

Lecture 1 : Importance and Scope of fruit and Vegetable Preservation in India

Introduction

Fruits and vegetables are important supplement to the nutritional requirements in the human diet as they provide the essential minerals, vitamins and fiber required for maintaining health. India is the second largest producer of fruits and vegetables in world after China. Huge quantity of produce is wasted due to inadequate facilities for preservation as only 1.5 to 2% of the total produce is processed in the country. Fruit and vegetable preservation is thus one of the major pillars of food industry. The food preservation and processing industry has now become a necessity rather than being a luxury.

Food is the prime necessity of life and can be classified in different groups according to their nutritional value and function in the body.

1. **Energy giving food:** Any food which provides energy is classified as energy giving food. One gram of carbohydrate imparts 4 calorie while 1 g of fat provides 9 calorie of energy, e.g., cereals, roots, tubers, dried fruits, sugar, fat etc.
2. **Body building food:** Foods which are rich in protein are body building foods, e.g., milk, meat, fish, egg are rich in protein of high biological value. Secondly pulses, oil, seeds and nuts etc are rich in proteins. Though, these proteins contain many essential amino acids for synthesis of body tissues yet may not possess all essential amino acids required for the human body.
3. **Protective food:** Foods rich in protein, vitamin and minerals are called protective foods, e.g., milk, egg, green leafy vegetables and fruits. Protective foods are of two types.
 - High biological value foods: Foods rich in protein, minerals and vitamin. (e.g., milk) are protective foods of high biological values.
 - Low biological value foods: This group includes foods rich in minerals and vitamins but deficient in proteins (e.g., fruit and vegetables, green leafy vegetables). Thus, fruit and vegetables are characterized as the protective foods of low biological value. They are rich source of carbohydrates, dietary fibre, mineral, vitamins, flavonoids etc.

Status of fruits and vegetables in India

Fruits and vegetables are the important category of horticulture crops grown in our country.

- Out of total cropped area of 184 million hectare, horticulture crops cover about 20.7 million hectares (about 11.25% of the total gross cropped area).
- Horticultural crops contribute about 18-20% of the gross value of India's agricultural output.
- India is the largest producer of mango, banana and lime.
- The country produces 41% of world mangoes, 23% banana, 24% cashew nut and accounts for 12% of world fruit production (MOFPI, 2009).
- India is the world's second largest fruit and vegetable producing country accounting for 79.97 million tonnes of fruit and 129.1 million tonnes of vegetables (FAO, 2009).
- Besides, about 5.66 million tonnes of loose flowers, spices, mushroom and aromatic plants are also produced.
- The export of fresh fruit and vegetables from India in 2006-07 was estimated at 9.84 lakh tonnes and valued at Rs 2411.70 crores.
- Mango, grapes, apple, onion, potato, green vegetables like okra, bitter gourd and green chilies are the major items of export.

PROCESSING OF HORTICULTURAL CROPS

- India also exported 9.53 lakh tonnes of processed foods comprising of mango pulp, juices, concentrates, dried and processed vegetables, pickle and chutney, alcoholic and non-alcoholic beverages worth Rs 2,757.74 crores (APEDA, 2007) (Table-1.1).

1. Fruits: Owing to wide diversity of agro-climatic conditions, almost all types of fruits are grown in the country.

- Temperate fruits: Apple, pear, peach, plum, apricot, cherries, almond, walnut and other nuts).
- Subtropical fruits: Mango, guava, papaya and citrus etc.
- Tropical fruits: Banana, pineapple, sapota, litchi and grapes etc.
- Arid fruits: Pomegranate, fig, phalsa, ber and aonla etc.
- Plantation crops: Coconut, cashewnut, and arecanut etc.

2. Vegetables: More than 40 kinds of vegetables are produced in our country. India comprises the prime position in cauliflower, second in onion and third in cabbage in the world. The country produces 36% green peas, 30% cauliflower and 10% onion and thus, accounts for 13% of total vegetable production in the world (MOFPI, 2009).

3. Status of fruit and vegetables processing industry in India

The food processing industry in India accounts for 14% of the total industrial output with 6.3% contribution in the national GDP. The food processing industry plays an important role in the Indian economy and is establishing as one of the largest sector in terms of production as well as returns. The installed capacity of processing fruit and vegetable in our country from more than 6600 FPO licensed units is about 3.85 million tonnes which is less than 2% of total fruit and vegetable production against 60-83% in many horticultural advanced countries like 60-70% in USA, 70% in Brazil, 78% in Philippines, 80% Saudi Arabia and 83% in Malaysia. Further, the actual production of processed products from these units stood at only 1.33 million tonnes (Table-1.2) which accounts for less than 35% capacity utilization of the installed processing units.

Table 1.2: Quantity of processed fruit and vegetable products in India

Status		Position in India
Area ¹ , m ha	Fruits	9.5
	Vegetables	7.9
	Others	3.3
	Total	20.7
Production ¹ , m tones	Fruits	79.97
	Vegetables	129.1
	Flowers, Spices and Aromatic plants	5.66
	Total	214.73
Export	Fresh Fruits/vegetables ²	9.84 lakh tonnes
	Value ²	Rs. 2411.70 Crores
	Processed Products ³	9.53 lakh tonnes
	Value ³	Rs. 2757.74 Crores
Infrastructure	Cold Store units ⁴ , number	5101
	Storage Capacity ⁴ , m tonnes	21.7
	Processing capacity, m tonnes	3.85
	Actual Production of processed products, m tonnes	1.33
	Capacity utilization, %	Less than 35

Categorization of different processing units

The categorization of different processing units in the country indicate that 70% of the total units comprised of home/cottage/small scale sectors having capacity to process up to 250 tonnes/annum, while 30% of the units consisted of large scale sector with a capacity to process about 30 tonnes/hr. However, large scale sector contribute 70% of the total production of processed products in India. Region wise distribution of units in country is comprised of Western 41%, South 28%, North 22% and about 9% in Eastern region. With respect to public and private sectors, about 95% of the total units fall under the private sector and only 0f 5% in different states in India up to the year 2008 (5166 units) is given in Table 1.3. Major products which are prepared in these units includes pulps, juices, concentrates, dried and processed vegetables, pickle, chutney, alcoholic and non-alcoholic beverages. The proportion of different products accounts for fruit juices and pulp (27%), ready to serve (RTS) beverages (13%), pickles (12%), jams and jellies (10%), synthetic syrup (8%), squashes (4%), tomato products (4%), canned products (4%) and other products (18%).

During 2007, India exported 9.53 lakh tonnes of processed foods (Table-1.4) comprising of mango pulp, juices, concentrates, dried and processed vegetables, pickle and chutney, alcoholic and non-alcoholic beverages worth Rs 2,757.74 crores (APEDA 2007). As such export value of processed products was higher then that of export value of fresh fruits and vegetables (2411.7 crores) during the same year. Thus there is a good scope for processing of fruit and vegetables in to different products to reduce wastage and earn foreign exchange.

Objectives of fruit and vegetable processing

1. To reduce wastage and losses: Fruit and vegetable industry is the backbone of horticulture industry as it takes care of all possible waste that occurs in spite of improvement in the distribution and marketing of fresh produce.
2. To handle glut: Produce during glut season utilized for making different processed products, thus fruit processing helps in reducing wastage and handling excess produce during glut season.
3. To stabilize farm prices and income: It stabilizes farm price by utilizing the excess produce in value addition to provide additional income to the farmers.
4. To utilize marketable surplus: Processing utilizes marketable surplus as well as cull and deformed produce, to ensure remunerative returns to the growers.
5. To generate employment: Processing of fruits and vegetables being a labour intensive helps to generate both direct and indirect employment for the masses.
6. To add variety to the diet: Value addition/processing make the food more attractive and palatable.
7. To ensure nutritional security.
8. To earn foreign exchange through export of processed fruit and vegetable products.

Major constraints in expansion of food industry

1. Variation in fresh produce quality involving frequent changes in production schedules.
2. Low productivity and high cost of raw material: Low production percent area in our country in comparison to horticulturally advanced countries is one of the major factors leading to high cost of raw material (Table-1.5).
3. Lower quality of raw material (low in soluble solids) in our country leads to requirement of comparatively more raw material for production of equivalent quantity of finished products, thus resulting in higher cost of production (Table 1.5).
4. Non availability of cost effective technologies for processing and packaging of fresh and processed products.
5. Lack of infrastructure for post harvest management, cool chain and cold storages.
6. Non-availability of trained man-power.
7. Low domestic demand of processed fruit and vegetable products due to high cost.
8. Irregular in supply and non-uniform quality of processed products due to variation in raw material quality and use of batch processes.
9. High cost of packaging material, higher taxes and excise duties.
10. Low capacity utilization in food industries.

11. Financial and fiscal constraints.
12. Infra-structural constraints in processing.
13. Inadequate farmer-processor linkage; leading to dependence on intermediaries.
14. Lack of strategies for market promotion.
15. Lack of strategies for utilization of processing industries waste (pomace, peel, core, stones/seed) for value addition.
16. Lack of R&D in food processing sector and its linkage with the food industry.

Table 1.5: Comparison of productivity (tonnes/ha) of import fruits and quantity of raw material required to prepare finished processed product (tonnes/ha) India and Abroad

Fruit/vegetable	Productivity, tones/ha	
	India	Abroad
Apple	8	30
Pine apple	10	80
Cauliflower	8	25
Onion	10	30
Potato	12	70
Tomato	15	60
Finished products		
Orange juice concentrate (65 ⁰ B)	14	10 (Brazil)
Pineapple juice concentrate (65.14 ⁰ B)	16	8 (Philippines, Hawaii)
Tomato Paste (20 ⁰ B)	7	4 (Italy)

Prospects for growth of processing industry

In spite of large number of constraints, the prospects for growth of processing industry are very high due to following factors:

1. Increased urbanization.
2. Changing life style and food habits.
3. Increase in purchasing power of the population.
4. Change in consumption pattern.
5. Increased awareness of population about health promoting foods.
6. Increased demand for functional foods, organic foods, convenience foods and diet foods.
7. Expansion of organized food retail.
8. Increase in population of working women having less time for spending in the kitchen. Thus need for processed convenience foods.

Government Initiatives

In order to reduce post harvest losses and expand the food processing industry, the Ministry of Food Processing Industries, government of India, has taken the following initiatives to provide a policy support for the industry.

- Formulation of the National Food Processing Policy
- Complete de-licensing, excluding for alcoholic beverages
- Food processing sector declared as Priority Sector for lending in 1999.
- 100% FDI on automatic route
- Excise duty waived on fruits and vegetables processing from 2000–01
- Income tax holiday for fruits and vegetables processing from 2004–05
- Customs duty reduced on freezer van from 20% to 10% from 2005–06
- Enactment of Food Safety and Standards Act, 2006 which includes all acts and rules pertaining to food such as Fruit Products order (FPO), Prevention of Food Adulteration (PFA) Act, 1954.

SWOT Analysis of food-processing industries in India

I. Strengths

- Abundant availability of raw material
- Priority sector status for agro-processing given by the central Government
- Vast network of manufacturing facilities all over the country
- Vast domestic market

II. Weaknesses

- Low availability of adequate infrastructural facilities
- Lack of adequate quality control and testing methods as per international standards
- Inefficient supply chain due to a large number of intermediaries
- Higher requirement of working capital.
- Inadequately developed linkages between Research organizations and industry.
- Seasonality of raw material

III. Opportunities

- Large crop and material base offering a vast potential for agro processing activities
- Setting of Agri-export zone (AEZ) and food parks for providing added incentive to develop green field projects
- Rising income levels and changing consumption patterns
- Favourable demographic profile and changing lifestyles
- Integration of development in contemporary technologies such as electronics, material science, bio-technology etc. offer vast scope for rapid improvement and progress
- Opening of global markets

IV. Threats

- Affordability and cultural preferences of fresh food
- High inventory carrying cost
- High taxation
- High packaging cost

Thus, keeping in view the availability of diverse raw material (fruit and vegetable), change in life style, rising income, increased urbanization and positive government support, there exists a good potential for expansion of fruit and vegetable processing industry in the country. Establishment of fruit processing units in rural sector shall help in reducing the post harvest losses, develop wide variety of value added products, and utilize by-products of food industry to improve the economic lot of growers, processors and nutritional status of Indian population.

