditure with large entities spending on an average 5-8% of its revenue on capital expenditure during the period of expansion. The Indian food processing sector is largely unorganized and spends little on technological advancement processing capabilities and is marked with limited capacities. To compete in the exports market and increase the share of processed food, India's food processing sector needs to invest in efficient and advanced processing capabilities. With this agenda, the availability of food processing equipment's in the domestic market becomes increasingly important, if we are to capture the world food trade market.

There exists a demand-supply gaps in the food processing plants and machinery sector in India. The domestic equipment manufacturing landscape needs suitable policy interventions to support the food processing sector and develop domestic capabilities for machinery manufacturing.

Currently the global food equipment companies with a domestic presence dominate the India landscape, catering to various segments such as dairy, beverages, and meat processing. Indian equipment manufacturers must compete with established brands from Germany, Japan, and the US with limitations in volumes and scale of operations.

Identifying the gaps in the food processing plants and machinery sector and addressing the key challenges faced by the sector and suitable policy interventions. The current landscape of the processing machinery used in various categories of food products, depends on imports and there are challenges faced by machinery manufacturers, traders and food processing players and the common infrastructure and machinery used at food parks.

India's food processing sector is at a pivotal stage, with growing demand for high-quality, efficient, and scalable solutions. However, persistent gaps in the availability of cost-effective and domestically produced machinery can hinder sectoral growth.

The development of the food processing industry in India, need a collaborative approach involving industry participants, research institutes, and regulatory bodies. By adopting a holistic approach and addressing the challenges and limitations faced by the industry, we can ensure the growth and development of the food processing sector, while maintaining the highest standards of safety, quality, and hygiene.

India needs to develop manufacturing capabilities in equipment and components segment, if the food processing sector aims to outperform and capture high share in global trade. Domestic production capabilities will ensure access to high efficiency machinery even to small units present in the sector.

Introduction

The **Food Processing Machinery sector** forms the backbone of modern food systems, serving as the technological foundation for converting raw agricultural produce into value-added, market-ready food products. Wide variety of machineries are needed to support diverse food processing operations, including conveying, sieving, pulping, grading, sorting, washing, peeling, mixing, grinding, cooking, pulverising, juicing, frying, etc. These machines form the backbone of India's food processing infrastructure. Food processing can be broadly categorized into three categories: primary processing, secondary processing and tertiary processing. Primary processing involves the initial processing of raw agricultural products to make them suitable for consumption or further processing. These include cleaning, grading, sorting, milling, juice extraction, etc. Examples include grains, pulses, juices, purees and spices. Secondary processing involves transforming primary processed products into more value-added products. It includes canning, bottling, freezing, extraction, refining, etc. Examples include canned fruits and vegetables, frozen meats, seafood, bread, refined oil, etc. Tertiary processing involves creating highly value-added products from secondary processed products. These include formulation and blending, texturization, flavouring and seasoning and ready-to-eat products. Examples include chips, namkeens, energy bars, instant noodles, instant soups, frozen meals, etc.

Food Processing Machinery/Equipment required across entire Food Value Chain:

Farm Level	Collection centres	Food processing units	Food distribution and transport	Restaurants
Harvesting machinery	Washing / cleaning machinery such as soak tanks, washers	Peeling / cutting / pureeing machines	Cold storage warehouses consisting of freezers, coolers, atmosphere control	Washing and cutting equipment
Soil cleaning washing	Sorting and grading machines	Cooking / blending/ frying machines based on process	Silos in case of non-perishables	Mixers, food processors, blenders
Sorting	Testing	De-oiling / straining machines based on process and type of food	Warehouse management systems for inventory control, tracking etc.	Grills, ovens, fryers
	Packaging	Packaging	Temperature controlled vehicles or reefer trucks, tankers	Beverage dispensers, coffee machines, dessert equipment such as ice-cream machines, etc
			Conveyors, forklifts	
			Wrapping machines, barcode scanning machines	
Primary processing	Primary + secondary processing	Tertiary processing		F&B retail

Global companies with domestic presence dominate the landscape in terms of food processing machinery in India. It caters to various segments such as dairy, beverages, meat processing, packaging, and automation. Food processing machinery companies are spread across key industrial hubs, ensuring efficient supply chain management and access to raw material. Several of the leading global process equipment manufacturers have a presence in India. Indian equipment

manufacturers can meet domestic demand but lack volumes and scale to compete with established brands from Germany, Japan, and the US.

In terms of imports of food processing machinery, China dominated Indian imports due to their price points. As of fiscal 2024, the share of China in the overall food processing machinery and parts imports stood at 40.8%, followed by Germany (8.0%), Italy (7.4%), the Netherlands (7.4%) and Turkey (4.8%) during the same period. Machinery for primary processing of vegetables and bread grain milling are major imports from China. Further, an analysis of 52 eight-digit HS codes reveals that importing from China is the most cost effective. China reported low price-to-volume ratio for 31 of these HS codes, outpacing other top suppliers, including Germany, Italy, the Netherlands, and Turkey, indicating lower import costs as against other countries. Machines which are more technically advanced are imported from European nations such as Germany, Italy, Netherlands and Turkey. These include machinery for processing confectionery, chocolates, dairy, bakery, macaroni, dairy, flour etc.

India imported nearly USD 857.2 Million worth of plants and machinery as of fiscal 2024, with large entities contributing to 55-60% of these imports. It is estimated that import dependency for the food processing equipment ranges from 14.0-18.0% of the overall demand, with certain segments such as meat, beverages bakery and oleoresins having a higher reliance on imports. Multinational corporations (MNCs) with significant global presence are the ones predominantly importing plants and machinery for their food processing facilities. Large entities import 40% of their equipment demand, whereas medium-scale entities import on an average 12-15% of their equipment demand. Majority of the process equipment demand is also catered by fabricators. Large players prefer imported machinery

- For their advanced technology and high efficiency output.
- State-of-the-art, advanced technology and precision-driven process machinery from established global companies.
- Unavailability of large production capacity and high-speed machinery domestically.
- Existing relations and tie-ups with international process consultants and equipment players.
- Compatibility and interoperability with existing systems
- Imported machinery also often complies with international standards, which are essential for exporting beverages to other countries

Imported machinery often comes with advanced food safety and hygiene features, such as easy cleaning systems, which reduces the risk of contamination and ensures compliance with international food safety standards.

Most food processing plants in the country have over 50% automation, and this percentage is increasing, indicating the growing need for food processing machinery.

The factors impacting domestic food processing equipment manufactures include working capital shortage, technology gaps, lack of R&D, non-uniform implementation of government schemes, quality & precision of domestically manufactured machines is not at the same level as imported machinery.

Our key focus should be on strengthening regulatory standards in food processing equipment industry in India. India has a limited number of equipment-specific standards compared to the extensive range covered by NSF/ANSI in the US and CEN EN standards in Europe. The existing BIS standards seem to just focus on primary processing equipment's such as potato graders, seed processing equipment, sugarcane crushers etc. A lack of comprehensive and updated standards for a wider variety of modern food processing equipment used in sectors like bakery, dairy, meat processing, and beverage production addressing the unique safety and hygiene requirements of each type of equipment (e.g., mixers, ovens, conveyors, filling machines).

Global Trends in Food Processing Machinery

The global food processing equipment industry grew modestly between 2021 and 2024 from USD 59 billion to USD 65-70 billion, weighed down by Covid-19, geopolitical concerns and intensifying economic growth worries.

In 2024, the Asia-Pacific region dominated the global food processing equipment market, driven by the rising demand for processed foods in emerging and developing economies such as India, China, Indonesia and Thailand. This region is expected to log the highest CAGR between 2024 and 2027 owing to the rapid expansion of its food and beverage industry, fuelled by increasing urbanisation, growing health awareness and higher disposable incomes. The meat, poultry and seafood processing equipment segments are estimated to have accounted for the largest share of the food processing equipment industry in 2024, while the beverage processing equipment segment is expected to be one of the sectors with the fastest CAGR growth in the food processing equipment industry between 2024 and 2027. [1]

India's imports accounted for $0.9-1 billion worth of food processing machinery which made up ~2.5% of global trade of food processing machinery) (April 2023 - March 2024)

The food processing machinery market size has grown strongly in recent years. It will grow from USD 61.81 billion in 2024 to USD 65.73 billion in 2025[2] at a compound annual growth rate (CAGR) of 6.3%. It will grow to $83.37 billion in 2029 at a compound annual growth rate (CAGR) of 6.1%. The growth in the forecast period can be attributed to smart manufacturing and industry 4.0 integration, sustainable and eco-friendly solutions, global population growth, customization and flexibility, rapid urbanization. Major trends in the forecast period include automation and robotics integration, focus on sustainability, advanced sensor technologies, data analytics and machine learning, customization and modular design.

Global Growth in Consumption:

Increased demand for processed food is expected to propel the growth of the food processing machinery market. Processed foods refer to any type of food that is not in its natural state and has been subjected to some sort of food processing. This can include foods that have been cooked, canned, frozen, dried, or packaged. These food processing procedures can be carried out using food processing machinery. For instance, in October 2023, according to Agriculture and Agri-Food Canada (AAFC), a Canada-based government department for agriculture and food-related products, in 2022, exports of processed food and beverage products reached an all-time high of USD 54.3 billion, marking a 14.1% increase compared to 2021. These exports represented 34.7% of the total production value. Therefore, the increased consumption of processed food is driving the food processing machinery market.

The growth is manifested due to:

- Rising demand for packaged and convenience foods
- Rising disposable income
- Focus on operational efficiency
- Increasing automation and hygiene standards
- Growing awareness of health and nutrition
- Growth of plant-based and functional foods
- Regulatory pressure for food safety and traceability

Key Market Segments & Sub-Segments

The food processing machinery market is segmented:

1) By Type:

- Depositor,
- Extruding Machines

[1] *Manufacturing Food Processing Equipment, Industry and Mines Department, Government of Gujarat*

[2] https://www.thebusinessresearchcompany.com/report/food-processing-machinery-global-market-report

- Mixers, Refrigeration
- Slicers And Dicers
- Other Types

2) By Mode of Operation:

- Semi-Automatic
- Fully Automatic

3) By Application:

- Bakery And Confectionery equipment
- Meat, Poultry and Seafood Machinery
- Dairy Processing Machinery
- Beverages Processing Machinery
- Fruit and vegetable processing systems
- Other Types of Machines

Sub-segments:

1) By Depositor:

- Cookie Depositors
- Cake Depositors
- Chocolate Depositors

2) By Extruding Machines:

- Single-Screw Extruders
- Twin-Screw Extruders
- Sheet Extruders

3) By Mixers:

- Planetary Mixers
- Ribbon Mixers
- Batch Mixers

4) By Refrigeration:

- Industrial refrigeration systems
- Blast Freezers
- Refrigerated Storage Units

5) By Slicers and Dicers:

- Vegetable Slicers
- Meat Slicers
- Fruit Dicers

6) By Other Types:

- Filling machines
- Packaging Machines
- Cooking Equipment

Regional Trends[3]

- **Europe**: Mature market, strong in innovation and sustainable tech.
- **North America**: Focus on automation and premium processing tech.
- **Asia-Pacific**: Fastest growing region, led by China, India, and Southeast Asia.
- **Latin America and Africa**: Emerging markets with rising investments.

Europe food processing machinery market accounts for the second-largest market share. The demand in Europe will rise in the next five years due to the growing popularity of convenience and ready-to-eat foods in the U.K., Germany, and France. The leading businesses operating in this market should also have opportunities as a result of the region's growing number of food processing facilities. Further, the German food processing machinery market held the largest market share, and the UK food processing machinery market was the fastest growing market in the European region.

The Asia-Pacific Food Processing Machinery Market is expected to grow at the fastest CAGR from 2023 to 2032. The creation of cutting-edge machinery that will aid in boosting these industries' production capacity is receiving more attention. The Asia Pacific area is home to numerous significant industry participants. The demand for processed foods is rising in countries like Australia, India, China, and New Zealand, which is fuelling the market's expansion. Moreover, China's food processing machinery market held the largest market share, and the Indian food processing machinery market was the fastest growing market in the Asia-Pacific region.

Food Processing Machinery Key Market Players & Competitive Insights[4]

Leading market players are investing heavily in research and development in order to expand their product lines, which will help the Industrial Food Processing Equipment market, grow even more. Market participants are also undertaking a variety of strategic activities to expand their global footprint, with important market developments including new product launches, contractual agreements, mergers and acquisitions, higher investments, and collaboration with other organizations. To expand and survive in a more competitive and rising market climate, food processing machinery industry must offer cost-effective items.

Manufacturing locally to minimize operational costs is one of the key business tactics used by manufacturers in the global food processing machinery industry to benefit clients and increase the market sector. In recent years, the food processing machinery industry has offered some of the most significant advantages to medicine. Major players in the Industrial Food Processing Equipment market are attempting to increase market demand by investing in research and development operations includes SPX Corporation, Anko Food Machine Co. Ltd., Berkshire Hathaway Inc., Mallet & Company, Inc., John Bean Technologies Corporation (JBT), Bucher Industries, Hosokawa Micron Corp., GEA Group, NICHIMO CO., LTD., and Tetra Laval International S.A. The holding company known as Berkshire Hathaway Inc., through its subsidiaries, Berkshire concentrates on businesses related to energy generation and distribution, utility and reinsurance, insurance, and freight rail transportation. In addition to life, health, and accident reinsurance, it also provides products for property and liability insurance and reinsurance. The company manages railroad networks in North America that connect ports and areas in the US's Midwest, Southeastern, Southwestern, and Western regions. In addition, Berkshire concentrates on business operations in the areas of manufacturing, services and retail, money and financial products.

Tetra Laval International SA (TLI) is a company that offers packaging services. It creates, produces, and sells machinery and full systems for milk production and animal husbandry. The business develops solutions for the packaging and distribution of food through its group firms, Tetra Pak, Sidel, and DeLaval. Tetra Pak provides solutions for food processing and packaging, DeLaval creates and provides tools and systems for animal husbandry, and Sidel provides tools for packaging liquid foods.

Key Global Players

- **SPX Corporation(USA)**

[3] https://www.marketresearchfuture.com/reports/food-processing-machinery-market-12364

[4] https://www.marketresearchfuture.com/reports/food-processing-machinery-market-12364

- **Anko Food Machine Co. Ltd.(Taiwan)**
- **Berkshire Hathaway Inc.(USA)**
- **Mallet & Company, Inc.(USA)**
- **John Bean Technologies Corporation (JBT),USA**
- **Bucher Industries (Switzerland)**
- **Hosokawa Micron Corp.(USA)**
- **GEA Group (Germany)**
- **NICHIMO CO LTD.(Japan)**
- **Tetra Laval International S.A. (Sweden)**

The Key Trends of the Global Food Processing Machinery Market

Product innovations are the key trends gaining popularity in the food processing machinery market. Major companies operating in the food processing machinery market are introducing innovative products to sustain their position in the market. For instance, in December 2022, GE Appliances, a US-based home appliance manufacturer, launched the GE Profile smart mixer with Auto Sense technology. The new product is a smart appliance that can be controlled using Google or Alexa voice commands. The uniqueness of the product is its auto-sense technology, which enables it to automatically sense changes in the mixture's viscosity and stop accordingly. With the use of torque sensors, Auto-Sense technology can detect changes in the viscosity of your mixture and streamline the procedure. The function integrates with the SmartHQ app, where you can choose from guided recipes that outline the procedure step-by-step.

Indian Food Processing Machinery Sector

Market Overview:

India Food Processing Equipment market stood at USD 1.07 billion in 2024 and is anticipated to grow with a CAGR 4.01% through 2030[5]. The India food processing equipment market is experiencing robust growth, driven by several factors that highlight the country's evolving food industry. One of the primary drivers is the increasing demand for processed and convenience foods, spurred by changing consumer lifestyles, urbanization, and a growing middle-class population. This shift has resulted in a significant rise in food processing activities, boosting the need for efficient and advanced food processing equipment. Additionally, government initiatives such as the Pradhan Mantri Kisan Sampada Yojana (PMKSY) and various other policies aim to support the development of the food processing sector, enhancing the prospects for equipment manufacturers.

Advancements in technology have revolutionized the food processing industry, leading to the adoption of automation, smart manufacturing, and innovative machinery. This not only enhances productivity but also ensures better product quality and safety, which are critical factors in the food industry. The growing trend towards healthier and organic foods has also led to increased investments in food processing facilities, further fuelling the demand for sophisticated equipment.

Key Challenges:

- High capital costs associated with modern food processing machinery often deter small and medium-sized enterprises (SMEs) from adopting advanced equipment.
- Lack of skilled labour to operate and maintain high-tech machines remains a significant barrier.
- Infrastructure shortcomings in rural and semi-urban areas—such as inconsistent power and logistics—are bottlenecks
- Concerns regarding energy consumption and sustainability are pushing manufacturers to develop eco-friendly equipment, but the transition to green technologies may be slow and costly.

The India food processing equipment market is poised for substantial growth, supported by favourable government policies, increasing consumer demand, and technological advancements, despite the challenges of high costs and labor shortages.

Market Segmentation: Key End-Use Segments

- Grains and Pulses(rollers, milling systems)
- Fruits and vegetables (pulpers, slicers, canning, blanching)
- Dairy (e.g., pasteurizers, homogenizers)
- RTE/RTC
- Non-Alcoholic Beverages (bottling, sterilization, carbonation)
- Meat and poultry (cutting, deboning, chilling systems)
- Edible Oil
- Bakery & Confectionary
- Tea and coffee
- Spices
- Sugar
- Oleoresins
- Fish (fillet, pickling, marinating)
- Food Packaging Machinery

Grains & Pulses: India being the largest producer of Pulses and second largest in Rice & Wheat grains. Grain and pulse processing involves primary processing which includes cleaning, sorting, de-husking and polishing as the major processes. Cleaning and grading/sorting are the most important processes involved in pulses and grain processing as they are key to ensure the quality and safety of the final product. Since grains and pulses mainly involve primary

[5] https://www.techsciresearch.com/news/19578-india-food-processing-equipment-market.html

processing, most of the machinery requirement is fulfilled domestically. All MSME players use domestic machinery, while a few large companies use some imported equipment such as the optical sorters which offer more precision to sort and grade the grains and pulses. The grains and pulses category is estimated to account for 5-10% of the machinery being imported, showing a low reliance on imported machinery.

Process	Description	Key equipment
Cleaning	Raw grains undergo a multi-stage cleaning process, involving destoning, sieving, and aspirator cleaning, to remove impurities. This process eliminates stones, finer impurities and dust.	Destoner, sieve, cleaner with aspirator
Sorting and grading	Raw pulses are passed through a grader, to separate grains into different fractions based on size	Graders, optical sorters (size, weight, colour, shape)
Pitting	To loosen the husk, grains are passed through rollers resulting in cracking and scratching of their husk. This aids in the subsequent oil penetration process	Carborundum / emery coated rollers
Oil treatment	Pitted pulses are treated with edible oil, such as linseed oil, for 12 hours to facilitate husk separation by allowing the oil to diffuse and loosen the husk from the kernel.	Batch mixer
Conditioning (alternate wetting and drying of oiled pulses)	The oiled pulses undergo a drying-wetting-drying cycle: first, they're dried in the sun or using a mechanical dryer; then, they're moistened with water while passing through a screw conveyor; finally, they're dried again to 10-12% moisture content, further loosening the husk for easy separation from the kernel.	Drying: mechanical dryer; Wetting: overhead tank, screw conveyor
De-husking	Conditioned pulses are passed through a roller and then the husk is removed using an aspirator, separating it from the grains.	Emery rollers, aspirator

Fruits & Vegetables: India's diverse climate ensures the availability of all varieties of fresh fruits and vegetables. It ranks second in fruit and vegetable production in the world, after China. Processing vegetables mainly involves freezing and packaging to increase shelf life and protect nutrient value. Individual quick freezing is a crucial process while freezing vegetables and some fruits. The process involves rapidly freezing individual pieces of vegetables, such as peas, carrots, broccoli, to a temperature of around -30°C to -40°C. This process helps in preserving the nutrients, texture and flavours. In some cases, vegetable processing also involves a process of retorting, which is sterilising the product to increase its shelf life under ambient temperature conditions.

India is highly dependent for dehydration systems and automation systems as they are largely imported. These imported machineries offer operational efficiency compared with Indian counterparts. There are three types of dehydration systems used in fruits and vegetables processing—normal hot air dryers, which India can produce, heat pump dryers, majorly produced in China, and freeze dryers, which are also largely imported. Indian companies lack the technical know-how of complex technologies, hence are not able to produce the later types of two dryers. Additionally, automation products and parts are largely imported for fruit and vegetable processing plants, along with advanced blades for precision cutting. Import dependency in fruits and vegetable category is estimated to be on a moderate side with 15-25% share in total equipment consumption. Fruits are typically a seasonal produce and involve less processing in the vegetable segment. Therefore, the capacity utilisation of machines in fruits and vegetables category is low.

Dairy: India's prominence in the dairy sector is national and global, as it ranks first in milk production, contributing 25% to the world's total milk output. India's dairy sector has witnessed a strong expansion over the past decade, with milk production registering a compound annual growth rate (CAGR) of 5%, with significant increase in production volumes, from 1,873 LMT in 2018-19 to 2,393 LMT in 2023-24.

The most critical process in dairy is pasteurisation, which is a process that involves heating milk or dairy products to a high temperature for a short period, followed by rapid cooling to kill pathogenic bacteria and extend the shelf life of the product.

Processing equipment for pasteurisation, homogenisation and packaging are imported. Moreover, separator technology is still not largely available and imported from Tetra Pak and GEA. In packaging, aseptic filling and packaging machinery are also imported, although some equipment players offer aseptic filling machinery. Though available domestically, a few large players prefer the imported aseptic filling machinery due to the volume they can handle with precision and accuracy. Other types of machinery imported in this category include cheese processing machinery and yogurt incubators. Typically, MSMEs and smaller players do not use imported machinery for dairy processing. Dependence on Imports for the dairy processing sector is estimated to range between 5-15%. There is still a lack of fully automated machines for sweets making industry in India.

Processes involved and key equipment used in Milk Processing:

Process	Description	Key equipment
Chilling	To prevent bacterial growth, raw milk is cooled to a temperature of 2° C to 5° C and stored in a milk vat	Milk vat
Separation	Raw milk is separated into cream and skim milk, to facilitate standardisation	Cream separator
Standardisation	To ensure consistent quality, cream is added back to the skim milk according to the type of milk being produced	Standardisation machine which uses dosing units
Homogenisation	To ensure uniform diffusion of milk fat in the standardised milk, large fat globules are broken down into tiny droplets	Milk homogeniser
Pasteurisation	To kill harmful bacteria, the homogenised milk is heated to 72° C for at least 16 seconds and then cooled down to ~30° C	Vat pasteuriser
Packaging	Pasteurised milk is packed using a packaging machine. This keeps out moisture and ensures product quality	Packaging machine
Testing	To assess the milk quality, a milk sample is mixed with a dye solution to measure microbial load; the time taken for the blue colour to disappear indicates the level of bacterial contamination	Methylene blue thiocyanate solution, test tube, incubator

RTE/RTC category: The ready-to-eat and ready-to-cook category in India has seen double-digit growth in the past few years, driven by factors such as increasing urbanisation and per capita income, and shifting consumer preferences towards convenience foods.

The ready-to-eat and ready-to-cook category requires large volumes of processing. For the production of potato chips, slicing and blanching are the critical processes. Slicing is important for the shape of the chips, while blanching is a critical step in the potato chip manufacturing process that involves briefly submerging sliced potatoes in hot water or steam to remove excess starch to make the chips crispy. India emerged as a significant exporter of French fries in fiscal 2024, with total exports reaching 135,877 tonnes. Additionally, the country exported ~23,749 tonnes of potatoes in the same period.

Automation products such as servo motors, servo drives, motors and pumps are largely imported in this category. Retort machines are also largely imported. Retorting is a process used to sterilise packaged food products, extending their shelf life without refrigeration while preserving their taste, texture and nutritional value. Though there are a few manufacturers who have started manufacturing retort machines in India, there is a requirement of using imported machinery by clients in the western countries. Other key machinery imported in this category include large batch fryers, seasoning equipment, with precise application mechanisms. A few players import filling and packaging machinery for their ability to efficiently and hygienically pack ready-to-eat (RTE) products, such as soups, sauces, and snacks. Additionally, the level of food processing is higher in European countries, which is why these countries come with more advanced machinery. Foreign consultants of large multinational manufacturers prefer the use of imported machinery due to their experience and precision and technical advancements of these machines. About 20-30% of equipment in the RTC / RTE category is estimated to be imported. Skilled labour costs and raw material costs are very high in this segment.

Processes involved and key equipment used (potato chips):

Process	Description	Key Equipment
Washing	Potatoes are washed to remove any adhering soil, debris or field material	Potato washing machine
Peeling	To ensure that chips look uniform, washed potatoes are peeled in a rotating drum, which has rough surfaces to remove the skin	Potato peeling machine
Slicing	Peeled potatoes are cut into very thin slices to achieve the desired shape of potato chips	Potato slicing machine
Blanching	Potato slices are blanched to avoid any change in colour	Potato blanching machine
Dewatering	Potato slices are de-watered using vibration or air-blowing machines to remove surface moisture, preventing them from sticking together.	Dewatering machine
Frying	To reduce moisture content to less than 2%, potato slices are fried in a fryer	Fryer
De-oiling	Fried chips are agitated in a de-oiling machine to remove extra oil from their surface	De-oiling machine
Sorting	Chips are inspected using an optical sorting machine to ensure their consistency	Optical sorting machine
Flavouring	Chips are seasoned in a rotating drum to evenly distribute salt and other flavouring agents	Flavouring machine
Packaging	Chips are weighed and sealed into bags with nitrogen gas to keep off the moisture and ensures quality	Packaging machine
Testing	Chips are tested with a texture analyser to measure their crispiness and hardness	Texture analyser

Non-Alcoholic Beverages: The non-alcoholic beverage sector is poised for rapid growth, driven by factors such as growing health consciousness, urbanisation, and rising disposable income. The market is expected to see significant expansion in areas, such as healthy drinks, plant-based beverages, organic drinks, and sports drinks. This presents a highly optimistic outlook for the industry. Novel products, such as dairy alternatives and plant-based protein drinks, including almond milk and soy-based preparations, have gained worldwide popularity, particularly in high-income economies. Additionally, there is a rising demand for functional fortified beverages, naturally healthy drinks, and organic certified products, fuelling the sector's growth further. Manufacturers are also introducing innovative flavours and packaging to cater to diverse consumer preferences. The Indian government is actively promoting the non-alcoholic beverage sector through various initiatives, including the revival of traditional Indian drinks e.g., Goli soda.

The production of non-alcoholic beverages involves several processing complexities. One of the main challenges is ensuring the quality and consistency of the raw materials, such as fruits, vegetables, and grains, which can vary in terms of flavour, texture, and nutritional content. Additionally, the processing steps, including sorting, washing, peeling, and juicing, require careful control to prevent contamination and spoilage. Further, the use of preservatives, sweeteners, and flavour enhancers must be carefully managed to meet regulatory requirements and consumer preferences. Overall, the production of non-alcoholic beverages requires a delicate balance of quality control, processing precision, and regulatory compliance to produce a safe and appealing final product.

There is a mid-to-high level of dependence on imports in the non-alcoholic beverage category, given the high volume and technical advancement required for processing. It is estimated that 25-35% of processing machinery in this category are imported. Automation products such as drives, programmable logic controllers, reverse osmosis membranes are imported as these are not available in India. Packaging machineries also imported in this category. Teta Pak packaging machinery and flexible packaging filling machines are imported. Additionally, high speed bottling systems, canning systems, carbonation machines and advanced filtration machines used by large players are imported. Carbonation and mixing machines are imported for their ability to efficiently and consistently carbonate and mix beverages. A few other machineries imported in this category include advanced distillation systems and molecular sieve systems.

Processes involved and key equipment used (Fruit juice):

Process	Description	Key equipment
Washing	Fresh, refrigerated, or frozen produce is washed to remove dirt and pesticides from its surface	Washing machine
Sorting	Washed fruits or vegetables are fed into a sorting machine to remove damaged or spoiled items	Sorting machine
Peeling	Fruits or vegetables are peeled using a peeling machine	Peeling machine
Cutting	Peeled fruits or vegetables are cut into smaller pieces for juice extraction	Multifunction vegetable chopper
Extraction	To extract juice, cut fruits or vegetables are pressed, crushed, or ground	Juice extractors, such as belt presses, screw presses, rack and cloth presses
Straining or filtration or clarification	Extracted juice is passed through non-corrodible metallic screens, to remove suspended solids, pectic substances and proteins	Non-corrodible metallic screens
Pasteurising	To kill potentially harmful microorganisms, filtered juice is heated to a specific temperature for a certain period	Pasteuriser
Blending	For consistency, different batches of pasteurised juice are blended	Mixer
Addition of preservatives and/or additives	Preservatives and additives are added to the juice to enhance its flavour, colour and texture and to improve its shelf life	Mixer
Packaging	To keep out moisture and ensure product quality, the juice is packed using a packaging machine	Aseptic packaging using tetrapak, and flexible packaging machines
Testing	A juice sample is analysed with a refractometer to measure its Brix value, estimating sugar content and other soluble solids in the juice	Refractometer

Meat Processing: India ranks second in egg production and fifth in meat production in the world according to the Food and Agriculture Organisation Corporate Statistical Database production data 2021. Egg production in the country has increased from 7,848 crore in 2014-15 to 13,838 crore in FY23 and clocked a CAGR of 7.35% over the past nine years. The per capita availability of eggs was at 101 eggs per annum in 2022-23 compared with 62 eggs in 2014-15. Meat production in the country has increased from 66.9 lakh tonnes in 2014-15 to 97.7 lakh tonnes in 2022-23. Chilling is one of the most critical steps in the meat processing chain that involves rapid cooling of the meat to a temperature that inhibits the growth of microorganisms, such as bacteria, yeast, and mould, which can cause spoilage and foodborne illness.

India is highly dependent on imported machinery, especially for slaughtering, deboning, cutting, and packaging. Other key machinery imported by Indian players include sausage stuffing and casing machinery. The sector relies on imported machinery due to the limited availability of advanced domestic machinery that meets the standards of imported machinery designed to produce high-quality products with minimal waste and better texture, which is essential for meeting customer expectations. Imported machinery often comes with advanced food safety and hygiene features, such as easy cleaning systems, which reduces the risk of contamination and ensures compliance with international food safety standards. Slaughtering machines are imported for their ability to humanely and efficiently slaughter animals, which reduces stress and improves meat quality. Indian manufacturers lack expertise to make complex machines similar to the imported ones.

Processes involved and key equipment used (sausages):

Process	Description	Key Equipment
Cutting and deboning	Meat or poultry is cut and deboned to prepare it for grinding	Meat cutting machine, deboning machine
Grinding	Meat or poultry is ground into a mince for mixing with non-meat ingredients	Grinder
Mixing or blending	Ground raw meat or poultry components, water, spices, seasonings, and flavourings are transferred to a mixer or blender for uniform distribution of all ingredients.	Mixer or blender
Shaping or linking	The meat mixture is stuffed into sausage casings using a filling machine to contain the ingredients	Sausage filling machine
Packaging	Sausages are packed using a packaging machine to keep out moisture and ensure product quality	Packaging machine
Testing	A sample of the fresh sausage is sealed and tested for water activity to determine its moisture level, a key indicator of microbial growth potential	Hygrometer

The meat processing equipment market in India is expected to reach USD 1,019.5 million by 2030 from USD 712 in 2024[6]. CAGR of 6.16% is expected of India meat processing equipment market from 2025 to 2030.

- In terms of segment, slicing was the largest revenue generating equipment in 2024.
- Dicing is the most lucrative equipment segment registering the fastest growth during the forecast period.
- In terms of revenue, India accounted for 6.3% of the global meat processing equipment market in 2024.

Edible Oil: India is the fourth largest oilseeds producer in the world. It has 20.8% of the total area under cultivation globally, accounting for 10% of global production. India produces groundnut, soybean, sunflower, sesamum, niger seed, mustard and safflower oilseeds. Oil pressing, also known as oil extraction, is one of the most critical processes, which

[6] https://www.grandviewresearch.com/horizon/outlook/meat-processing-equipment-market/india

involves extracting oil from oilseeds, nuts, or other oil-bearing materials using mechanical pressure or other methods. The goal of oil pressing is to separate the oil from the solid material.

India's edible oil processing industry was traditionally reliant on imported machinery, however, in recent times, adoption of Indian made machinery has increased. Oil press machines, which are more advanced, are now being offered by Indian manufacturers. In addition, technologies such as cold press and automation are being offered in Indian machines, thereby reducing the reliance on imported machinery. India has a wide range of oil extraction machines available, catering to various needs and industries.

Some common types of oil machines available in India are cold press oil machines, screw press oil machines, hydraulic oil press machines, oil expeller machines, and mini oil mills automatic oil machines. Certain oil pressing machines for products such as coconut are still being imported. Imported oil pressing machines come with more advanced technology, such as hydraulic or screw processing, which can provide higher oil extraction efficiency and better-quality output. Imported oil pressing machines often comply with international standards, such as ISO or CE, which is essential for exporting edible oil to other countries. Imported oil pressing machines also have higher capacity, which enables Indian edible oil processors to process larger quantities of oilseeds and meet growing demand. Some large players still import machinery such as oil pressing machines and oil filtration machines. Machines for coconut oil processing are largely imported.

Processes involved and key equipment used (edible oil):

Process	**Description**	**Key equipment**
Cleaning	Oil seeds are cleaned with destoners, magnetic separators, and aspirators to remove stones, metal contaminants, and lightweight impurities, ensuring processing machines remain free of debris	Destoner, magnetic separator, aspirator
Drying	Cleaned oil seeds are dried in grain dryers to reduce the moisture content and minimise degradation during storage	Grain dryers
Dehulling or shelling or decorticating	Dried oil seeds are dehulled to remove abrasive hulls/shells, reducing wear on downstream processing machines	Dehuller
Crushing	Dehulled oil seeds are crushed to meet the size requirement for flaking	Oil seed crushing machine
Flaking	Small pieces of dehulled oil seeds are pressed to form thin flakes for faster cooking	Flaking machine
Cooking or tempering	Oil seed flakes are heated at elevated temperatures to denature proteins and deactivate enzymes that split fats	Cooker
Extruding or puffing	Cooked flakes are heated at high pressure for a short time and then released under atmospheric pressure to improve the oil extractability	Extruder
Pressing	Oil seed flakes are separated into raw oil and oil seed meal	Oil press machine or oil extraction machine or expeller
Degumming	Raw oil is treated in a degumming machine to remove the gums	Degumming machine
Neutralisation	Fatty acids are removed when degummed oil is treated with a neutralising agent in a neutraliser	Neutraliser

Process	Description	Key equipment
Bleaching	Degummed oil is mixed with bleaching earth in a bleacher to absorb colour pigments, then removed to produce bleached oil.	Bleacher
Deodorising	Bleached oil is subjected to steam distillation under high temperature and vacuum to evaporate all odour substances	Deodoriser
Dewaxing or winterisation	Deodorised oil is chilled in a crystalliser to crystallise the waxes present in the oil; the crystals are then removed from the oil	Crystalliser
Packaging	Oil is packed using a packaging machine to keep out moisture and ensure product quality	Packaging machine
Testing	A free fatty acid (FFA) test strip is used to determine the oil's FFA content by colour change, ensuring it meets quality standards and avoiding deterioration of quality	FFA test strip

Bakery & Confectionary: The Indian bakery market, which includes biscuits, confectionery, cakes and pastries, is estimated to have reached Rs 1.17 – 1.20 lakh crore in fiscal 2024. Biscuits dominate the bakery market with an estimated ~55% share in fiscal 2024, followed by chocolates (20%) and sugar-based confectionery (14%).

Baking is one of the most critical processes in biscuit making (as shown in the example below) and in the overall bakery industry. Baking gives biscuits their characteristic texture and structure, including crispiness, crunchiness, and chewiness, and helps to develop their flavour, colour and appearance. Larger players are dependent on imported machinery for advanced processes such as mixing, baking, filling and optical sorting, while smaller players use domestic machinery. For instance, imported ovens come with advanced technology, such as automatic temperature control and steam injection, which might not be readily available in domestic counterparts. Imported mixers and blenders can mix at high speeds and come with more precision control systems. In the long run, imported equipment can be more cost-effective, even though the upfront cost is much higher, due to higher productivity and efficiency. About 30-35% of the machine requirements are estimated to be fulfilled through imports in this category given the high demand for these products and the large volumes these imported machinery can handle.

Processes involved and key equipment used (biscuits):

Process	Description	Key equipment
Mixing and kneading	All ingredients, including wheat flour, sugar, leavening agents, skimmed milk powder, and malt extract, along with fats, are fed into a mixer where they are mixed properly to prepare the dough	Mixer
Moulding	Dough is processed through a biscuit moulding machine with three key components—rollers, cutters, and laminators. First, the dough is fed through the rollers to flatten it, making it easier to cut. Next, the dough sheets are hardened and layered by the laminator. Finally, the laminated sheets are passed through the cutter, which precision cuts them into the desired shape, giving biscuits their distinctive form	Biscuit moulding machine
Baking	Moulded biscuits are transferred to the oven via a conveyer belt in batches where they are baked, causing the leavening agents to create gas which makes the biscuits rise and become crispy	Oven
Cooling	Baked biscuits are passed on to cooling conveyors for natural cooling	Cooling conveyor

Packaging	Cooled biscuits are stacked and fed into the packaging machine for packaging to avoid moisture and ensure product quality	Packaging machine
Testing	A sample of biscuits is treated with controlled forces to quantify its texture properties, measuring its crispiness, hardness, and chewiness of the biscuits	Texture analyser

Tea and coffee: India is the second largest producer of tea globally based on Tea Board of India (Government of India) article published in March 2023. Indian tea is considered to be among the finest in the world because of the significant investments made in tea processing units, the wide product range and innovations to keep pace with changing demands. Indian tea also holds several geographical indication tags, for instance Darjeeling tea.

India is the seventh largest producer of coffee in the world. As per the post-blossom estimate of Coffee Board of India, the country's coffee production reached 374,200 tonnes during coffee year 2023-24 (October 2023-September 2024). Karnataka, Kerala and Tamil Nadu dominate the country's coffee production, accounting for approximately 96% of the output in this period, with Karnataka alone contributing 71%.

The tea and coffee processing industries are not heavily reliant on imported machinery, though some advanced and auxiliary equipment, such as moisture analysers, de-stoners for sorting and quality control equipment, is imported. Imported moisture analysers are equipped with advanced technology such as infrared and microwave sensors, which provide faster and accurate measurement. Imported de-stoners often come with advanced separation technology, such as air jets and more efficient vibrating screens, and have higher processing capacities. Larger players also import sophisticated packaging machinery. For larger players, import dependency is 20-30%, while smaller players do not import machinery for tea and coffee processing.

Processes involved and key equipment used (Tea)

Process	Description	Key equipment
Plucking	Tea leaves are plucked from the top of the plant for processing within a few hours to prevent fermentation	Tea plucking machine
Withering	The leaves are laid out on bamboo mats or tarps, or rotated in a withering machine, to reduce the moisture content	Tea withering machine
Rolling, maceration or bruising	Withered tea leaves are rolled, twisted and crushed to break down their cell walls and initiate oxidation	Rolling machine or rotor vane
Firing	The leaves are briefly heated to a high temperature to denature enzymes and halt oxidation, preventing browning	Tea leaf roasting machine
Sorting	The leaves are separated into batches based on their size, because different-sized leaves brew at different speeds	Tea sorting machine
Packaging	Tea leaves are filled into bags which are then sealed to keep out moisture and ensure product quality	Packaging machine
Testing	A sample of is tested for its concentration of theaflavins as they are responsible for the astringency of the tea	Spectrophotometer

Processes involved and key equipment used (Tea)

Process	Description	Key equipment
Harvesting	Coffee cherries can be harvested using two methods: strip picking, which involves removing all cherries from a branch and then sorting out unripe (green) and overripe (very dark) ones; or selective picking, which involves hand-picking only the ripe, deep red cherries	Coffee harvesting machine

Process	Description	Key equipment
Parchment coffee bean extraction	Parchment coffee beans can be extracted in two ways: Dry method: Cherries are sun-dried on beds, regularly raked and turned to ensure even drying, and covered at night to prevent moisture absorption. This process takes several weeks, until the outer layer turns black and brittle, transforming the cherries into parchment coffee beans Wet method: Cherries are pulped to remove their outer skin, then fermented in water and enzymes to dissolve the mucilage. The beans are then washed and dried in the sun or a dryer till the moisture content is reduced to 11%, resulting in parchment coffee beans	Dry method: drying beds Wet method: pulping machine, fermentation tank, washing machine, drying table or dryer
Hulling	Dried parchment coffee beans are hulled to remove the parchment layer	Hulling machine
Polishing	Any silver skin that remains on after hulling is removed to produce polished beans, which are considered superior to unpolished ones	Coffee polisher
Grading and sorting	Polished coffee beans are sorted and graded according to size, colour and weight. This process separates high-quality beans from defective or low-quality ones, ensuring that only the finest beans are processed and packaged together	Sieves, coffee bean colour sorting machine, gravity separator
Roasting	The beans are roasted to the required level and then immediately cooled to produce aromatic brown beans	Roasting machine
Grinding	The roasted beans are ground into the desired size	Coffee grinding machine
Packaging	Ground coffee is weighed and usually packed in airtight bags or sealed containers to avoid moisture and ensure product quality	Packaging machine
Testing	A small amount of coffee is brewed and cooled to room temperature to measure its pH level, which indicates if the coffee tastes sour or bland	pH meter

Spices: India is the largest producer of spices in the world. In fiscal 2024, the country's spice production reached 118 LMT, with garlic being the topmost produced spice, trailed closely by chilli and ginger. Among states, Madhya Pradesh (31%) was largest producer of spices in fiscal 2024, followed by Gujarat and Andhra Pradesh.

Mixing and grinding are crucial processes in spice processing. Mixing ensures that the spices are uniformly blended, which is essential for achieving consistent flavour and aroma. It also helps break down lumps or agglomerates, ensuring that the spices are evenly distributed and homogeneous. Grinding reduces the particle size of the spices, which increases their surface area and allows for better extraction of flavour and aroma compounds. Very few large players import machinery for advanced processes such as grinding and mixing. Overall, import dependency is very low in the sector at less than 10%.

Processes involved and key equipment used (blended spice processing):

Process	Description	Key equipment
Cleaning	Whole raw spices are processed using several cleaning machines to remove large contaminants	Destoners, magnetic separators, air blowers
Washing	Spices are washed using weak alkaline cleaning solutions and/or neutralising agents to remove small contaminants	Spice washing machine

Process	Description	Key equipment
Drying	The spices are dried either in the sun or in a spice dryer	Spice dryers, such as tray, rotary or fluidised bed dryers
Roasting	The dried spices are roasted to intensify their flavour and aroma	Drum, infrared or hot air roasters, among others
Sorting and grading	The roasted spices are sorted and graded by size, colour and density. The result is a collection of uniform-looking spices	Sieving machines, optical sorters and density separators
Grinding	The spices are crushed into powder	Spice grinders
Sieving	The finely ground spices are run through sieves or screens to achieve a uniform particle size in the spice powder	Sieves/screens
Mixing or blending	Spice powders are mixed to produce a custom blend	Mixers
Packaging	The blended spice powder is weighed and filled into bags, which are sealed to keep out moisture and ensure product quality	Packaging machine
Testing	A sample of the spice blend is taken in a crucible, weighed and then heated in a muffle furnace until all the organic matter in the spice blend is burned. The residue or ash is then weighed	Crucible, muffle furnace

Oleoresins: Oleoresins are concentrated extracts of spices, herbs and other plant materials. Oleoresins are used as flavourings, colourings and fragrances in a variety of industries, including food, beverages, pharmaceuticals and cosmetics. India is a key producer of oleoresins given its leading position in the world in spice production. Spice oleoresins produced in India include:

- **Paprika oleoresin**: India is the largest producer of paprika oleoresin, which is used as a colouring agent in food products
- **Chilli oleoresin:** India is also a major producer of chilli oleoresin, which is used as a flavouring agent in food products
- **Turmeric oleoresin:** India produces a significant quantity of turmeric oleoresin, which is used as a colouring and flavouring agent in food products
- **Ginger oleoresin**: India is also a major producer of ginger oleoresin, which is used as a flavouring agent in food products and beverages

The process of extracting the solvent from spices is complex and technically advanced, which is why more than 50% of machines used by large players are imported. Extractors, spray dryers and distillation machinery are the key equipment imported in this category.

- Extractors are imported for their ability to efficiently extract oleoresins from spices, herbs and other plant materials
- Spray dryers are imported for their ability to efficiently dry oleoresins and produce high-quality powders
- Distillation machinery is imported for its ability to efficiently separate and purify oleoresins, which is essential to ensure high quality.

Processes involved and key equipment used:

Process	Description	Key equipment
Cleaning	Whole spices are cleaned to remove debris, metal and other contaminants	Destoner, gravity separator, sieve metal detectors
Drying	The cleaned spice is dried artificially to reduce its moisture content to 8-10% to prevent fungal growth and toxin production in the spice	Convection dryers
Grinding	The dried spice is ground to prepare it for distillation	Grinding mill
Process	Description	Key equipment
Distillation	The ground spice is placed in a distillation apparatus through which steam is passed. The essential oils in the spice are vapourised and passed through a condenser to cool them to a liquid state. The liquid mixture of water and essential oils settles in such a way that the essential oils accumulate on the water surface and are then collected along with the de-oiled cake	Steam distillation apparatus
Extraction	The de-oiled cake from distillation is treated with an appropriate solvent to extract non-volatile resins	Percolator
Blending	The non-volatile resins and the volatile essential oils are blended and homogenised to obtain a smooth oleoresin	Mixer
Packaging	The oleoresin is weighed and packed to keep out moisture and ensure product quality	Packaging machine

Fish: These machines range from basic manual models to advanced, automated systems. Manufacturers offer a variety of equipment for different processing needs, including machines for filleting, cutting, pickling, and marinating, with options for both small-scale and large-scale operation

- Fish Filleting Machines are designed to efficiently separate fish fillets from the bones.
- Pickling Machines are used to uniformly coat fish with brine or other pickling solution
- Marinating Machines often vacuum tumblers are used to infuse marinades into fish meat. These machines help to tenderize the fish and enhance its flavour.

Food Packaging: The Indian food packaging machinery market is a substantial and growing sector, currently valued at USD 1.9 Billion in 2024. Projections indicate a rise to USD 2.7 Billion by 2033, with a compound annual growth rate (CAGR) of 4.09% between 2025 and 2033[7].

Market Segmentation: South and West Region dominate the equipment manufacturing landscape

India's food processing machinery sector is spread across key industrial hubs, ensuring optimised logistics, supply chain efficiency and market accessibility. The sector's presence is geographically diversified, with hubs in the west, north, south, east, and central regions, catering to various segments such as dairy, beverage, meat processing, snacks, packaging, and automation.

Western region: particularly Maharashtra and Gujarat, houses several food processing machinery manufacturers. Maharashtra's role is also supported by industrial zones and its concentration of food processing equipment production. Cities such as Mumbai, Pune, Nagpur and Ahmedabad are known for manufacturing capabilities, with a focus on dairy, beverage, and snack food machinery. These areas benefit from proximity to industrial parks, export-oriented ports, and

[7] https://www.imarcgroup.com/india-packaging-machinery-market

infrastructure, supporting domestic and international business expansion. Companies in this region provide solutions for food production, including machinery with automation, energy management, and customised systems.

Southern region: with hubs in Bengaluru, Vijayawada, Chennai, Coimbatore and Hyderabad, contributes to grain milling, snack processing, and packaging machinery production. These areas incorporate technological advancements, IT ecosystems, and export-oriented facilities. Manufacturers in these regions develop systems with energy management, automation, and integrated solutions for the food processing industry. Bengaluru focuses on automated processing and large-scale manufacturing, addressing the demand for packaged foods.

Northern Region: includes a manufacturing belt for dairy, bulk food, and beverage processing machinery, with Delhi, Noida, Sonipat and Gurugram as key hubs. The region benefits from proximity to fast-moving consumer goods manufacturers, making it ideal for food packaging and beverage bottling solutions. Delhi serves as a distribution point for northern and north-western India. Noida is known for its manufacturing units, while Gurugram and Sonipat specialise in packaging solutions for the beverage and dairy industries. The integration of automation and comprehensive solutions allow these machinery companies to undertake large-scale operations.

Eastern region: including West Bengal, plays a role in specialised machinery production for sectors such as tea processing and packaging. This area's proximity to tea-growing regions allows companies to provide machinery to the tea estates. The tea industry is a key segment, with machinery designed for bulk processing and handling production cycles.

Central Region: with Nagpur and Indore as hubs, serves as a centre for conveyor systems and automation solutions. The location enables connectivity to other states and facilitates nationwide distribution. Companies in this region focus on material handling systems, including conveyor systems, washing lines and assembly solutions for the food processing industry. This location supports operational efficiency for businesses that supply across the country and helps manage transportation costs.

India's food processing machinery sector is defined by regional specialisations, where automation, energy management, and integrated solutions influence operations. The western and southern regions focus on automation and production lines, while the north and east deal with specific segments such as dairy, beverage, bulk food processing, and tea production. The location of these companies supports market reach, operational costs and the food processing industry's competitiveness.

These companies address India's domestic requirements, while positioning themselves in the global food processing machinery industry. Their presence across industrial hubs ensures adaptability, scalability, and an optimised supply chain, allowing them to meet the demand for machinery solutions in the food processing sector.

Processing infrastructure at food parks: reliance on imported machinery

Mega food parks (MFPs) and food parks in India are designed to provide comprehensive infrastructure for the food processing industry, enabling efficient and cost-effective production, processing and packaging of products. Crisil's survey of food parks across the country indicated that ~20% food parks rely on imports for over 20% of their machinery requirement for common processing infrastructure.

Common core processing facilities at food parks:

Product line /facilities	**Average capacity at a single food park**
Individual quick-freezing (IQF) lines	IQF lines for fruits and vegetables with capacities of up to 1,200 kg/hour
Tetra Pak juice units and flexible packaging juice units	15,000 pieces per hour of 200 ml each
Dairy unit raw milk processing, pouching	More than one lakh litres
Packhouses	Capacity of 10 metric tonnes per hour consisting of stages such as washing, sorting, drying, waxing and grading

Spice processing line	15 metric tonnes per day with cleaning and grading equipment, separators, grinders, driers, pulverisers and packaging machinery

Key Growth drivers for Indian Manufacturers

a. Urbanisation & Changing Lifestyles

- Rising consumption of convenience and processed foods stimulates demand for modern machinery

b. Government Support & Infrastructure

- Initiatives like PMKSY, PMFME, Mega Food Parks, and Production-Linked Incentive (PLI) schemes offer strong financial incentives and infrastructure development

c. Automation & Smart Technologies

- Adoption of robotics, IoT, AI, machine vision, and Industry 4.0 practices is transforming production efficiency, reducing errors, and enabling predictive maintenance
    - Smart sensors, IoT-enabled machines, AI-based quality inspection
    - Predictive maintenance and digital twins in manufacturing
- Hygienic & Sustainable Design
    - Stainless steel, clean-in-place (CIP) systems, low-water technologies
    - Energy-efficient machines aligned with net-zero targets
- Customized & Compact Solutions
    - Miniaturized equipment for small-scale units and startups
    - Modular design for easy scalability

d. Cold Chain & Logistics Expansion

- Cold storage infrastructure and better logistics reduce post-harvest losses and drive investment in related machinery
- Under PMKSY, Integrated Cold Chain and Value Addition Infrastructure scheme offers grant-in-aid up to ₹10 crore per project.
    - Subsidy covers 35% of project cost in general areas,50% in North-East, hilly, tribal, island region
    - Covers pre-cooling units, cold storage, blast freezing, reefer vans, IQF, packaging, irradiation — from farm-gate to consumer
    - Around 397 projects approved, with ~286 operational, adding 112.35 lakh MT/yr processing and 25.39 lakh MT/yr preservation capacity
    - India currently has 8,690 cold storage units (39 mMT capacity) covering 15% of fruit & vegetable output; however, less than 5% is precooled or reefer-transported[8].

e. Sustainability & Efficient Operations

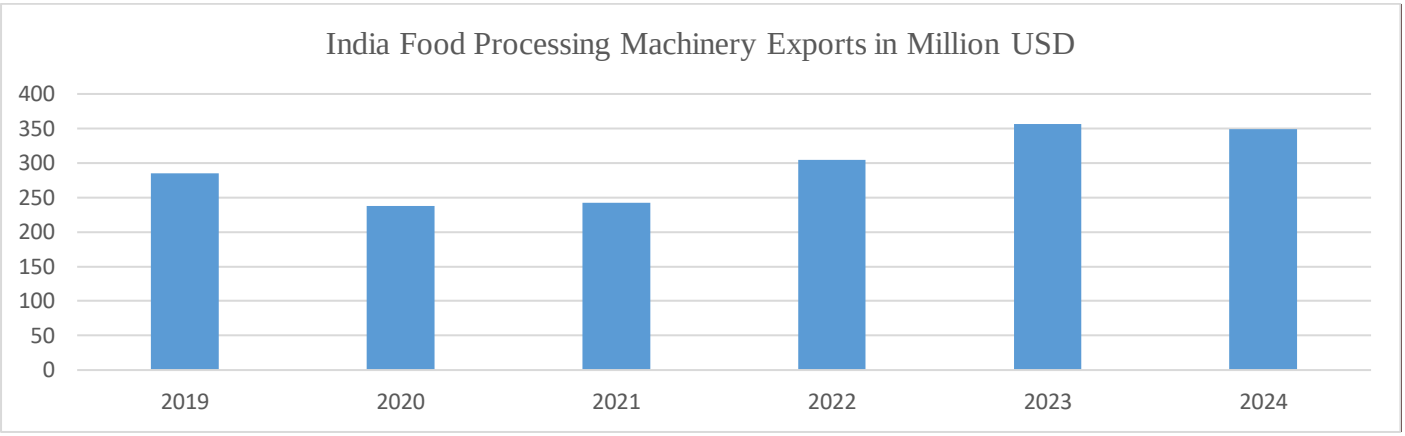
- Focus on eco-friendly equipment that conserves energy, water, and reduces waste aligns with regulatory pressures

f. Rising Exports & Imports

India food processing machinery exports clocked a CAGR of 7.7% between fiscals 2019 and 2024 mainly aided by rising global demand for processed and packaged foods, strong government push, including the Pradhan Mantri Kisan Sampada Yojana. Tax incentives also encourage the production of machinery that meets international standards. Machinery parts, cleaning and sorting machinery, and sugar manufacturing machinery dominated exports.

[8] https://indianinfrastructure.com/2025/01/07/improving-operations-warehousing-and-supply-chain-trends-shaping-the-logistics-sector/

Table 1.



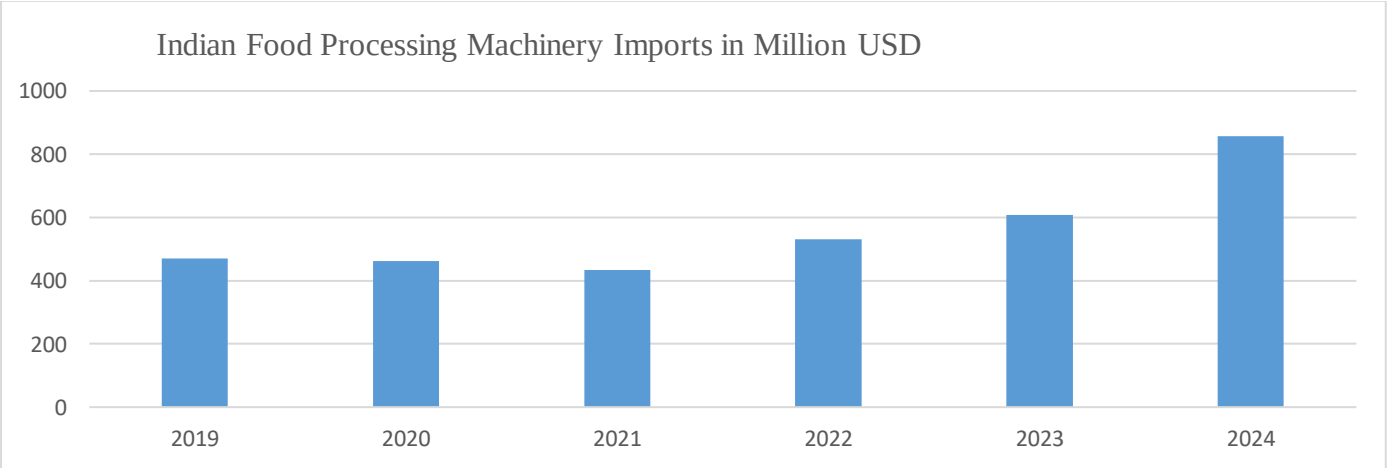
India exported food processing machinery worth USD 40.86 million to Kenya, as per the trade data for fiscal 2024. Nigeria, Nepal, Tanzania and Bangladesh were the other major destinations for Indian food processing machinery exports.

Demand for food processing equipment in India is estimated to have increased at 5-7% CAGR over the past decade, to USD 3.63 billion to 4.24 billion in fiscal 2023, on the back of growing domestic demand for processed and packaged foods, particularly in urban areas, government initiatives such as Make in India, support provided through the Food Processing Fund and PMKSY, among others, as well as a growing population.

Between fiscals 2019 and 2024, China was the largest supplier of food processing machinery and parts to India. As of fiscal 2024, the share of China in the overall food processing machinery and parts imports stood at 40.8%, followed by Germany (8.0%), Italy (7.4%), the Netherlands (7.4%) and Turkey (4.8%) during the same period. Among the top five suppliers of food processing machinery and parts to India, the Netherlands and China have grown the fastest with a CAGR of 25.9% and 18.7%, respectively, between fiscals 2019 and 2024.

An analysis of supply of the food processing equipment in the country estimates food processing equipment imports ranges between 16.5-17.5% of the overall demand, i.e. of total sales, imports stood at USD 608.52 Million in fiscal 2023.

Table 2.



Factors driving the import of plant and machinery equipment: food processing players purchase domestically made machinery for general machinery and process elements, such as mixers, conveyors, storage vessels, etc.

Pricing also plays a key role in the preference of domestic machinery. 65-70% of industry participants mentioned pricing as one of the factors for opting to procure from domestic equipment manufacturers. Another factor was customisation

regarding domestic manufacturers. Domestic equipment manufacturers largely provide made-to-order equipment, and, hence, can customise equipment to suit a client's process requirements.

However, domestic equipment manufacturers face considerable challenges to compete at the global level, owing to perceived low technology capabilities. They find it difficult to secure contracts from domestic customers as well.

Indian equipment manufacturers are believed to lack the expertise to build technologically high-end machinery; they are considered followers and not innovators. But Indian equipment manufacturers have proven their technology capabilities to build cutting-edge equipment, especially by collaborating with international firms. Stil, they have not been able to showcase and commercialise the products.

Hence, in terms of capacity utilisation, domestic mid- and large-sized of food processing equipment players' utilisation ranges 70-80%, while smaller players made machines as per order, thereby indicating lower capacity utilisation.

Key Challenges for Domestic Manufacturers:

Working capital: Small food processing machinery companies of ten struggle to access credit from financial institutions, making it challenging to manage working capital requirement. 100% collateral is required to access working capital, and in many cases at very high interest rates.

Technology gaps: Indian food processing machinery of ten lacks advanced automation and control systems, which could reduce efficiency, productivity and product quality

Lack of R&D budgets: Lack of R&D budget limits and hinders the industry's ability to innovate and compete with global players.

Non-uniform implementation of government schemes: Non-uniform implementation of government schemes poses challenges for Indian food processing machinery manufacturers including lack of standardization across states, inconsistent subsidies and incentives, complexity in the process to avail benefits under schemes.

Quality and precision: Domestic-manufactured food processing machinery is believed not to have the same level of precision and accuracy as imported machinery, which could impact product quality and consistency

Key Industry Players in India:

India's food processing machinery sector is diverse and strategically positioned. It caters to various segments such as dairy, beverages, meat processing, packaging, and automation. Food processing machinery companies are spread across key industrial hubs, ensuring efficient supply chain management and access to raw material. Several of the leading global process equipment manufacturers such as Alfa Laval, Buhler, GEA group, Tetra Pak have a presence in India. These players cater to demand for machinery in India as well as other countries in the Asian subcontinent.

Indian equipment manufacturers can meet domestic demand but lack volumes and scale to compete with established brands from Germany, Japan, and the US. Specialised technology and tools, such as high-tensile cutting blade, have to be imported as these are not manufactured in India. MNCs have also invested in research and development (R&D) to develop the requisite expertise and technology. New product development takes time, which impacts the capabilities of the domestic equipment manufacturers to compete with the global companies.

One of the most significant barriers India faces in the global market is the perception about its products. India's manufacturing sector has traditionally been linked with low-cost production, which has often been synonymous with compromised quality. To effectively compete with renowned brands from countries like Germany, Japan, and the US, India needs to revamp its image and prioritize quality.

Below is a detailed tabular representation of the top food processing machinery companies in India, covering their location, specialisation, capacity, and unique offerings:

No	Company	Location	Product list	FY24 revenue (Rs crore)	Add-on details
1	Alfa Laval India Pvt Ltd	Pune, Maharashtra	Heat exchangers, separators, pumps, and fluid handling systems	1,687.3 (CY22)	Global presence, ISO-certified, energy-efficient solutions
2	Buhler India Pvt Ltd	Bengaluru, Karnataka	Grain milling, pasta production, and chocolate processing	858.5	Swiss technology, energy-efficient systems
3	GEA Group India	Vadodara, Gujarat	Dairy, beverage and food processing equipment	573.5	Focus on sustainability, automation, and turnkey solutions
4	Heat and Control	Chennai, Tamil Nadu	Snack food processing, frying, seasoning and packaging system	386.4	Global leader in snack food processing, innovative solutions
5	Tetra Pak India Pvt Ltd	Pune, Maharashtra	Packaging and processing solutions for liquid food	437.5	Aseptic packaging, ecofriendly designs
6	Krones India Pvt Ltd	Secunderabad, Telangana	Processing machinery beverages, dairy products, confectionary	201.8 (CY22)	Provides turnkey solutions for the liquid consumer products industry
7	Sidel India Pvt Ltd	Gurugram, Haryana	Beverage packaging and processing solution	258.1	Global leader in beverage packaging, ecofriendly design
8	Fowler Westrup (India) Pvt Ltd	Malur, Karnataka	Grain and seed processing machinery	260.8	Advanced seed and grain processing solutions
9	Nichrome India Ltd	Pune, Maharashtra	Packaging machines for food, dairy, and beverages	122.0	Innovative packaging solutions, ISO-certified
10	Kanchan Metals Pvt Ltd	Greater Noida, Uttar Pradesh	Food processing confectionery, sweets and packaging machinery	162.6	High-quality stainless steel fabrication affordable pricing with hygiene designs
11	Danfoss Industries Pvt Ltd	Gurugram, Haryana	Refrigeration, heating, and cooling systems for food processing	2,569.8	Energy-efficient solutions, leading provider of climate and energy technologies
12	Bajaj Processpack Ltd	Noida, Uttar Pradesh	Packaging and processing machinery for food	232.8	High-quality, ISO-certified, turnkey solutions
13	IDMC Ltd	Anand, Gujarat	Dairy equipment, milk handling and packaging systems	751.0	Pioneer in dairy machinery, trusted by Amul and other major dairy brands
14	Windsor India Ltd	Ahmedabad, Gujarat	Bakery, confectionary, and snack machinery	354.0	Advanced automation, high-quality machinery

No	Company	Location	Product list	FY24 revenue (Rs crore)	Add-on details
15	SSP Pvt Ltd	Mumbai, Maharashtra	Dairy, fruit and vegetable processing equipment	206.9	High-quality stainless-steel machinery
16	Goma Engineering Pvt Ltd	Mumbai, Maharashtra	Dairy, beverage, and pharmaceutical processing machinery	148.8	High-quality, ISO-certified
17	T&I Global Ltd	Kolkata, West Bengal	Tea processing machinery	183.5	India's leading tea machinery manufacturer
18	Bry-Air India Ltd	Gurugram, Haryana	Conveyors and material handling systems for food processing	349.5 (CY23)	Specialises in moisture control solutions
19	JBT CorpIndia	Mumbai, Maharashtra	Food processing and packaging solutions	36.6	Advanced automation, global presence
20	Meatek Food Machineries Pvt Ltd	Pune, Maharashtra	Meat processing, frozen food equipment, slaughterhouse machinery	10.7	Specialises in meat and poultry processing
21	Sona Machinery	New Delhi	Agro-processing equipment, focusing on rice milling and grain processing	97	Turnkey solution provider for rice mills and grain-based distilleries, including engineering, erection, and commissioning services
22	Chem Process Systems	Sanand, Gujarat.	Dairy, food and pharmaceutical processing machinery, distil	238.3	Specialises in power plant equipment, vacuum systems and related components
23	Neologic Engineers	Pune, Maharashtra	Food processing machinery	185	Specialises in complete processing lines for various applications, including dairy products like butter and ghee, milk pasteurisation, ice cream production
24	SATAKE INDIA (Japan)	Delhi	Grain processing equipment	112.1	Specialises in colour sorters, laboratory equipment and plant automation solutions
25	VSA Machines	Hyderabad, Telangana	Biscuit making machinery	1.3	N/A
26	Shreeja Health Care Products	Surat, Gujarat	Oil extraction machinery, including oil maker machines, commercial oil presses, mini oil ghani	20	Specialises in both small, business-oriented machines and larger, commercial-scale oil extraction equipment

No	Company	Location	Product list	FY24 revenue (Rs crore)	Add-on details
			machine and filter press machines		
27	Vishwakarma Industries	Delhi	Agricultural machinery	0.05 (FY21)	Known for needle looms, plastic scrap dryers and recycling machines, and certain types of agricultural machinery such as chaff cutters and threshers
28	Suri Engineers	Hyderabad, Telangana	Rice processing equipment	110.2	Supplies machinery for rice mills, including pre-cleaning, separation, fine cleaning and polishing equipment
29	Middleby Corp	Bengaluru, Karnataka	Food processing and packaging equipment	164.7	Also produces equipment for industrial baking, thermal processing, slicing and loading
30	Noida Fabcon Machines	Greater Noida, Uttar Pradesh	Food processing equipment, conveyor systems and snack making machines	36.5	N/A
31	Allround Vegetable Processing	Ambala, Haryana	Vegetable processing equipment	68.6	Specialises in post-harvest handling and storage solutions, particularly for root vegetables such as carrots, potatoes and onions
32	New Era Machines	Sahnewal, Punjab	Biscuit production lines and baking systems	37.9	Also known for its expertise in three-roll pre-sheeters
33	Gee Gee Foods and Packaging Co.	New Delhi,	Food processing equipment	0.2	Specialises in high-performing and superior-designed equipment
34	SPX Flow Inc.	Pune, Maharashtra	Food and beverage processing	545.9	Manufactures a range of industrial machinery, including mixers, pumps, valves, homogenisers, and heat exchangers, as well as specialised equipment such as ultra-high-temperature systems and spray dryers

Government Initiatives

Government of India has taken up various initiatives to boost the Food Processing Machinery sector

Government Policies

The government's economic policies and measures are vital steps by which a government attempts to influence the economy and incentivizes various food processing industries inthe Country. Several policy initiatives have been taken from time to time by the Government to promote growth of the food processing sector in the country. Some of the prominent policies are listed below:

Policies	Details
License Exemption	The government has taken the initiative to exempt all processed food items from the purview of licensing under the industries (Development and Regulation) Act to promote ease of doing business.
Easing FDI norms	100% Foreign Direct Investment (FDI) permitted through automatic route for food processing sector including FP Machinery subject to sectoral regulations
Income Tax exemptions	The government supports the sector through 100% exemption of IncomeTax on profits and gains for new Food Processing Units for initial 5 assessment years; Corporate tax has been substantially reduced in the budget announcement of 2019, making India among the countries with the lowest corporate tax. where new companies Corporate tax slab New companies: 15% Existing companies: 22% + cess
Reduced Custom Duty	All goods related to Food Processing, imported as part of the Project. Imports are entitled to customs duty at a very concessional rate.
Enabling Environment	The government classified food processing sector including dairy processing under 'agricultural activity' and is considered under PrioritySector Lending for ensuring credit availability in the sector.
Special Funds	Government of India has Set up a Special Fund of ₹2000 crore in NationalBank for Agriculture and Rural Development (NABARD) to provide affordable credit for designated Food Parks and agro-processing units.

Government Schemes

The government has launched the following schemes that can be leveraged for developing the food processing sector in the country.

PRADHAN MANTRI KISAN SAMPADA YOJANA (PMKSY):

PMKSY is a comprehensive scheme implemented by MoFPI which aims to create modern infrastructure with efficient supply chain management from farm gate to retail outlet. The key objectives of PMKSY are:

- Creation of modern infrastructure for food processing mega food parks/ clusters and individual units
- To create effective backward and forward linkages - linking farmers, processors and markets
- To create robust supply chain infrastructure for perishables

Under PMKSY, the various sub-schemes titled Creation/Expansion of Food Processing and Preservation Capacities (CEFPPC); Integrated Cold Chain and Value Addition Infrastructure; Operation Greens etc. are being implemented.

The continuation of the Central Sector Scheme – Pradhan Mantri Kisan Sampada Yojana (Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters) with an allocation of **Rs. 4600 Crore** has been further approved until March 31, 2026.

As of February,'2025, MoFPI has sanctioned 1608 Projects including 41 Mega Food Parks,394 Cold Chain Projects,75 Agro-processing Clusters Project,536 Food Processing Units,61 creation of Backward & Forward Linkages and 44 Operation Greens projects under PMKSY across the country. A total sum of INR 6198.76 crores has been disbursed as grants in aid/subsidy since the inception of component schemes of PMKSY

PM FORMALIZATION chain OF MICRO FOOD PROCESSING ENTERPRISES (PMFME)

The PMFME, a centrally sponsored scheme with an outlay of ₹ 10,000 Crore to was implemented over a period of five years from 2020-21 to 2024-25. The scheme provided financial, technical, and business support for existing micro food processing enterprises. As on March 2024, loan amount of ₹ 6946.16 crore for 86,342 applicants were sanctioned. The scheme generally adopted the One District One Product (ODOP) approach to reap the benefit of scale in procuring inputs, using shared services and marketing products. Till March 2024, 726 Districts with 137 unique products were approved under the ODOP in 35 States/ UTs.

PLISFPI- Production Linked Incentive Scheme for Food Processing Industry

The Central Sector Scheme, Production Linked Incentive Scheme for Food Processing Industry (PLISFPI) was approved by Union Cabinet in **March 2021**, with an outlay of **₹10,900 Crore**. The Scheme is being implemented over a six-year period from 2021-22 to 2026-27.

- Incentivising manufacturing of four major food product segments viz Ready to Cook/Ready to Eat(RTC/RTE) foods including millet-based products, processed fruits & vegetables ,marine products and Mozzarella Cheese (Category I)
- Production of Innovative / Organic products of SMEs (Category II).
- The third component related to support for branding and marketing abroad (Category III) to incentivise emergence of strong Indian brands for in-store branding, shelf space renting and marketing.
- From the savings under PLISFPI, a component for Production liked Incentives Scheme for Millet based Products (PLIMBP) was also carved out for the scheme to encourage the use of Millets in RTC/RTE products and incentivising them under the PLI scheme to promote its production, value addition and sale.
- As of February 28, 2025, a total of 171 food processing companies have been approved for assistance under various categories of the PLISFPI scheme in the country and incentives to the tune of ₹1155.296 crore has been disbursed, out of which ₹13.266 crore has been disbursed to MSMEs in 20 eligible cases.
- According to data reported by the scheme's beneficiaries, an investment of ₹8,910 crore has been made across 213 locations. As of 31 October 2024, the scheme has reportedly generated employment of over 2.89 lakh.

The scheme has significantly contributed to the country's overall growth and development by scaling up domestic manufacturing, enhancing value addition, boosting the domestic production of raw materials, and creating employment opportunities. The scheme supports large companies, millet-based products, innovative and organic products, as well as small and medium enterprises, while also promoting Indian brands globally.

The MOFPI Subsidy 2025 is a government grant aimed at supporting food processing industries across India. The scheme provides financial assistance of up to ₹5 crore, helping businesses modernize and expand their operations.

Recent Developments[9]:

- **March 2025**: In a bid to enhance food safety and quality, the Ministry of Food Processing Industries (MOFPI) will financially support the establishment of 100 new NABL-accredited (National Accreditation Board for Testing and Calibration Laboratories) food testing laboratories across India in the financial year 2025-26.
- **January 2025**: The Ministry of Food Processing Industries (GOI), Punjab Agricultural University (PAU), Punjab Agro Industries Corporation, and Hindustan Unilever Limited (HUL) are set to hold joint deliberations to enhance tomato production and paste manufacturing in Punjab.

[9] https://pib.gov.in/PressReleasePage.aspx?PRID=2116175#:~:text=March%202025%3A%20In%20a%20bid,the%20financial%20year%202025%2D26.

Food Processing Machinery R&D and Skill Development

Research & Development (R&D)

The development of advanced and efficient food processing machinery is heavily dependent on robust research and innovation. In India, however, R&D in this segment remains limited compared to global benchmarks.

Current Landscape

- **Public Sector Institutions**:
  - **ICAR (Indian Council of Agricultural Research)** and its specialized institutes (like CIPHET – Central Institute of Post-Harvest Engineering and Technology) are involved in developing indigenous machinery, especially for small-scale and rural applications.
  - **CSIR – CFTRI (Central Food Technological Research Institute)** works on equipment design for food preservation, dehydration, and fortification.
- **Academic Contributions**:
  - IITs, NIFTEM (National Institute of Food Technology Entrepreneurship and Management), and agricultural universities conduct applied research in food engineering and machinery development.
- **Private Sector R&D**:
  - Concentrated in large equipment manufacturing companies, though limited in scale due to high costs and low margins.
  - Startups and SMEs often face barriers in accessing funds and technical infrastructure.

Key Challenges

- Low levels of private investment in machinery R&D.
- Weak industry-academia collaboration.
- Lack of standardized testing and certification facilities.
- Limited commercialization of lab-scale innovations.
- India has a limited number of equipment-specific standards compared to the extensive range covered by NSF/ANSI in the US and CEN EN standards in Europe

Policy Needs

- Incentives for private sector R&D under schemes like **Make in India** or **Startup India**.
- Strengthening of **Technology Business Incubators (TBIs)** in food tech institutions.
- Dedicated **Food Machinery Innovation Clusters** with public-private partnerships.
- Support for indigenous prototyping and pilot-scale validation.
- Key focus should be on strengthening regulatory standards in food processing equipment industry in India covering extensive range as covered by NSF/ANSI in the US and CEN EN standards in Europe.

Skill Development

India's food processing sector is labour-intensive but suffers from a shortage of skilled workers, especially in machinery operation, maintenance, automation, and hygiene-compliance roles.

Current Initiatives

- **Ministry of Food Processing Industries (MoFPI)** under the **PMFME** and **SAMPADA** schemes supports training programs for micro-entrepreneurs.
- **Food Industry Capacity and Skill Initiative (FICSI)**, under NSDC, develops qualification packs and provides vocational training for roles like:
  - Machine Operators (Grinding, Mixing, Packaging)
  - Maintenance Technicians
  - Plant Supervisors
- **ITI and Polytechnics** offer basic training but lack specialization in food machinery-specific disciplines.
- Some large players conduct in-house training, though these are not standardized across the sector.

Challenges

- Skill gaps in machine operation, especially for automated and imported systems.
- Lack of awareness among MSMEs about training programs.
- Inadequate training infrastructure in rural and semi-urban areas.
- Minimal focus on lifelong learning and upskilling.

Recommendations

- Develop **specialized skill hubs** for food machinery training in collaboration with manufacturers.
- Incentivize **apprenticeship programs** with industry partners.
- Update **vocational curricula** to include digital tools, automation, and quality control systems.
- Create **certification programs** for machinery handling and plant hygiene that are aligned with global food safety standards (like HACCP, ISO 22000).

R&D and skill development are critical pillars for enabling India's food processing machinery sector to become globally competitive. By aligning innovation ecosystems with industry needs and equipping the workforce with modern technical competencies, India can reduce its import dependency, enhance manufacturing capacity, and ensure inclusive sectoral growth. A targeted and coordinated approach involving government, academia, and industry will be essential to unlocking this potential.

Unlocking the Opportunities for Sustainable Growth

1. **Focus on Tier-II/III City Penetration**: Rising middle-class demand opens new rural and semi-urban markets.
2. **SME-focused Financing:** Loans, subsidies, and lease models to help SMEs acquire modern equipment.
3. **Skill-building Ecosystem**: Partnerships with institutes like NIFTEM-Thanjavur to train talent
4. **Smart & Green Machinery**: Innovation in AI-powered quality control, energy-efficient processing, biodegradable packaging equipment.
5. **Cold Chain Machinery Boom**: Growth in refrigerated transport, modular cold stores, and farm-level on-site processing units.
6. **Export-readiness**: Scale up Indian-made machinery for export, especially to neighbouring countries.
7. **Integration with PLI & Mega Food Parks**: Leverage government infrastructure and incentive clusters for market access.
8. Focus on strengthening regulatory standards in food processing equipment industry in India covering the extensive range covered by NSF/ANSI in the US and CEN EN standards in Europe.

Conclusion

Food processing machinery is a vital enabler of value addition, efficiency, and safety in the global food supply chain. The Indian food processing technology industry has emerged as a promising sector, benefiting from a robust food ecosystem that presents substantial investment prospects. It is also driven by favourable economic policies, growing capacities, appealing fiscal incentives and robust market demand. According to MoFPI[10], the Indian food industry output is anticipated to reach a size of USD 535 billion by FY 2025-26. It commands a 10.4% share in exports and employs 11.6% of the workforce, with the unregistered segment providing livelihoods to 5.1 million individuals. Exports of processed food machinery reached USD 3.1 billion in 2023, growing at a 5-year CAGR of 8%. Top export markets for India include the US, Singapore, Saudi Arabia, Nepal, Nigeria, UAE and Bangladesh. India, with its growing domestic food industry, skilled workforce, and policy backing, is emerging both as a major market and a competitive manufacturing base. Continued investment in R&D, skilling, quality standards, and global partnerships will be key to transforming India into a global hub for food processing equipment.

[10] https://www.indiabusinesstrade.in/blogs/food-processing-technology-the-sunrise-opportunity

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Published by: Economic Division, MoFPI
W: mofpi.gov.in; worldfoodindia.gov.in
Knowledge Partner – Ernst &Young LLP