

Review Article

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An Analysis in Acceptance of Freezing System for Reduction of Wastage in Food Products

G. Velayudham*

Department of Poultry Engineering, College of Poultry Production and Management,
Tamil Nadu Veterinary and Animal Sciences University, Hosur - 635 110, India

*Corresponding author

ABSTRACT

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The food wastage is major problem raised worldwide. To overcome this problem, we must accept the preservation techniques. In that food freezing process is the easiest method available for storage for long period of time without change its nature. In food preservation sector, the food must storage in cold chain till now. But there will be a possibility of storage of food in home freezing. In this logic, the food can freeze in home itself, hence the people have to reduce the food wastage, multiple variety types of food can freeze, preservatives and additives are avoided, financial gain for people and nation. The increased usage of preserved food can lead to individual food security for all citizen in the worldwide. The data were commenced to assess the suitability for freezing of a range of different foods, and to provide information on freezing techniques and storage times. While greater use of home freezing could lead to reduced food waste, it was recognised that it will impact on domestic.

Introduction

The worldwide problem of food wastage has got into an unconditional situation and causes hunger, the actual/real statistical report of hunger of people is in blind condition. To overcome this problem, we must accept the freezing technique (i.e. freezing process). The food storage are in level of short term and long term storage, refrigerated trucks, freezers in retails shops etc. Most of peoples in worldwide are in lack of knowledge of freeze food, which food has to freeze, time period of freezing etc. The suitability of freezing range of different food for short time and long-time

can be guided to the public. This problem can be ended in solution from post-harvest freezing system to home freezers (i.e., Farm to kitchen) (Brown, *et al.*, 2014).

The food products are cultivated from farm have to preserved in cold chain sector up to retails outlets and it can stored or preserved in home freezers. This results in reduction of wastage of food. The products chosen for chilling/freezing purpose are fruits, fruit smoothies, eggs, carbonated beverages, fish, prawns, beef, chicken, pork, lamb, cheese, milk, yoghurt, vegetables, cake etc. several factors are likely impact on reducing

household food waste, if freezing was more widely practised. The processed food manufacturer can give proper guidance on storage life variability of different type foods. Always food sector is sunrise industry, has significant potential and is integral part of our economy (Jayathilakan, *et al.*, 2012). India stands first in globally milk production, second in fruit and vegetables, sixth in fish availability and has largest cattle population and large poultry base. For achievement of reduction of food wastage, we can make a cold chain from farm to kitchen. Hence, the current scenario of cold chain industry has followed in below lines.

Cold chain

Cold chain is important element in creating a supply chain network that can work seamlessly in connecting the entire process. If we can establish in large scale, the wastage of produce will reduce drastically and there will be balance between the supply and demand side and high produce more earning to farmers.

The staggering gap in India about 3 – 4 % of the perishable food is transported in temperature - controlled vehicles whereas this figure somewhere around 75 – 80% in china and USA. The government has involved in more initiatives and big business houses getting involved in this sector, for self – sufficient growth. The wastage of food products, due to the lack of infrastructure and multi - modal logistics contributes to about 1000cr from the agriculture sector only. The government of India has involved in developing a sagarmala project for improving the cold chain transportation with infrastructure to handle domestic consumption with export of remaining products. There is gap in cold chain infrastructure brought out by National centre for cold chain development. The management

of cold chain are in that directions are compulsory to realise the potential. Each and every product is from farm to fork needs to be addressed for the chain. It will reduce the wastage viable and sustainable. The major important in that is needed to implement a pack – house and pre – cooling system for fruits and vegetables and its optimal storage temperature. Some products are to be in room cooling, forced air cooling and vacuum cooling for remove moisture from produce during pre - cooling system.

In recent days, the CO₂ based refrigeration system has initiated for low, medium and high temperature application in Refrigeration and Air conditioning sector to reduce global warming raised due to refrigerants.

Refrigeration technology

Refrigeration industry plays a major role in the commercial and industrial processes, systems and applications in food processing and preservation sector.

Cold chain (food processing, preservation and distribution)

Dairy industry

Beverage's industry

Pharmaceutical and bulk drug industry

Fertilizer and chemical industry

Ice making industry

The industry has faced several challenges due to environmental issue of ozone depletion and global warming. Hence, the choosing of proper refrigerant for any particular application is the right phenomenon for environmental safety. In 1970's that a new wave of multiproduct cold stores began in

Maharashtra and it followed in other sector like food processing and freezing sector. The outlook of paper is usage of more cold storage to cold chain, and cover entire food chain from farm to retail as seen as important aspects of food preservation. The recent trends in cold storage has increase in multiproduct cold stores and controlled atmosphere (CA) stores, pack houses with processing and pre – cooling facility and ripening units. There is great probable for frozen food production in the country and distribution facilities for refrigerated foods. Refrigerated transport is an important link in the cold chain and has a great scope for huge growth.

Bulk cold storage for single product

Multi - purpose cold stores for multiple product

Cold storage for specific product

Pack house and pre – cooling facility for fresh fruits

Controlled atmosphere (CA) for apples, pears

Ripening units for bananas, mangoes, and papayas

Frozen food storage for processing, freezing, packing

Storage facilities for fruits and vegetables

Cold storage for ready-to-eats, meats, fish, poultry, dairy products.

Refrigerated transport

The cold chain sector is developing faster rate in India for increasing production to storage and transportation facility of the commodity. The industry is integral part of supply chain

unit of refrigerated storage and refrigerated transportation. On rising the need of infrastructure and to reduce wastage, according to the market research report, the cold chain industry in India is forecasted to grow at a CAGR of 19% during the period of 2017 – 2022.

The requirement of cold chain industry is follows

Rising need for cold chain

Increasing government initiatives

Increasing private investments

Changing lifestyles pattern of food consumption

Increasing demand for packaged, canned, frozen and ready – to – eat products.

The small and local distribution centres help in reducing delivery time and increase shelf life by ensuring that the cold chain.

New technology in cold chain industry

Now days cold chain industry has lot of modern construction structure (PEB), material handling equipment's, insulated panel technology, mechanized cold room, chamber doors, temperature controllers, water management systems, heat recovery systems, use of renewable energy systems, storages racks, web based platforms, project management software, warehouse management systems, bar coding systems, modern electrical and electronic systems, IoT in cold logistics and energy monitoring, online food delivery platforms, dry and wet fire safety systems. These applications will help and improve quality and reliability and reduce wastage in cold chain sector.

Fig.1

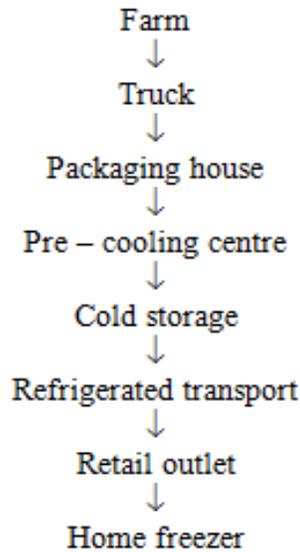
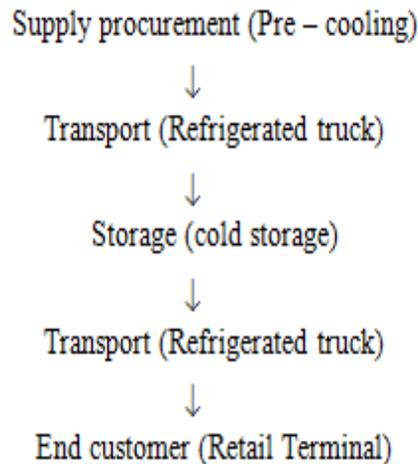


Fig.2



Challenges in cold chain industry

In the one aspects, there is more viable opportunities in cold chain industry. But in real practice, some challenges are focussed. Initial cost of construction of cold storage is more, Land requirements in suitable location, insufficient market surveys, Lack of power supply, Non – availability of adequate water with proper quality, Lack of road

infrastructure, Lack in refrigerated trucks, Non – availability of skilled labours, Global warming through refrigerated usage, Damaged and spoilt produce disposal.

Environmentally friendly cold chain sector

The industrial refrigeration systems have to operate at very low temperature and required high energy and water consumption. Hence,

the system has to design these plans and projects with environmental friendly. The material used in cold chain industry to be recycled, High energy efficiency of systems, Use of natural ventilation and lighting, Energy saving devices, Rain water harvesting, use of renewable energy systems.

The cold chain industry is shows a growth in past 50 year. Now there is significant transformation in industrial applications, technology, geographical spread, standards and practice. However, it must be realized that for a country which is more production in milk, fruits and vegetables, meats products has adequate lack in cold chain facilities. In order to improve technical sound, energy efficient and sustainable cold chain, the government has establish the National Centre for Cold – chain Development (NCCD) under the Ministry of Agriculture and mission for integrated development of Horticulture (MIDH), National Horticulture Board (NHB), National Horticulture Mission (NHM), Ministry of Food Processing Industry (MOFPI), Agriculture and Processed Food

Products Export Development Authority (APEDA) and state level bodies. Some private organisation help to promote the cold chain in country, provide standards for installation, safety and other aspects in national and international levels.

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