MINISTRY OF FOOD PROCESSING INDUSTRIES
GOVERNMENT OF INDIA

सत्यमेव जयते

NIFTEM
KNOWLEDGE • INNOVATION • OUTREACH

Reading manual for Garlic Processing

Under PMFME scheme

National Institute of Food Technology Entrepreneurship and Management

Ministry of Food Processing Industries

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CHAPTER 1

INTRODUCTION

1.1 GARLIC- ONE DISTRICT ONE PRODUCT

Garlic (*Allium sativum L.*) belongs to the member of the onion family, Alliaceae. Garlic is one of the important bulb crops among all bulbous crops grown. Garlic is Cultivated for thousands of years and used for culinary, antimicrobial and medicinal purposes. The name garlic is derived from old English word ‘gar’ means apparently, hinting to the clove. Its origin is Central Asia and it is then spread to Mediterranean region. Around 3000 BC, trading parties from India reached Middle East, where they introduced garlic to the mighty Babylonian and Assyrian empires, who embraced this plant and spread it across neighbouring civilizations. Now it is grown all over the world.

Garlic is one of the most important commercial spice crop, valued for seasoning and flavouring vegetarian and non-vegetarian dishes due to its unique flavour (volatile organosulfur compound ‘Allicin’). Another important scope is pharmaceutical industry especially, in the Unani and Ayurvedic systems of medicine.

1.2 CLIMATE CONDITIONS

Garlic Grows well under a wide range of climatic conditions. However, it cannot stand too hot or too cold weather. It requires medium temperature in summer as well as in winter. Short days are very favourable for the formation of bulbs and cool, moist climate during Vegetative growth and bulb development stages and a warm dry weather during maturity. Garlic requires temperatures of 32° to 50°F (0-10°C) during its first two months of growth and is not affected by hot weather as it

matures. It can be grown well at elevations of 1000 to 1300 m above MSL. Garlic Bulb formation takes place during long days and at high temperatures. An average temperature of 25-30°C is most helpful for bulb formation.

1.2.1 SOIL FOR GARLIC FARMING

The Garlic crop grows in the well-drained loamy, rich in humus with fairly good potash content soil. Garlic Crops raised on sandy or loose soils have poor keeping quality, and the bulbs produced are lighter in weight.Garlic Bulbs produced in heavy soils are deformed, and during harvest, many bulbs are broken and bruised. Bulbs become badly discoloured, poorly-drained soil, acidic soils are not suitable for clove development. However, a pH range between 5 to 7 had little effect on growth and yield.

- **Propagation**

Garlic is propagated by planting cloves or bulbils or aerial bulbils. Propagation by aerial bulbils is preferred when closer space is adopted. Aerial bulbils are more productive as compared to clones. Larger cloves give a higher yield. Virus-free seeds should be used.

If garlic propagation is done by cloves, all the cloves are planted except the long slender once in the centre of the bulb. Bulbs with side growth are discarded. Healthy cloves or bulbils free from disease and injuries should be used for sowing. One hectare requires about 150 to 200 kg cloves. Dibbling or Furrow planting can be adopted.

- **Season for plantation**

The season of Garlic plantation is not exactly same to all over India. June-July and October November are the normal planting seasons for garlic.
August to November: - Maharashtra, Karnataka, and Andhra Pradesh.
September to November:-The northern state of India.
March to April: - Hilly areas.
November -West Bengal

- **Harvesting**

Crop duration is of 4 ½ to 5 months. Garlic crop is ready for harvest within 130-150 days after planting, depending on cultivar, soil, and season. When garlic crop get ready for harvest leaves start turning yellowish or brownish and show signs of drying up. Bulbs are carefully lifted or uprooted with a country plough or mechanically and are tied into small bundles which are then kept in the

field or in the shade or 2-3 days for curing and drying so that the bulbs become hard and their keeping quality is improved.

- **Yield**

The garlic yield 40 to 100 quintals per hectare produce, depending on many factors like garlic variety, season, and soil.

1.3 SCOPE OF GARLIC PROCESSING INDUSTRY IN INDIA

- India is one of the leading Garlic producer.
- Garlic is consumed in every home in India.
- Processing industry shows constant market demand.
- Bulbs are easily stored for 5-6 months after harvest
- Garlic is used in varied food preparations
- Raw garlic is also used in second generation products like garlic powder, garlic salt, garlic vinegar, garlic cheese croutons, garlic potato chips, garlic bread etc.
- It has also been used as a popular remedy since vedic period.

1.4VARIETIES OF GARLIC

High yielding and disease resistant garlic verities widely used in commercial Garlic cultivation are listed below. Local varieties are either white in colour and have fairly big bulbs with a better keeping quality and a higher yield or red in colour with pungency.

The popular garlic varieties from (ICAR-DOGR)

Bhīma Omkar :- Recommended for Delhi, Gujarat, Haryana and Rajasthan. Matures in 120-135 days, average yield is 8-14 t/ha and are Medium size with compact white bulbs.

Bhīma Purple :- Recommended for Andhra Pradesh, Bihar, Delhi, Haryana, Karnataka, Maharashtra, Punjab and Uttar Pradesh. Matures in 120-135 days, Average yield is 6-7 t/ha. Attractive purple skinned bulbs

The popular garlic varieties from (NHRDF)

Agrifound White, Agrifound Parvati, Agrifound Parvati-2,Yamuna Safed, Yamuna Safed-2,Yamuna Safed-3,and Yamuna Safed-4

The popular garlic varieties from (MPKV)

Nashik ,Shweta, Godavari, Phule Baswant.

Tamil Nadu Agricultural University (TNAU) has released one improved variety by clonal selection viz., Ooty 1 Garlic. It is a high yielder (17t/ha) with a shorter duration of 120 to 130 days. The bulbs are big sized weighing 20 to 30g and each bulb has 22 to 25 cloves, which are dull white in colour.

1.5 NUTRITIONAL PROPERTIES OF GARLIC

Garlic (*Allium sativum*), Nutrient value/100 g.(Source: USDA National Nutrient data base)

Principle	**Nutrient Value**
Energy	**149 Kcal**
Carbohydrates	**33.06 g**
Protein	**6.36 g**
Total Fat	**0.5 g**
Cholesterol	**0 mg**
Dietary Fiber	**2.1 g**
Vitamins	
Folates	**3 µg**
Niacin	**0.700 mg**
Pantothenic acid	**0.596 mg**
Pyridoxine	**1.235 mg**
Riboflavin	**0.110 mg**
Thiamin	**0.200 mg**
Vitamin A	**9 IU**
Vitamin C	**31.2 mg**
Vitamin E	**0.08 mg**
Vitamin K	**1.7 µg**
Electrolytes	
Sodium	**153 mg**
Potassium	**401 mg**
Minerals	

Calcium	**181 mg**
Copper	**0.299 mg**
Iron	**1.70 mg**
Magnesium	**25 mg**
Manganese	**1.672 mg**
Phosphorus	**153 mg**
Selenium	**14.2 µg**
Zinc	**1.160 mg**
Phyto-nutrients	
Carotene-ß	**5 µg**
Crypto-xanthin-ß	**0 µg**
Lutein-zeaxanthin	**16 µg**

1.6 MARKET POTENTIAL OF GARLIC PROCESSING

The principle producers of garlic in the world are China, Egypt, India, Turkey, South Korea and Spain. Garlic is commercially cultivated throughout the country. In India garlic is harvested in the month of March – April and stored throughout the year. But daily fluctuating environmental conditions make it very difficult to maintain the quality and quantity of garlic during storage period. This leads to inadequate availability of garlic bulbs in the market as compared to demand. Here comes the importance of processing technologies. Dehydrated cloves, garlic paste, minimally processed garlic, dehydrated powder are some examples. Primary processing needs to be strengthened. Major objective of processing is to ensure the maximum off season availability. There is urgent need to focus and elevate garlic processing through simple low cost technologies.It is also employed for the preparation of either the steam-distilled essential oil or the solvent-extracted oleoresin.

Among dehydrated and processed garlic products viz., dehydrated garlic flakes, garlic slices or rings, garlic grits, garlic tablets, garlic pickles, garlic powders, digestive churns, paste, garlic salts are most demanded processed product at national and international level due to its nutritional compositions, health benefits and Medicinal properties. Nutritional quality and flavouring component wise Indian garlic is much better and as a result there is better demand in ethnic markets in Singapore, Indonesia, Bangladesh, Sri Lanka, Philippines and UK.This will be helpful in improving the rural income and creation of more employment opportunities to the consumers from

rural and urban masses. Also the demand of dehydrated and processed food has increased to manifold in last few decades. India has emerged as prominent exporter of dried and preserved vegetables including garlic during last few years.

Volume of garlic produced across India in financial year 2018, by leading state*(in 1,000 metric tons)*

CHAPTER 2

PROCESSING OF GARLIC

2.1 DEHYDRATED PRODUCTS

2.1.1 DEHYDRATED GARLIC POWDER

Dehydrated garlic powder is the dry powder obtained from garlic bulbs. It is characterized by a pungent and pleasant flavor, due to the compound allicin. In bread making it's added to enhance flavour. Other baked products like bread rolls, pizza and other savory items also make use the dehydrated garlic powders. It is a homogenous product, 95 % of which passes through a sieve of an apertures size of 250 u m.

- **RAW MATERIALS**

Dried and properly cured garlic

- **MANUFACTURING PROCESS**

It is a product prepared by drying garlic cloves and powdering it. The cloves are separated and Outer skin removed. Skin of individual cloves are not removed and cut into pieces not more than 5mm cube. No blanching or other treatments are applied. The product spread evenly on drying trays. Dry until brittle .Final moisture content should be about 5%. The yield is about 5:1. Separate dry skin by winnowing. The dry products may be ground into powder which should be then protected against moisture as they are very hygroscopic in nature. These are products passing through a sieve apertures size from 1.25 mm to 4 mm.

Note: The finished product should be cool down to room temperature for half an hour before packing.

Always store rated products in a dark place

Place dehydrated garlic powder in packing material which have enough barrier effect against moisture transfer.

The dryer used for garlic must be reserved especially for garlic. Flavour or odour contamination is possible to other products. For export the garlic, quality is the most important criterion. The quality is assessed by mean of its intrinsic (Moisture, volatile oil, oleoresins content, major chemical

constituents) as well as extrinsic (size, appearance, colour) quality. Blanching is not practiced it makes garlic to lose its flavour. Use of preservatives is not prescribed,

- **SUN DRYING**

Sun drying is usually adequate to dry to produce but there is a chance of contamination of the material by dust and dirt. Mechanized drying could enhance the quality of the product. Usually the whole garlic bulbs are spread out in the sun to dry. They are left to Wither for two days until the moisture content is about 20%. They are then threshed to remove the paper skin. Which are further dried to a final moisture content of 5 to 6.5%.Drying should be in the shade to prevent over-heating. The drying time depends on the climate. It is important to ensure that the temperature of drying ovens does not exceed 65°C as this reduces the levels of volatile oils. The dried bulbs should be stored in closed Containers. This can be powdered to form the garlic powder.Varieties with pungent flavour are the most appreciated for dehydrated products. After removing the top root and other ingredients garlic are washed thoroughly and then cut into slices if desired (3 mm to 5 mm) thick after cutting they are washed carefully.

Dried products may be ground into powder. Storage life: about 12 months.

- **FLOW CHART OF GARLIC POWDER**

RECEPTION

CLEANING (Removal of tops roots and outer skin)

PRE WASHING

PRE-DRYING

SIZE GRADING

CUTTING AND WASHING (IF NEEDED)

DRAINING

DRYING

WINNOWING

GRINDIN /PULVERIZING

SIEVING

CONTROL

PACKING

LABELLING

STORAGE

- **MACHINERIES REQUIRED FOR DEHYDRATED GARLIC POWDER**
- **MACHINERIES FOR CLEANING/PEELING/SEPERATING**

GARLIC PEELING MACHINE

GARLIC CLOVE SEPERATOR

GARLIC CLOVES CLEANER

- **MACHINERIES FOR DRYING**

ELECTRIC DRYER

SOLAR DRYERS

- **MACHINERIES FOR GRINDING**

PULVERISER

- **MACHINERIES FOR PACKAGING**

AUTOMATIC POWDER FILLING MACHINE

SEMI AUTOMATIC FILLING MACHIN

2.1.2 DEHYDRATED GARLIC FLAKES OR PIECES

It is a product prepared by cutting garlic cloves into slices and removing broken pieces smaller than 4 mm. These are products passing through a sieve apertures size from 1.25 mm to 4 mm. Skin of individual cloves is not removed. The particles have an irregular shape and size. No blanching or other treatments are applied. The product spread evenly on drying trays. Dry until brittle Moisture content should be within 6.5%.The finished product should be cool down to room temperature for half an hour before packing and stored in a dark place. Dehydrated garlic is packed in material which has enough barrier effect against moisture transfer.

Note: The finished product should be cool down to room temperature for half an hour before packing. Store the garlic flakes in a dark place.

Place dehydrated garlic in packing material which has enough barrier effect against moisture transfer.

The dryer used for garlic must be reserved especially for garlic. flavour or odour contamination is possible to other products

For export quality is the most important criterion. The quality is assessed by mean of its intrinsic (Moisture, volatile oil, oleoresins content, major chemical constituents) as well as extrinsic (size, appearance, colour) quality.

- **SUN DRYING**

Sun drying is usually adequate for the production of garlic flakes. But discolouration of the final product is unpeeling and the chance of contamination of the material by dust and dirt. Mechanized drying could enhance the quality of the product. Usually the whole garlic bulbs are spread out in the sun to dry. They are left to Wither for two days until the moisture content is about 20%. They are then threshed to remove the paper skin. Which are further dried to a final moisture content of 5 to 6.5%.Drying should be in the shade to prevent over-heating. The drying time depends on the climate. It is important to ensure that the temperature of drying ovens does not exceed 65°C as this reduces the levels of volatile oils. The dried bulbs should be stored in closed Containers. Varieties with pungent flavour are the most appreciated for dehydrated products. After removing the top root and other ingredients garlic are washed thoroughly and then cut into slices if desired (3 mm to 5 mm) thick after cutting they are washed carefully.
Storage life: about 12 months.

- **FLOW CHART OF DEHYDRATED GARLIC FLAKES OR PIECES**

RECEPTION

CLEANING (Removal of tops roots and outer skin)

PRE WASHING

PRE-DRYING

WINNOWING

SIZE GRADING

CUTTING

DRAINING

DRYING

CONTROL

PACKING

LABELLING

STORAGE

- **MACHINERIES REQUIRED FOR DEHYDRATED GARLIC FLAKE**

✓ MACHINERIES FOR CLEANING/PEELING/SEPERATING

✓ MACHINERIES FOR DRYING

✓ MACHINERIES FOR PACKAGING

2.1.3 GARLIC PASTE

Garlic paste is a product of high demand on market. Product with the same flavour as fresh garlic. The cleaned bulbs are broken into cloves, peeled and boiled carefully to obtain a homogeneous paste. To ensure a pleasing appearance and good shelf-life an addition of 0.1 % SO2, 15 % NaCl and 0.05 % ascorbic acid is recommended. There are many methods for garlic paste making. Vacuum packaging process increases the shelf life and freshness of the product.

- **FLOW CHART OF DEHYDRATED GARLIC PASTE**

SOURCING RAW INGRIDIENTS

↓

CLEANING AND DE- SKINNING

↓

CRUSHING & PULPING

↓

ADDITION OF PRESERVATIVES

↓

VACCUM PACKAGING

- **MACHINERIES REQUIRED FOR GARLIC PASTE**

VACCUM PACKING MACHINE

AUTOMATIC GARLIC PASTE MACHINE

2.1.4 PICKLED GARLIC

Whole, sliced, cubed garlic is pickled in vinegar or brine or vegetable oil or their combinations. Picking garlic in vinegar leads to formation of S-allyl cysteine.

Pickles are high salt and acid products high acidity in pickles prevents spoilage from harmfull food poisoning microorganisms. Acids is directly added as vinegar or lemon juice or created by natural fermentation process. The acidity or salinity of the pickle solution gives it an environment in which microorganisms do not easily grow

Types of garlic pickles

1. Oil pickles

2. Fresh pack or quick processes pickle

3. Brained pickle/ fermented pickle

- **INGREDIENTS**

Garlic, salt, vinegar, sugar, spices, water, packaging containers

- **FLOW CHART OF GARLIC PICKLE**

RECEPTION

SELECTION

WASHING

PEELING

MIXING WITH SALT AND BRINE SOLUTION

ADDITION OF SPICES

ADDITION OF OPTIONAL INGREDIENTS

FILLING IN GLASS JARS

COVERING WITH OIL

FERMENTATION WITH MICROBES

STORAGE

- **MACHINERIES REQUIRED FOR GARLIC PICKLE**

PICKLE MAKING MACHINE

FULLY AUTOMATIC FILLING MACHINE FOR PICKLE

SEMI AUTOMATIC FILLING MACHINE FORPICKLE

2.1.5 GARLIC SALT

Garlic salt is prepared of a free flowing, uniformly blended dry mixture of non-iodized salt. It has greater culinary latent than powder and one tablespoon is equivalent to clove of fresh garlic. Ground garlic with salt (3 part salt and 1 part dried garlic powder by volume, or 6 parts salt and 1 part garlic powder by weight)

Simple method, but a high demanded product made from dehydrated garlic powder.

2.1.6 OIL OF GARLIC

Garlic oil is derived by steaming crushed garlic and capturing the resultant oil released. The yield of garlic oil is around 0.46-057 per cent on moisture free basis (quite expensive).The specific gravity and refractive index of garlic oil at 25°C is 1.091-1.098 and 1.5740-1.5820, respectively. (Sokhansanj and Jayas,1987). It is reddish brown over powdering liquid. One gram of oil is equivalent in flavouring terms to 900 g fresh or 200 g dehydrated garlic powder. The high pungency of garlic oil makes difficult to use it. The oil is commonly used in vegetable oil.

- **MACHINES FOR GARLIC PROCESSING**

The simple and low cost Garlic processing machines and technologies for processing developed by Department of Processing and Food Engineering, CTAE, MPUAT,Udaipur are: –

Garlic Grader

Garlic bulb breaker

Garlic clove flaker

Dry Garlic peel remover (de-skinner)

Fresh Garlic clove peeler

- **ADVANCED DRYERS FOR THE DEHYDRATION PRACTICES**

Cabinet dryers, solar dryers, Vacuum dryers

- **PROCESSED PRODUCTS DEVELOPED BY CENTRAL FOOD TECHNOLOGY RESEARCH INSTITUTE ARE: –**

Odourless garlic powder, Garlic paste, Garlic crush, Garlic oil Oleoresin Other processed products.

2. 2 PACKAGING MACHINERY

2.2.1 DEHYDRATING MACHINES

2.2.2 PICKLE FILLING MACHINE

2.2.3 DEHYDRATED PRODUCTS

Semi-Automatic Filling Machine Fully Automatic Filling Machin**e**

CHAPTER 3

FSSAI STANDARDS

3.1 ABOUT FSSAI

- Food Safety and Standards Authority of India (FSSAI).
- Autonomous body established under the Ministry of Health & Family Welfare, Government of India.
- The FSSAI has been established under the Food Safety and Standards Act, 2006

3.2 FSSAI STANDARDS FOR SPICES

In respect of **spices**, there are specifications for volatile content of the oil on dry basis, moisture, total ash on dry basis (bleached / unbleached in case of ginger), calcium content as CaO on dry basis in case of ginger, extraneous matter, acid insoluble ash, total starch (in case of turmeric), defectiveness, insect damage matter, and crude fibre.

- **REGULATION FOR SPICES**

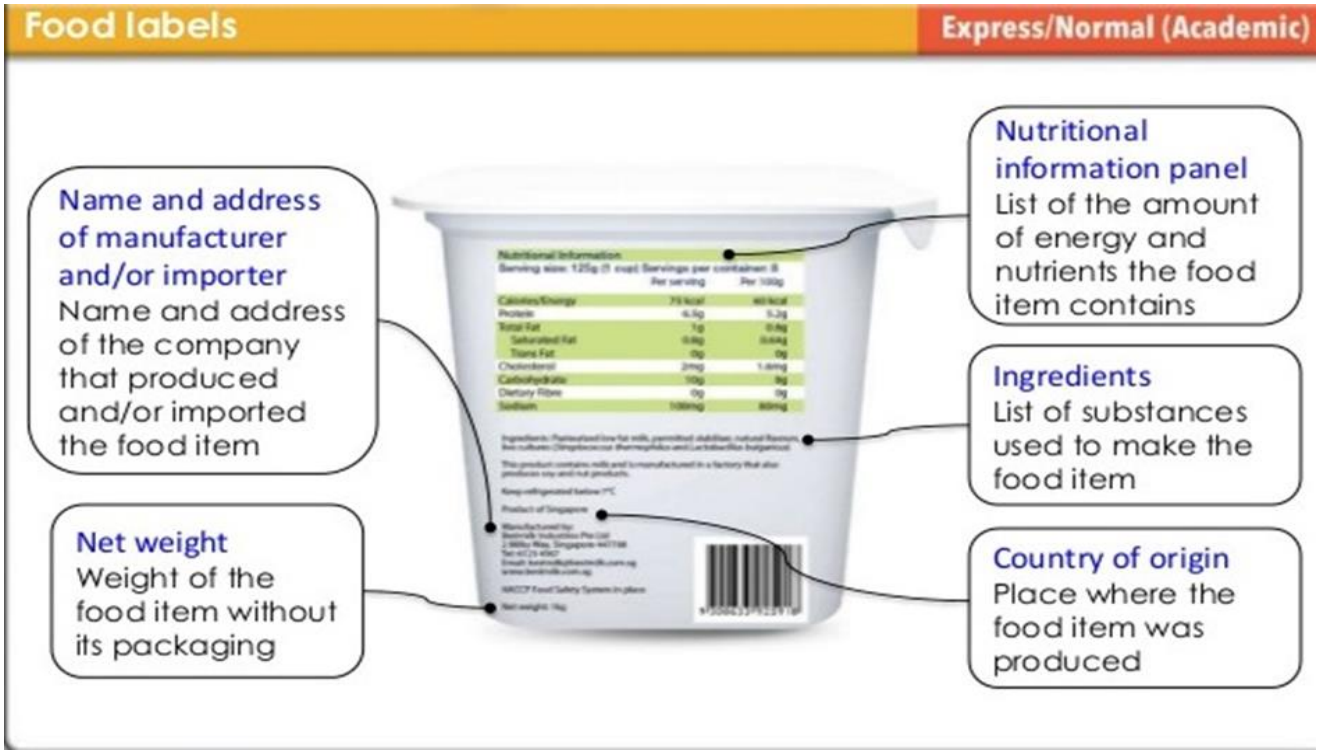
The following regulations are important for spices, tea, coffee, cocoa, etc.

(a) Quality Specifications for more than 40 products including the following are available in 3Food Safety and Standards *(Food Products Standards and Food Additives)* Regulations, 2011:

The FSSAI has notified the Food Safety and Standards (Food Products Standards and Food Additives) Second Amendment Regulations, 2019 related to revision of existing standards of coconut milk and coconut cream, standards for dried oregano (whole and powder), pimento (Allspice) (whole and powder), formulation of laurel (Bay Leaf) (Whole and Powder), Dried Mint, Dried Rosemary. These regulations shall come into force on the date of their publication in the Official Gazette. Food Business Operators will have to comply with all the provisions of these regulations by 1st July 2020.

- Extraneous matter – not more than 0.5%
- Moisture - In case of powdered garlic- not more than 5.0% by weight
  Other than powdered garlic - not more than 8.0% by weight
- Total ash on a dry basis- not more than 5.0% by weight
- Ash insoluble in dilute HCL- not more than 0.5% by weight
- Cold water soluble extract on a dry basis- not less than 70% and more than 90%

- Volatile organic sulphur compound on dry basis- not less than 0.3% by weight.
- Peroxidase test – negative.



CHAPTER 4

GARLIC PACKAGING

4.1 BULK PACKAGING-IMPORTANCE.

- Bags are flexible, collapsible and durable.
- Product wastage/spillage and tampering can be avoided.
- Since the handling is mechanized, less labour is required.
- Saving in time for loading and unloading.
- Bags are light in weight and, therefore, freight costs are reduced.
- Creates eco-friendly, pollution free working atmosphere.

4.2 GARLIC PACKAGING NET BAG

- Garlic is usually packed and transported in jute gunny bags and net bags
- The plastic based alternate packaging materials are used to overcome the contamination problems associated with jute.
- Eco friendly packaging materials like jute gunny bags, paper box etc can be utilized.

4.3 GLASS CONTAINERS

- Bottles/Jars are commonly used for dehydrated garlic, in brine, pickle etc
- The glass used for food packaging is soda-lime glass.
- Most bottles and jars are tailor-made specifically for one product or one manufacturer.
- Glass packaging materials are strong and corrosion resistant but costly.
- Glass bottles were found to be better containers for storing garlic pickle and dehydrated products.

- Eliminates the risk of potentially harmful chemicals found in some plastics that can leach into food.

4.4 PET BOTTLES

- PET bottles have obvious advantages over glass.
- Pet Bottles are unbreakable and light weight.
- More attractive.
- Better gas barriers and are still cost-effective.

4.5 FLEXIBLE PACKAGING

- The printed flexible pouches are generally laminates of various compositions.

✓ **Requirements for materials**

- Barrier property
- Good substrate bond & Heat seal property
- Lighter in weight and Economical.

✓ **Structures used in EO : 3 and 5 layer**

- LD - LLD-HMHDPE- LD
- LDPE/LLDPE/ Metallocene + Masterbatch- Tie layer - Nylon
- Barrier Layer - Tie Layer – LDPE/LLDPE / Metallocene. Laminate
- Pouches from 5 layer nylon barrier films.
- Prevent oil oxidation, seal strength

✓ **FLEXIBLE PACKAGING ISSUES:**

- Leakages in transportation Losses

- ‘Printing ink dissolves in oil’.
- More Shelf space,
- Difficult to display
- Rodent problem in rural areas
- Spillage while refilling: wastage
- Recyclability

4.6 COMPOSITE CONTAINERS

- Used for packaging of garlic paste.
- Side wall is PE coated foil laminated spirally wound paper.
- The top and bottom ends of the container may be made from metal or plastic.
- The inner face is coated with plastic film or a combination of film and aluminum foil- optimum barrier properties against moisture and oxygen

4.7 KRAFT PACKAGING

- Very popular material in food packaging.
- Made by sulphate pulping process.
- Poly amide or polyamine resin is used to coat or laminate to improve barrier properties.
- Good strength, printability and appearance.
- Low cost, wide availability and low weight.

✓ **DETERIORATIVE FACTORS OF DEHYDRATED GARLIC PRODUCTS**

- Losing crispness
- Tendency to get rancid
- Chances of mould growth on prolonged exposure to moisture.

- ✓ **DETERIORATIVE FACTORS OF GARLIC PICKLE**

- Low salt concentration
- Low acidity, lactic acid bacteria quickly than other microbes, and may spoil easily.

4.8 SUITABLE CONTAINER FOR GARLIC PICKLE

4.8.1 GLASS CONTAINERS

- Odorless and chemically inert with all food products.
- Maintains product freshness for a long period of time.
- Rigidity - good insulation, novel designs are possible.
- Benefits the environment as it is reusable and recyclable.

4.8.2 POUCHES

Different seal type are available

- Centre seal formation
- Three sides seal formation
- Four sides seal formation
- Strip pack formation

4.8.3 PET BOTTLES

Different shapes are available

- PET bottles have advantages over glass.
- Unbreakable and light weight but also more attractive.
- They have better gas barriers and are still cost-effective.
- BPA Free

4.8.4. FLEXIBLE PACKAGING

The printed flexible pouches are generally laminates of various compositions.

- Flexible thermoplastic films of multi-layer or monolayer construction, or their laminates with aluminum foil
- Provides a high resistance to the passage of oxygen, light and water vapour and to produce an effective heat seal.
- The air tight sealing can be done to retain the contents in a fresh condition.

CHAPTER 5

OPPORTUNITIES FOR MICRO/UNORGANIZED ENTERPRISES

5.1. PM-FME SCHEME

Ministry of Food Processing Industries (MoFPI), in partnership with the States, has launched an all India centrally sponsored "PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME Scheme)" for providing financial, technical and business support for up-gradation of existing micro food processing enterprises. The objectives of the scheme are :

I. Support for capital investment for up-gradation and formalization with registration for GST, FSSAI hygiene standards and Udyog Aadhar;

II. Capacity building through skill training, imparting technical knowledge on food safety, standards & hygiene and quality improvement;

III. Hand holding support for preparation of DPR, availing bank loan and up-gradation;

IV. Support to Farmer Producer Organizations (FPOs), Self Help Groups (SHGs), and producers cooperatives for capital investment, common infrastructure and support branding and marketing.