



PM Formalisation of Micro Food Processing Enterprises Scheme

Processing of Kair Sangri Pickle



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CHAPTER 1

INTRODUCTION

1.1 About

Kair (*Capparis decidua*) is one of the important multipurpose woody species of desert and arid regions of the Indian subcontinent, Africa and Saudi Arabia. Found in several states, is locally referred as Kair in Rajasthan, Karil in Uttar Pradesh, Ker in Gujarat, Teent in Haryana, Della in Delhi and Punjab and Nepti in western Maharashtra. Its natural habitat is pediment plains all over the dry regions.



It is an important constituent of desert ecosystems and plays a significant role in the rural economy of peoples of the northwest arid regions of the Indian sub-continent. The natives of the Thar Desert recognized the importance of this shrub long ago.

Kair usually grows in dry, exposed habitats such as foothills and wastelands. It grows in very shallow soils, soils affected by saline irrigation water, or in stabilized sand dunes. It is an extremely hardy species and provides vegetative cover in hot sandy desert areas where little else grows. Besides many socioeconomic and ecological benefits, all parts of this plant have a number of medicinal properties. The plant is traditionally used to cure toothache, arthritis, asthma, cough, inflammation, intermittent fevers, malaria, rheumatism, and swelling. It is also believed to possess laxative, astringent and vermi fuge properties. The alcoholic extract of fruit pulp and root bark is claimed to have anthelmintic activity. The fruits and the seeds are used to cure cholera, dysentery and urinary purulent discharges and have diuretic and antidiabetic properties. The spicy taste fruits serve as an astringent for bowels, a remedy for bad breath and is claimed to cure cardiac troubles. The green immature fruits are considered antihelminthic and laxative and are employed in the treatment of asthma, constipation, coughs, hysteria and other psychological problems. The blanched fruit is used as a vegetable. Green berries are used in food preparations such as pickles. The seeds oil is edible when processed and also used to cure skin diseases.

Occurrence and distribution of kair:

It is of a common occurrence in dry places in Sind, Baluchistan, Western Rajputana, Deccan Peninsula, Egypt, Socotra, Arabia, Tropical Africa, Central India, Punjab, Gujarat, Tinnevely and Pakistan. On most occasions *C. decidua* is found to be growing with

Zizyphus mauritiana. *C. decidua* or Kair is an indigenous medicinal plant of India having large biodiversity in different north-western states of India. The plant usually grows in dry, exposed habitat, often on foothills, in wastelands. It is found in the deserts, especially of Rajputana, Punjab and Sind, southwards to Karnataka and Tamil Nadu, growing wild in Western Ghats, Rajasthan and Gujarat. As an estimate, *C. decidua* is distributed over 3 450 km² plains in Nagaur, Bikaner and Jodhpur districts of Rajasthan with an estimated annual production of 7000 tonnes of fruits. It can be found at the altitude range from 300-1200m with mean annual rainfall of 100-750mm and mean annual temperature of 25-41°C. It has been found to be one of the best species for afforestation, reforestation and shelter belts to check the movement of sand in the Thar Desert, India. Plant area is day by day shrinking to some isolated patches in the Thar Desert of Rajasthan. Quick conservation of biodiversity is urgently required to protect important plant species like *C. decidua*. It is extremely drought resistant and tolerates some frost, resulting in an interesting plant because of its excellent adaptation to arid conditions. It can also tolerate fire and termites.

Traditional Uses: Plant has its wider utility in traditional folk medicine and is used as ailments to relieve variety of pains or aches such as toothache, cough and asthma heal. All studies indicated that the plant have significant pharmacological activities like hypercholesterolemia, anti-inflammatory and analgesic, anti-diabetic, anti-microbial, anti-plaque, anti-hypertensive, anti-hermitic activities. The compositional studies indicated *C. decidua* seeds as rich sources of all three major food components, i.e., carbohydrates, lipids and proteins. The plant and its parts are widely used by traditional healers and tribal people for curing variety of ailments' folk medicine, mixture of equal quantity of fruit powder and sugar is prescribed in rheumatism. They are given in diarrhoea in cattle and goats. No systematic information is available for *C. decidua* nutritional value. Immediate domestication is necessary to preserve the species and put it to economic use.

Sangri: The unripe green pods of khejri, locally known as sangria or sangar. Sangri, which grow plentiful in Rajasthan. Khejri (*Prosopis cineraria*) is one of the most common tree species found in India especially in western Rajasthan, It plays a



vital role in preserving the ecosystem of arid and semi-arid areas, mainly in the Thar Desert. It is locally known as khejri, jant, jand, vanni, sami, sumari. Its trade name is kandi. Its grow in arid region of India mainly Rajasthan, Haryana, Gujarat, western Uttar Pradesh and drier

part of Deccan. The tree is frost and drought resistant and tolerates extreme temperature ranging from 40–45°C in summer to less than 10°C in winter. It is capable of growing in areas of rainfall ranging from 100–600 mm. The tree can withstand the hottest winds, the driest season and stay alive where other plants cannot survive.

Sangri used as a vegetable in fresh and dried form and ripe pods (khokha) are utilized for fresh consumption and for the flour preparation. Fresh sangris are plucked, dried carefully and stored for usage round the year by local population. Sangri pods grow on the khejri tree, which is a thorny evergreen that grows to around 5 meters in height. The slender pods are green when unripe, and turn a chocolate brown upon maturing. Each pod measures from 8 centimetres to 25 centimetres in length. The pods contain as many as 25 oval-shaped seeds embedded in a sweet, dry, yellow pulp. Sangri pods offer an earthy, nutty flavour that has spice-like notes of cinnamon and mocha.

Sangri pods, also known as “desert beans”, are used as a vegetable, and are particularly prized for their unique taste and nutritional benefits. Sangria is small moderate sized evergreen thorny tree, with slender branches armed with conical, thorns and with light bluish green foliage. Sangri are used in curries, pickles and chutneys.

Traditional uses: It has been used for centuries as a human diet in the Rajasthan region. The dry pods of the Prosopis are known as “Marwari Mewa”. It reduces the craving of water in the summer due to this it is sometimes used by the farmers in lean periods. Pods of the Prosopis increase milk production in milch animals. It is a very useful tree and famous especially in the desert areas due to its spreadability and importance. It is also known as the “Golden tree” or “Wonder tree” of the desert. *Prosopis cineraria* stem bark is useful in the treatment of Rheumatism, Cough, Common cold, Anthelmintic disorder, dysentery, Bronchitis, Asthma, Leucoderma, piles, and Tremors of the muscles. The Prosopis cineraria play an important role in the socio-economic development of the farmers. The wood of the Prosopis is the main part of the tree that has economic importance it is used for fuel, firewood, and charcoal. Flowers of the Prosopis are used for skin disease, as a blood purifier and producing a cooling effect. Prosopis provides a safeguard in pregnancy by preventing miscarriage in pregnancy. Dry pods of the Prosopis is known as sangria and it is the main part of some Rajasthani dishes and also have a broader range of pharmaceutical application like in pain, High cholesterol level, Diabetes, Anaemia, Kidney & Liver disorders. The leaf of the tree is known as loom and they have high nutrient content like carbohydrates, Protein, Fat, Minerals, and Vitamins. The Leaf of the Prosopis is used in mouth ulcer and eye trouble, the

leaf *Prosopis* have Antibacterial, Antihyperglycemic, Antihyperlipidemic, and Antioxidant Activity.

1.2 World Scenario

Sangri is found in the desert regions of India, Afghanistan, Iran, Pakistan and Africa. It is mainly found in the Thar Desert of Rajasthan in India, where it is said to have originated. Because Sangri grows abundantly where other plants cannot, even flourishing on sand dunes, it is a plant product that is highly prized in the dry, arid regions where it is found. Sangri is used by nomadic people of the desert, as well as by villagers. Sangri was supposedly first used as a food source when famine-struck villagers of Rajasthan had nothing to eat. In the Rajputana famine of 1868 to 1869 in India the people of Rajasthan depended on everything from the bark of the khejri tree, to the carbohydrate and protein-rich Sangri pods, for sustenance.

1.3 Kair Sangri production in India

Khejri (*Prosopis cineraria*) is a common tree species in India, especially in western Rajasthan, where it plays an important role in preserving the ecosystem of arid and semi-arid regions, particularly in the Thar Desert. The tree is frost and drought tolerant, and it can withstand temperatures ranging from 40–45 degrees Celsius in the summer to less than 10 degrees Celsius in the winter. The tree can withstand the hottest winds, the driest season and stay alive where other plants cannot survive.

1.4 Health Benefits of Kair Sangri

- Sangria pods are very nutritious and contain enormous medicinal properties.
- The khejri tree is called as kalptru since the different plant parts have been utilized for medicinal purpose in one form or another.
- This tree is also adorned with the abortifacient and laxative properties. Stem bark may be used for treating respiratory and gastrointestinal ailments.
- Fresh leaves of the plant are crushed to make a paste and used to treat blister, boils and mouth ulcer in case of animals.
- As the root part is used as ant dysenteric and the smoke of leaves is used to cure eye infections.
- Bark of the tree has proven useful to get rid of asthma, bronchitis, dysentery, leucoderma, leprosy, rheumatism, muscle tremors and piles.

- Blooming flower of the tree are blended with sugar and consumed to prevent miscarriage.
- Whereas twig and flowers parts work as anti-diabetic agent. This tree is bucket of nutraceutical component.
- Kair is also known for its medicinal qualities.
- The plant has a bad smell and taste.
- It is carminative, tonic, emmenagogue, aphrodisiac, alexipharmic, improves the appetite, good for rheumatism, lumbago, hiccough, cough and asthma.
- When pickled or cooked as vegetables, the immature fruits are used to cure stomach problems, especially constipation.
- Ker has been used in traditional medicine for centuries.
- Indian tribes have utilized fruits, roots, and bark to concoct various remedies.
- In Ayurveda, capers are hepatic stimulants and have been used for arteriosclerosis, as a diuretic, and as a kidney disinfectant.
- Fruits possess ant diabetic activity.
- The alcoholic extract of fruit pulp and root bark possesses antihelminthic activity.
- The extract of unripe fruits and shoots of *C. decidua* produced.

Nutritional Content

Sangria pods are very nutritious. The dry pods are comprised of 40-58% carbohydrates, 8-20% protein, 24-28% crude fibre, 3.2-4.1% fat, 5.4% ash content, 0.33% calcium and 0.44% phosphorus.

Kair is an also very important nutritional and medicinal plant. The mature fruits, meanwhile, are consumed fresh. The fruits are rich in protein (8.6%) and vitamin C (7.8 mg/100 g of pulp by weight). The amount of sugar varies from 1.7 percent to 3.0 percent. The seeds contain 20.3 percent oil.

1.5. Kair- Sangri Pickle

People pluck the sangria from trees during the season and follow the conventional drying process by drying the sangria in sunlight and store at home for the latter consumption. The adequate techniques of drying pickle making, and powder



making should be established. Dried fruits and vegetables possess least moisture content;

hence can be stored for prolonged duration. Ker Sangri pickles are a very unique and popular pickle from Rajasthani cuisine. It is a flavourful dry mix of Ker and Sangri pickled in Indian spices. Ker is a small sour shrub berry having appearance of small balls. And Sangri are long green beans which resemble a thin stick and are pods of the Khejri tree. These unique varieties of berries and beans grow only in arid deserts of Rajasthan. Ker berries are quite sour and unfit for eating. They need to be soaked in buttermilk or salt water to reduce their sourness. They are then dried in sun after washing. Similarly Sangri beans are dried after boiling and can be used for a long period. You can purchase pre-processed Ker and Sangri from the market which can be directly used to make the pickle. Otherwise you can process them yourself, by soaking them in buttermilk for around 3 days. The detailed instructions for this are given in the recipe. Ker Sangri Achar is many times found in Rajasthani/ Marwari wedding menu list. It is part of Rajasthani folklore that Ker Sangri originated during a famine as people were faced with food shortage and they invented this method to eat this shrub berries and beans which otherwise were very sour and unfit for consumption. Ker Sangri Pickle is quite spicy and tangy. It goes very well on the side of any Indian curry & bread or rice and is a hugely popular delicacy in Rajasthan.

CHAPTER 2

PROCESSING OF KAIR SANGRI PICKLE

Processing kair sangri provides an economical way to store and transport from regions of production to distant markets as well as utilization of this product through the year. Processing allows small and medium sized businesses to create jobs in growing, processing, marketing and to contribute to the economic growth of a region.

2.1 Ingredient Composition (100 gram)

- 400 gm Ker
- 400 gm Sangri
- 500ml Buttermilk (Chaas)
- 20g Powdered Rai (Black Mustard Seeds)
- 20g Dana Methi (Whole Fenugreek Seeds)
- 50g Split Yellow Mustard (Sarsonke Beej)
- 10g Saunf (Fennel Seeds)
- 10g Kalonji (Nigella Seeds)
- 30g Amchur (Dry Mango Powder)
- 10g Heeng (Asafoetida)
- 20 Haldi (Turmeric Powder)
- 50g Lal Mirch (Red Chilli Powder)
- 30g Salt
- 250ml Mustard Oil



fruit of sangri



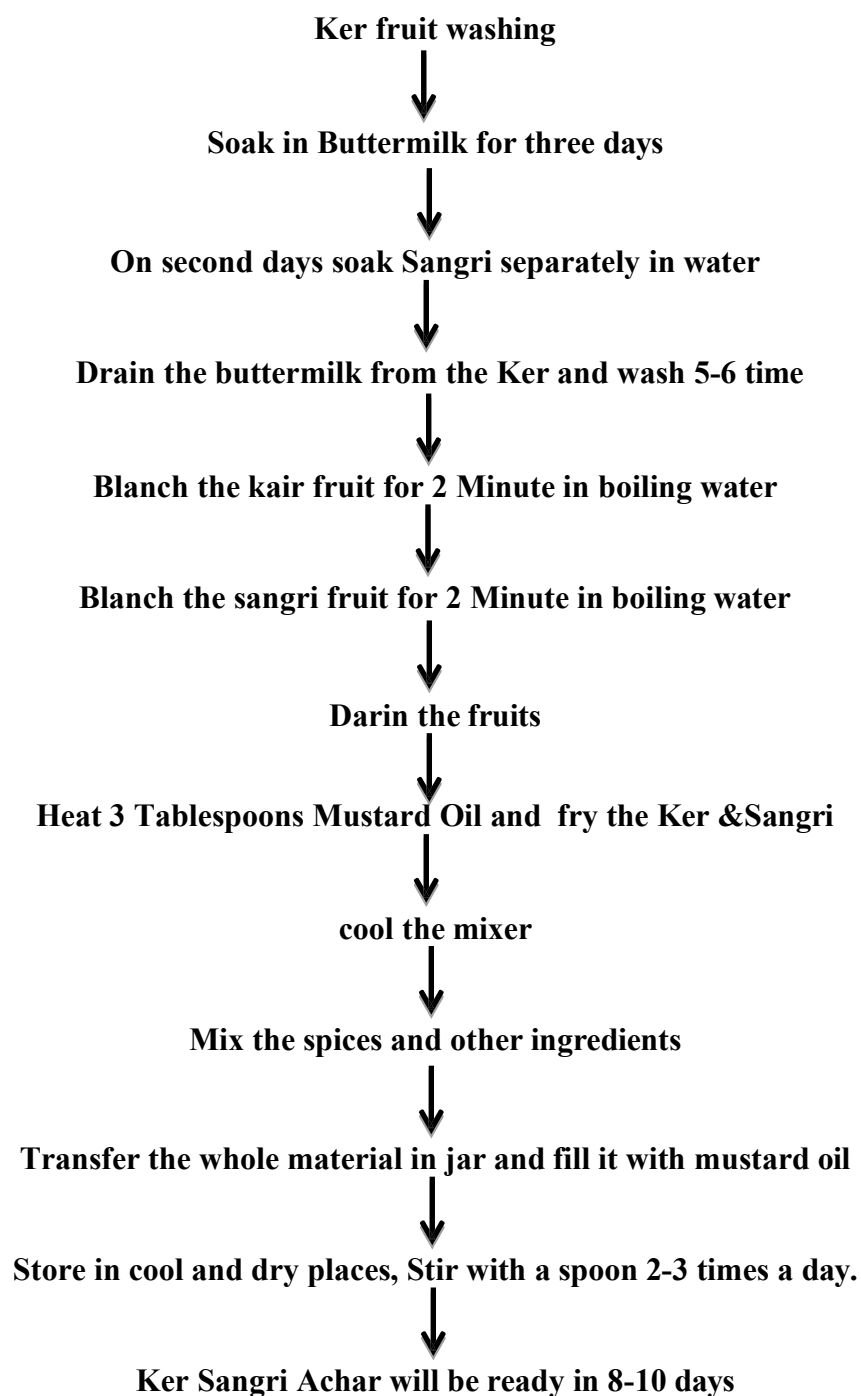
Fruit of Kair

2.2 PROCESSING

The following processing technology are given below for kair - sangri Achar

1. Ker fruit washed and left to soak in Buttermilk for three days at room temperature. This helps in the removal of Ker's bitterness.
2. Instead of Buttermilk, beaten curd mixed with 1 cup of water and 2 teaspoons of salt can be used.
3. Starting on the second night, soak Sangri separately in water overnight.
4. Drain the buttermilk or curd mixture from the Ker and wash it 5-6 times with water to process it.
5. Then add Ker to boiling water and boil for 2 minutes. Then cover with a lid and let it blanch for 5 minutes.
6. Drain the water from Sangri as well, and boil it separately in new water for 2 minutes. Again leave it covered with a lid for 5 minutes.
7. Drain the water from both Ker & Sangri. Spread them out on a clean cloth or paper and let them dry completely.
8. Heat 3 Tablespoons Mustard Oil in a pan and fry the Ker & Sangri in it.
9. Let the mixture cool down fully.
10. Now grind the whole spices i.e. Rai (Black Mustard Seeds), Dana Methi (Whole Fenugreek Seeds), Split Yellow Mustard (Sarsonke Beej), Saunf (Fennel Seeds), and Kalonji (Nigella Seeds). Add these to the Ker & Sangri.
11. Also add Amchur (Dry Mango Powder), Haldi (Turmeric Powder), Red Chilli Powder, Salt, and Heeng (Asafoetida) to the mixture.
12. Mix all the ingredients well and transfer the mixture to a jar.
13. Add the remaining Mustard Oil to the jar. Make sure not to overfill, and leave some space at the top.
14. Store the pickle at room temperature. Stir with a spoon 2-3 times a day.
15. Ker Sangri achar will be ready in 8-10 days. Store it at room temperature and serve it along with any Indian meal.

2.3 FLOW CHART OF KER-SANGRI ACHAR PROCESSING



2.4 EQUIPMENTS AND MACHINERY USED

Spice grinder- A spice grinder is a tool used to grind up hard, dried whole spices. There are a few types of spice grinders which are dedicated to one spice alone, such as pepper mills, and nutmeg graters.



Trolley- A trolley is traditionally used to transport or move the no. of pickle jars.



Stainless Steel tanks: These tanks are used for soaking the fruits in buttermilk or in water.



Blancher machine: This machine is required to blanch the fruit of kair and sangria.



Electric cooking kettle: This machine is used for frying and mixing the ingredient in the pickles.



Stainless Steel Knife- Larger chef's knives are used for cutting meat, dicing vegetables, disjointing some cuts, slicing herbs, and chopping nuts.



CHAPTER 3

PACKAGING

3.1 Characteristics of Pickles

Pickling of plant and animal foods is a relatively old method of food preservation. It is estimated that the first pickles were produced over 4,000 years ago using cucumbers native to India. The ancient Egyptians and Greeks both have written about the use of pickles for their nutritive value and healing power. Pickles were a common food during the time of the Roman Empire and they soon spread throughout Europe. While there are many different types of pickles, some characteristics are common to all. In general, pickled cucumbers are crisp vegetables, which can be described as having a strong, biting flavor caused by the vinegar in which they are stored. Different pickle manufacturers normally add spices to give their pickles a unique flavor.

3.1.1. The factors that lead to spoilage of the pickles are highlighted as below:

In the absence of oxygen, radiolysis of lipids leads to cleavage of the interatomic bonds in the fat molecules, producing compounds such as carbon dioxide, alkanes, alkenes, and aldehydes. In addition, lipids are highly vulnerable to oxidation by free radicals, a process that yields peroxides, carbonyl compounds, alcohols, and lactones. The consequent rancidity, resulting from the irradiation of high-fat foods, is highly destructive to their sensory quality. To minimize such harmful effects, fatty foods must be vacuum-packaged and held at subfreezing temperatures during irradiation.

Proteins are not significantly degraded at the low doses of radiation employed in the food industry. For this reason, irradiation does not inactivate enzymes involved in food spoilage, as most enzymes survive doses of up to 10 kilograys. On the other hand, the large carbohydrate molecules that provide structure to foods are depolymerized (broken down) by irradiation.

This de-polymerization reduces the gelling power of the long chains of structural carbohydrates. However, in most foods some protection against these deleterious effects is provided by other food constituents. Vitamins A, E, and B1 (thiamine) are also sensitive to irradiation. The nutritional losses of a food product are high if air is not excluded during irradiation.

3.1.2. Selection of Packaging Material

In the absence of oxygen, radiolysis of lipids leads to cleavage of the interatomic bonds in the fat molecules, producing compounds such as carbon dioxide, alkanes, alkenes, and aldehydes. In addition, lipids are highly vulnerable to oxidation by free radicals, a process that yields peroxides, carbonyl compounds, alcohols, and lactones. The consequent rancidity, resulting from the irradiation of high-fat foods, is highly destructive to their sensory quality. To minimize such harmful effects, fatty foods must be vacuum-packaged and held at subfreezing temperatures during irradiation.

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3.1.3. Water Vapour Transmission Rate (WVTR)

Knowledge of WVTR of packaging materials and the effect of folding, creasing, crumpling of materials on papers and aluminium foil show considerable effect. However, thermoplastic materials are not much affected.

Effect of Folding and Crumpling on the WVTR of Pickle

	WVTR, g/m ² , 24 hr. 38°C & 90% RH.			
	Flat	Folded	Crumpled	Gelboflex
Met PET (12μ)	0.9	1.7	3.4	18
Met PET / LDPE (50μ)	0.5	0.6	0.7	0.6
2-sides PVDC coated PET	4.2	3.7	5.9	4.8
2-sides PVDC coated PET/LDPE	2.9	3.6	3.3	3.1

3.1.4. Gas Transmission Rate

Permeability to gases like oxygen decides the shelf-life of oxygen sensitive eatable items. The oxygen transmission rates (OTR) of some plastic materials and the effect of folding and crumpling.

Effect of Folding and Crumpling on the OTR

	Oxygen transmission rate, ml /m ² , 24 hr. Atm. at 25°C.			
	Flat	Folded	Crumpled	Gelboflex
Met PET (12μ)	< 1	5.5	16	59
Met PET / LDPE (50μ)	< 1	< 1	2	3.5
2-sides PVDC coated PET	6	6	8	7
2-sides PVDC coated PET/LDPE	7	7	9	11

Besides OTR, permeability to volatiles and flavours is important in pickles packaging. Polyolefin have high values, whereas plastics such as polyester, nylons, ethylene vinyl alcohol (EVOH) have good barrier properties for transmission of volatiles.

Odour Transmission of Packaging Materials

Packaging Material	Thickness (μ)	Days to Aroma Leakage			
		Vanillin	Menthol	Piperonal	Camphor
BOPP / PE	17/50	6	2	1	13
PET / PE	12/50	2	16	5	< 30
PET / EVOH	12/15	< 30	< 30	30	< 30
OPP / EVOH / PE	18/15/50	30	< 30	27	< 30
PET / EVOH / PE	12/15/50	15	25	27	< 30

3.1.5. Tensile Strength & Elongation

Tensile Strength and Elongation properties of materials need to be studied as their running on high-speed machines should be suitable.

3.1.6. Tear Strength

For a fruit processed product, tear strength is of importance as low tear values are necessary and useful for opening packages by hands.

3.1.7. Heat Seal Strength

The performance of a finished package is determined by the effectiveness of the package seal i.e. the permeability to water vapor, gases and volatiles increase if the seal is not perfect. Thermoplastic films such as polyethylene give excellent heat seals.

3.1.8. Performance Properties

Apart from the above mentioned important properties, a material has to perform well on machines, therefore knowledge of physical properties like slip, stiffness, blocking resistance is also necessary. Twist retention for twist wrap is also of importance. The initial function of packaging is to protect. However, the emotional role played by packaging is also of importance, especially when the confection is a gift. A sophisticated packaging using deluxe materials is often used as a way of expressing feelings. Packaging must also be specialized for specific target groups. A different pack size is required for quick impulse buys at petrol stations and roadside shops than for the super markets selling predominantly family sized packs.

3.2 Packaging Materials used for Pickles packaging

A very high quantum of polymeric materials, glass jars, besides cellulosic and Aluminium foils are used for packaging items. Paper board and metal containers are also used for certain applications. Although a variety of packaging materials are available, the ultimate choice of the wrapper depends upon the required shelf-life, performance on the wrapping machine and the cost which is purely based on the segment of the market targeted by the manufacturer. The most common choice of packaging medium is plastic (generally flexible) as it provides the required protection and preservation, grease resistance, physical strength, machinability and printability. Plastics being lighter in weight are, therefore, the most preferred material for packaging of Pickles.

There are many changing trends in the packaging of Pickles. Plastic films and their laminates are increasingly replacing waxed papers due to better properties and aluminium foil laminates due to price and better flex crack property. Depending on the type of package i.e. twist wrap,

pillow pack and vertical flow pack or roll pack, the plastic based packaging films used for Pickles are listed below.

Polyethylene (PE): It is considered to be the backbone of packaging films. Since one of the greatest threats to the integrity of Pickles comes from moisture, polyethylene with its low water vapour transmission is of definite interest. Polyethylene films are fairly free of plasticizers and other additives and are quite extensively used as a part of lamination. Its ability to heat seal increases its value.

Low Density Polyethylene (LDPE) is an economical material with low WVTR, however, it has high permeabilities to flavours/volatiles, poor grease resistance and are limp. High-density polyethylene (HDPE) is stiffer, more translucent and has better barrier properties but needs higher temperature for sealing.

Later additions include high molecular weight high-density polyethylene (HM HDPE) and linear low-density polyethylene (LLDPE). HM HDPE is a paper like film with high physical strength and barrier properties, but is less transparent than ordinary polyethylene. HM HDPE is available in twist-wrap grades. Polyethylene films are also suitable for making bags and pouches. A copolymer of polyethylene and poly vinyl alcohol, and EVOH has outstanding gas barrier properties especially when dry.

Polypropylene: Polypropylene films are undergoing a growth trend in the Pickle industry. They have better clarity than polyethylene and enjoy superior machine ability due to stiffness. Lack of good seal ability has been a problem; however, PVDC and vinyl coating have been used to overcome this problem. Some varieties of PP have been specially developed for twist-wrap applications as they have the ability to lock in position after twisting. Pearllised polypropylene with an opal finish and attractive gloss is also used.

Poly Vinyl Chloride (PVC): PVC is a stiff and clear film having low gas transmission rate. PVC can be used as small wraps, bags and pouches. PVC when co-polymerised with polyvinylidene chloride is known as Saran. Since it is a costly material, it is only used as a coating to obtain barrier properties and heat sealability. PVC film is also used for twist wraps, as it has twist retention properties and is excellent on high-speed machines.

Polyesters (PET) and Polyamide (PA): Polyethylene terephthalate film has high tensile strength, gloss and stiffness as well as puncture resistance. It has moderate WVTR, but is a

good barrier to volatiles and gases. To provide heat seal property, PET is normally laminated to other substrates. Nylons or polyamides are similar to PET, but have high WVTR.

Glasses: Pickles should be stored in glass and not plastic containers as they have high salt and acid content and thus will react with the plastic. Such eatables should be kept in glass containers to avoid any chemical reaction. Glass jars have wide mouths and hence the processes of filling and emptying the jar contents are easy. These glass jars have plastic or metal band lids which are very to open and close. Also they are air tight which helps in preserving the pickle for a longer time. These lids are easy to clean and hence prevent any possible contamination.

Metallised Films: When polymeric films are metallised there is an improvement in their barrier properties. Metallisation is also used for decorative purposes and aesthetics. The films, which are used for metallisation are PVC, PET, PP and polyamides. To safeguard the interest of the consumer the Standards of Weights & Measures (Packaged Commodities) Rules, have imposed a limit on the weight of the wrapper. Under this, it is essential that in the case of twist wrap and pillow wrap candies, where the weight of the individual pieces is less than 10 grams, the size of the wrapper and the type of wrapping material selected is such that it meets the limit on weight of wrapper, under the above rules.

3.2.1 Types of Packages

- **Pillow Bags and Pouches-**Another common type of packaging is a pillow pouch or bag. The bags get their name from their shape, which resembles a pillow. They are found lying flat on grocery store shelves.
- **Re-closable Zipper Bags and Pouches-** Re-closable bags and pouches are essential for Pickle products because they give customer convenient access to their goodies while preserving freshness. Zipper closures let customers use portion control or take their Pickle on the go.
- **Flexible Pouches-**Flexible pouches are a great option for holding processed pickle and other Fruits. They can be manufactured with zipper-seal closures, which help keep the interior contents fresh for use. Flexible pouches offer amazing printing

capabilities, so you can add your attractive product branding to the pouch itself. Many pouches stand up on their own, which helps you improve your shelf appearance.

- **Earthen Pots**-Clay pot's porous nature lets both moisture & heat to circulate through the food those results in slow yet aromatic dish. Earthen pots also retain the nutrition of the food that is usually lost in other types of utensils. The thermal inertia in earthen pots keeps the meat tender and soft for long.
- **Glass Jars**- Using a pickle glass jar has its advantages and health benefits. Pickle glass jars have been a popular choice over the years and are found in different colours and styles. This is a huge advantage when it comes to storing pickles. Glass is a non-porous which resists dirt and hence is easily cleaned. Pickles remain fresh longer in the glass jars than if you store them in plastic or metal jars. Glass is inert hence you will not ingest chemicals unlike when you store these pickles in plastic or metal jars or bottles.

3.3. Quality considerations during packing

Quality control of packed products is the last time the item is checked before reaching the customer. Documented checking of the packages entails:

- Weight of the package;
- Weight of the pickle;
- Presence of adequate amount of oil/vinegar.
- Uniformity of the Pickle;
- Damage to the Pickle;
- Defects; and
- Moisture content.

The surrounding area is also checked:

- Cleanliness of the conveyer belts;
- Calibration of the scales (automatic or manual);
- Writing on the packages;
- Satisfactory working of the metal detector (installed on every retail packing line);

- Repackaging installations and marking; and
- Qualification for international standards such as ISO and HACCP

3.4 Future Trends

Pickles are in their own category of mouth-puckering: Pickle juice is sour, but not in the same way that, say, blue raspberry flavouring is sour. It's sour in the way that vinegar is sour. And just thinking about pickle juice (whether you're a pickle lover or hater) is enough to induce that familiar saliva-producing mouth feel. Pickles and pickle products vary as per local taste and preferences and thus, many international, as well as regional players, are succeeding in this market by catering to the personalized needs of the citizens of a country. Large varieties, flavors, and major ingredients make this a huge market. Vegetable pickles are prepared using one among these main methods: lactic acid fermentation of vegetables, and with or without the addition of salt for the preservation of vegetables in vinegar. Vegetables, such as cucumber, cabbage, olive and onion are fermented by lactic acid bacteria which can grow in low concentrations of salt. Vegetables pickled in acetic acid (vinegar) would include addition of salt and sugar. As they do not ferment, they possess unique flavor and texture.

Also, vegetable pickles with claims, such as gluten-free, kosher, etc., are gaining more popularity among the global population. Hence key players are coming up with an extended product portfolio. Hotties Spicy Sriracha Pickle Chips were launched by Rick's Picks in March 2012. This shelf-stable product is made with in-season vegetables from local farms and claims to be low in sodium, cholesterol-free, fat-free, and gluten-free. These pickles are perceived to be natural and healthy food as a side dish, especially in North American and European countries. The price variation of raw materials and ingredients added to the preparation of pickles is one among the restrains in the pickles market. Therefore, in developing countries, like India, people are preferring more home-made pickles or pickles prepared by unorganized pickle industry, as it includes pure ingredients and can be customized on the basis of ingredients and packaging.

CHAPTER 4

FOOD SAFETY REGULATIONS AND STANDARDS OF HANDMADE PICKLES

4.1 Standards: As per Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011, category 2.3.43 pickles mean the preparation made from fruits or vegetables or other edible plant material including mushrooms free from insect damage or fungal infection, singly or in combination preserved in salt, acid, sugar or any combination of the three. The pickle may contain onion, garlic, ginger, sugar, jaggery, edible vegetable oil, green or red chilies, spices, spice extracts/oil, lime juice, vinegar/acetic acid, citric acid, dry fruits, and nuts. It shall be free from copper, mineral acid, alum, and synthetic colors, and shall show no sign of fermentation.

SL. No.	Particular	
1.	Pickles in Citrus juice or Brine conforming to the following requirements:	
	Drained Weight	Not less than 60.0 per cent
	Sodium Chloride content when packed in Brine	Not less than 12.0
	Acidity as Citric Acid when packed In Citrus Juice	Not less than 12.0
2.	Pickles in Oil	
	Drained Weight	Not less than 60.0 %
	Fruit and Vegetable pieces shall be practically remaining submerged in oil	
3.	Pickles in Vinegar	
	Acidity of vinegar as acetic acid:	Not less than 2.0 %
	Drained Weight	Not less than 60.0 %
4.	Pickles may contain preservatives (single or in combination)	
	Benzoic acid and its sodium and potassium salt, or both (calculated as benzoic acid)	250 ppm maximum
	Sulphur dioxide	100 ppm maximum
	Pickles shall conform to the microbiological requirement as follows	
	Mould count Absent in 25 grams/ml	

Processed Pickles:

Includes all forms of processing other than peeling, cutting and surface treating Vegetables.

- Pickling is the process of preserving edible products in an acid solution, usually vinegar, or in salt solution (brine). In the latter case, the acid that does the preservative action (lactic acid mainly) is produced by fermentation.
- Most major vegetables can be preserved by pickling, either commercially or in households. Cucumbers, cabbage, and green olives account for the largest volume of vegetables and fruits commercially pickled in Western countries. Capers, garlic, onions, carrots, cauliflower, beans, and other vegetables are also pickled, albeit in lesser quantities.
- Pickling imparts unique characteristics to fruits and vegetables. Desirable changes in flavor, texture, and color take place in fermented, pasteurized, and refrigerated pickles, and are carefully monitored.
- Pickling is the process of soaking food in a solution containing salt, acid, or alcohol. It can be used with most foods, including fruits, vegetables, meats, seafood, and eggs.

4.2 Food Safety

General Hygienic and Sanitary practices to be followed by Petty Food Business Operators applying for Registration

Sanitary and Hygienic Requirements for Food Manufacturer/ Processor/Handler

The place where food is manufactured, processed or handled shall comply with the following requirements:

1. The premises shall be located in a sanitary place and free from filthy surroundings and shall maintain overall hygienic environment. All new units shall set up away from environmentally polluted areas.
2. The premises to conduct food business for manufacturing should have adequate space for manufacturing and storage to maintain overall hygienic environment.
3. The premises shall be clean, adequately lighted and ventilated and sufficient free space for movement.
4. Floors, Ceilings and walls must be maintained in a sound condition. They should be smooth and easy to clean with no flaking paint or plaster.
5. The floor and skirted walls shall be washed as per requirement with an effective disinfectant the premises shall be kept free from all insects. No spraying shall be done during the conduct of business, but instead fly swats/ flaps should be used to kill spray flies getting into the premises. Windows, doors and other openings shall be fitted with

net or screen, as appropriate to make the premise insect free The water used in the manufacturing shall be potable and if required chemical and bacteriological examination of the water shall be done at regular intervals at any recognized laboratory.

6. Continuous supply of potable water shall be ensured in the premises. In case of intermittent water supply, adequate storage arrangement for water used in food or washing shall be made.
7. Equipment and machinery when employed shall be of such design which will permit easy cleaning. Arrangements for cleaning of containers, tables, working parts of machinery, etc. shall be provided.
8. No vessel, container or other equipment, the use of which is likely to cause metallic contamination injurious to health shall be employed in the preparation, packing or storage of food. (Copper or brass vessels shall have proper lining).
9. All equipments shall be kept clean, washed, dried and stacked at the close of business to ensure freedom from growth of mould/ fungi and infestation.
10. All equipments shall be placed well away from the walls to allow proper inspection.
11. There should be efficient drainage system and there shall be adequate provisions for disposal of refuse.
12. The workers working in processing and preparation shall use clean aprons, hand gloves, and head wears.
13. Persons suffering from infectious diseases shall not be permitted to work. Any cuts or wounds shall remain covered at all time and the person should not be allowed to come in direct contact with food.
14. All food handlers shall keep their finger nails trimmed, clean and wash their hands with soap, or detergent and water before commencing work and every time after using toilet. Scratching of body parts, hair shall be avoided during food handling processes.
15. All food handlers should avoid wearing, false nails or other items or loose jewellery that might fall into food and also avoid touching their face or hair.
16. Eating, chewing, smoking, spitting and nose blowing shall be prohibited within the premises especially while handling food.
17. All articles that are stored or are intended for sale shall be fit for consumption and have proper cover to avoid contamination.
18. The vehicles used to transport foods must be maintained in good repair and kept clean.
19. Foods while in transport in packaged form or in containers shall maintain the required temperature.

20. Insecticides / disinfectants shall be kept and stored separately and away from food manufacturing / storing/ handling areas.

4.3 Labelling Standards: Labelling requirements for packaged food products as laid down in the Part VII of the Prevention of Food Adulteration (PFA) Rules, 1955, and the Standards of Weights and Measures (Packaged Commodities) Rules of 1977, require that the labels contain the following information:

1. Name, trade name or description
2. Name of ingredients used in the product in descending order of their composition by weight or volume
3. Name and complete address of manufacturer/packer, importer, country of origin of the imported food (if the food article is manufactured outside India, but packed in India)
4. Nutritional Information
5. Information Relating to Food Additives, Colors and Flavors
6. Instructions for Use
7. Veg or Non-Veg Symbol
8. Net weight, number or volume of contents
9. Distinctive batch, lot or code number
10. Month and year of manufacture and packaging
11. Month and year by which the product is best consumed
12. Maximum retail price

4.3.1 Wherever applicable, the product label also must contain the following

The purpose of irradiation and license number in case of irradiated food. Extraneous addition of coloring material. Non-vegetarian food – any food which contains whole or part of any animal including birds, fresh water or marine animals, eggs or product of any animal origin as an ingredient, not including milk or milk products – must have a symbol of a brown color-filled circle inside a brown square outline prominently displayed on the package, contrasting against the background on the display label in close proximity to the name or brand name of the food.

Vegetarian food must have a similar symbol of green color-filled circle inside a square with a green outline prominently displayed.

All declarations may be: Printed in English or Hindi on a label securely affixed to the package, or Made on an additional wrapper containing the imported package, or Printed on the package itself, or May be made on a card or tape affixed firmly to the package and bearing the required information prior to customs clearance.

Exporters should review the Chapter 2 of the “FSS (Packaging and Labelling) Regulation 2011” and the Compendium of Food Safety and Standards (Packaging and Labelling) Regulation before designing labels for products to be exported to India. FSSAI revised the labelling Regulation and a draft notification to that effect was published on April 11, 2018, inviting comments from WTO member countries and the comments received are under review and the publication date remains unknown.

According to the FSS Packaging and Labelling Regulation 2011, “prepackaged” or “pre packed food” including multi-piece packages, should carry mandatory information on the label.



Contact Us

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