PM Formalisation of

Micro Food Processing Enterprises Scheme

HANDBOOK OF
KIWI READY-TO-SERVE BEVERAGE PROCESSING

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CHAPTER 1

INTRODUCTION

1.1 ABOUT KIWI

Kiwifruit or **Chinese gooseberry** is the edible berry of several species of woody vines in the genus *Actinidia*. Also called kiwifruit, Chinese gooseberry, or *yang tao*, kiwi originated in northern China, where it was mostly eaten for medicinal purposes, the most common cultivar group of kiwifruits (*Actinidia deliciosa* 'Hayward') is oval, about the size of a large hen's egg: 5–8 centimetres (2–3 inches) in length and 4.5–5.5 cm (1 ¾–2 ¼ in) in diameter. It has a thin, fuzzy, fibrous, tart but edible light brown skin and light green or golden flesh with rows of tiny, black, edible seeds. The fruit has a soft texture with a sweet and unique flavour. In 2018, China produced half of the world total of kiwifruit. It wasn't until the early 20th century that kiwi spread from China to New Zealand and began being cultivated there. Kiwi is a relatively new fruit crop. New Zealand didn't start growing the crop commercially until the 1940s, and it wasn't introduced in the United States until the early 1960s.

In recent years, its production and consumption has increased (Izali et al., 2007). The kiwifruit is unique because of its high nutritional content, different flavours, vitamins, minerals, antioxidants, phytochemicals and fibres content. In terms of nutrient content, the kiwifruit is amongst the richest fruits: it is also very valuable in terms of health. It is usually consumed fresh but in recent years along with increased production, industrial use is increasing. It is used in the canned food industry, for marmalades, fruit sauces and candies and for fruit juice concentrates, either separately or mixed with strawberries or apples. The fruit is also canned, dried, frozen, and used for the preparation of nectars (Göksel and Atak 2016).

In India Kiwi fruit can be grown in warm and humid climatic conditions. Deep yellow brown loamy and well-drained and fertile soil is suitable for cultivation of kiwi. One thing of major importance is to provide shelter to protect from wind as wind can damage kiwi plant, its small flowers and immature fruits.

Varieties in India

1. Abbott: The oblong, medium sized, fruits are covered with dense hairs. They are very sweet in taste with lower ascorbic acid content and medium titratable acidity.

2. Allison: It is an early ripening, heavy bearer and sweet in taste. Ascorbic acid and titratable acidity are on the lower side. This variety is most suited for Himachal Pradesh.

3. Bruno: This cultivar requires comparatively less chilling period. The fruits are tapering in shape towards the stem end. The fruits are dark brown having very dense, short and bristly hair, highest in ascorbic acid and titratable acidity. The bearing is very heavy.

4 Monty: It is a late flowering cultivar but fruit maturity is not late. The fruit is somewhat wider towa1.rds blossom end with higher acidity and medium sugar content.

5. Hayward: Most popular cultivar or the world. It is superior in flavour with high sugar and ascorbic acid content. It requires comparatively more chilling hours.

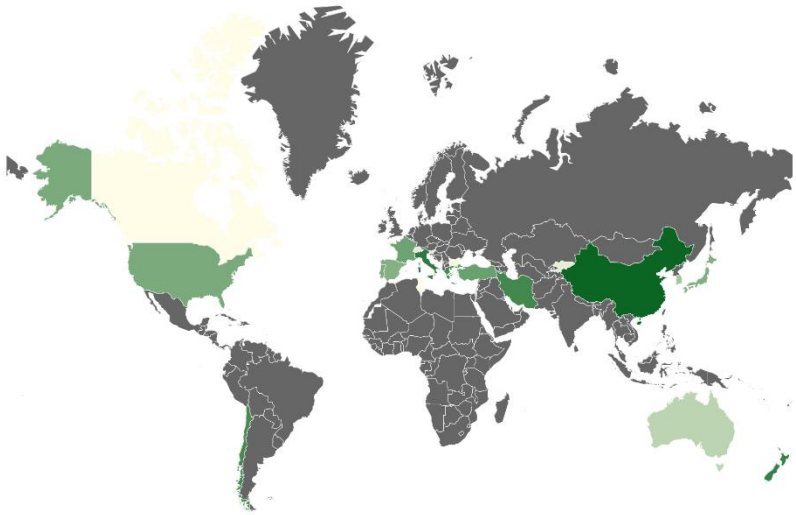
1.2 Production of Kiwi

World Scenario

China (2.1M tonnes) constituted the country with the largest volume of kiwi fruit production, accounting for 50% of total production. Moreover, kiwi fruit production in China exceeded the figures recorded by the world's second-largest producer, Italy (555K tonnes), fourfold. New Zealand (437K tonnes) ranked third in terms of total production with a 10% share. (World - Kiwi Fruits - Market Analysis, Forecast, Size, Trends and Insights Report.2020).

Country	Productions (Tonnes)
China	1,765,847
Italy	447,560
New Zealand	382, 337
Chile	255,758
Greece	162,800

(Source: World - Kiwi Fruits - Market Analysis, Forecast, Size, Trends and Insights Report 2020)



Countries Producing Kiwifruit

(Source: World - Kiwi Fruits - Market Analysis, Forecast, Size, Trends and Insights Report 2020)

Indian Scenario

Kiwi is among the very few recent introductions which have surpassed in popularity due to its tremendous commercial potential in the sub-Himalayan region of India. In fact, no other fruit has attracted so much attention in such a short period in history of commercial fruit production since 1960s. In India, kiwi was first planted in the Lal Bagh Gardens (1960) at Bangalore as an ornamental tree. Later on, for cultivation purpose at IARI, Regional Station, Phagli, Shimla

(H.P) -1963 from USA with extensive research and development support its commercial cultivation has been extended to the mid-hills of Himachal Pradesh, Uttarakhand, Jammu and Kashmir, Arunachal Pradesh, Sikkim, Meghalaya, and Nilgiri hills in India.

	2018-19		2019-20 (1st Advance Estimate)		2019-20 (2nd Advance Estimate)	
Kiwifruit	**Area** (in '000 Ha)	**Production** '000 MT	**Area** (in '000 Ha)	**Production** '000 MT	**Area** (in '000 Ha)	**Production** '000 MT
	5	**13**	**5**	**13**	**5**	**13**

(Source: National Horticulture Board)

1.3 Potential Health Benefits of Kiwi

1. **Can help treat asthma**
2. **Aids digestion**
3. **Boosts the immune system**
4. **Reduces risk of other health conditions**
5. **Can help manage blood pressure**
6. **Reduces blood clotting**
7. **Protects against vision loss**

Nutritional content

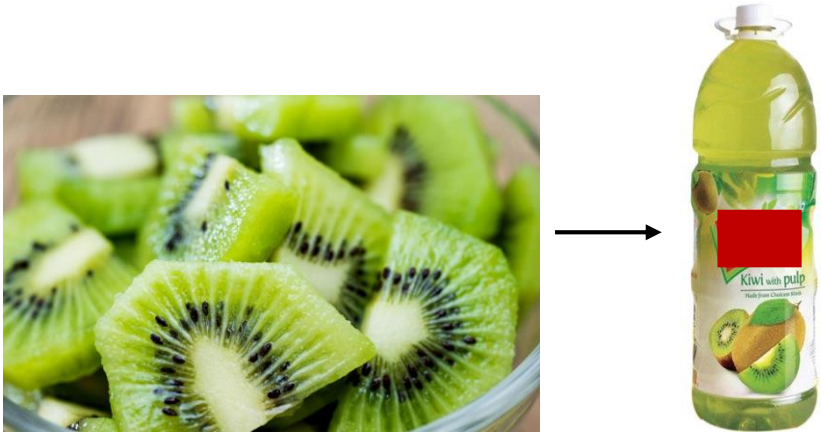
Sl. No.	Nutrient	Amount(/100g)
1.	Energy	61 kcal
2.	Protein	1.14 gm
3.	Fibre, total dietary	3 gm
4.	Carbohydrate	14.66 gm
5.	Total lipid (fat)	0.52 gm
6.	Sugars	8.99 gm

7.	Vitamin C, total ascorbic acid	92.7 mg
8.	Calcium	34 mg
9.	Magnesium	17 mg
10.	Potassium	314 mg

(Source: USDA Nutritional data 2017)

1.4 Kiwi Ready-To-Serve Beverage

Demand for the natural fruit juice beverages is continuously increasing over the synthetic beverages. Ready to serve beverages are popular among every age group because of their refreshing nature and taste. As a result, consumer demand for convenient and easily available product is continuously increasing. Kiwi Ready to Serve Fruit Beverages means an unfermented product which is prepared from Kiwi juice or Pulp/ Puree or concentrated juice or pulp of sound mature kiwifruit and shall contain total soluble solid not less than 10.0% and fruit juice content not less than 10.0% (FSSR 2011). It is not diluted before serving; hence it is known as ready to serve beverage.



CHAPTER 2

PROCESSING

RTS products represent a very important segment of the total processed fruit industry. RTS products are being marketed as refrigerated, shelf-stable, and frozen, in a variety of packages with increased emphasis on functionality, health attributes, new flavours or blends, and in some cases fortified with vitamins and minerals. Fruit RTS is regarded as source of energy due to their rich carbohydrate content. The organic acids present in the fruit RTS plays a significant role in the maintenance of the acid-base balance in the body. Kiwi RTS is a complex product. The quality of kiwi fruit is important for the characteristics of the final Kiwi RTS product.

2.1 INGREDIENTS USED FOR PREPARATION OF KIWI RTS BEVERAGES

- **Kiwi juice/Pulp**
- **Sugar-** Sugars are added primarily as flavouring additive to impart the sweetness in the beverages. They also act as mild preservative, modify the osmotic pressure and check spoilage.
- **Citric Acid as acidulants-** Acidulant are acids that either occur naturally in fruits are used as additives in beverage formulation. It provides sourness to product. Citric acid is the most versatile and widely used food acidulant. It is useful characteristics include excellent solubility, extremely low toxicity, chelating ability and pleasantly sour taste. It acts as a mild preservative by regulating ph.
- **Flavourings**- To enhance, extend, round out or increase the potency of flavours already present.
- **Colourings-** The colours are permitted additives in beverage to provide different shades and improve the aesthetic quality of beverage. For product identification as majority of fruit beverages are characterized by the colour of fruit which is used in its formulation
- **Pectin -**Pectin is a hydrocolloid obtained commercially from the citrus peel or apple pomace. Major application of pectin is in stabilization of acidified drinks. It prevents crystallization in high sugar containing beverages
- **Potassium Metabisulfite as preservative -**Potassium Metabisulfite (KMS) is a white crystalline powder used as an antioxidant and sanitizer. It is most commonly used as a

food preservative, which preserves the natural colour of food and protects food against bacteria.

2.2 PROCESSING OF KIWI RTS

1) Selection of Fruits

All fruits are not suitable because of difficulties in extracting the juices or due to poor quality juice. The variety and maturity of the fruit and locality of cultivation influence the flavour and keeping quality of its juice. Only fully ripe fruits are selected. Over ripe and unripe fruits adversely affect the quality of the juice.

2) Sorting and Washing

Diseased, damaged or decayed fruits are rejected or trimmed off. Dirt and spray residues of arsenic, lead etc are removed by washing with water or by using dilute hydrochloric (HCl) acid solution (0.5%) followed by washing in water.

3) Juice Extraction

Generally, juice is extracted by crushing or grating the fruit and pressing the crushed mass in a basket or hydraulic press. Juice can also be extracted by using a screw type juice extractor. There are two types of extraction methods i.e., single and double operation system.

i. Single operation: In single operation, screw type, plunger type or roller type press is generally used to crush and press the prepared fruit to extract the juice. Citrus fruit segments are fed through a hopper, passed through conical screws and the juice flows out through the perforations while the pomace comes out at the end of the conical jacket. The screw type extractor is operated either manually or by using electricity depending upon the requirement. The juice extracted is generally thick and cloudy and contains a considerable amount of macerated pulp. Finally, the juice is strained through a thick cloth or a sieve to remove seeds.

ii. Double operation: In this system, the fruits are crushed and then pressed separately. Kiwifruits are crushed in fruit grater or crusher and the crushed mass is pressed by means of basket press and hydraulic press.

4) Addition

Acid, stabilizer, coloring, flavoring agent, acidity regulator, anti- oxidant, preservative is added to the juice and are mixed in a mixing tank to get a homogenised juice pulp mixture.

5) Addition of sugars: All juices are sweetened by adding sugar. Sugar can be added directly to the juice or as syrup made by dissolving it in water. RTS are made by adding appropriate quantity of sugar into the pulp or juice using cane sugar.

6) Deaeration

Freshly extracted juice contains appreciable quantity of oxygen which may affect the quality of juice if not removed before packing. Air in juice is due to the presence of intra-cellular spaces present in the fruits. Most of the air as well as other gases are removed by subjecting the juice to a high vacuum. This process is called as deaeration and the equipment used for the purpose is known as the deaerator. Heating of juice during heat processing also helps in removal of the air.

7) Clarification of Juice by Straining or screening

Un-clarified fruit juices contain varying amounts of suspended matter consisting of broken fruit tissue, seed, skin, pectic substances and protein in colloidal suspension. Seeds and skin which adversely affect the quality of juice are removed by straining through a muslin cloth or sieve. The fruit juices are strained or screened by muslin cloth or stainless-steel mesh sieves manually to remove coarse particles in a small-scale industry. But in large industries power operated screening system or filter press is used.

8) Preservation

RTS are preserved by pasteurization or by using chemical preservatives.

i) Pasteurization: Preservation of fruit juices by application of heat is the most common method. Pasteurization is a process in which juice is heated to 100^0C or slightly below for a sufficient time to inactivate/kill the micro-organisms, which cause spoilage. Usually, the fruit juices are pasteurized between 75 and 88^0C with times ranging from 30 sec to 30 min depending on the type of heating system, the nature of the juice and the size of the container. Pasteurization can be performed either by heating at low temperature for a long time (LTLT) or heating at high temperature for short time (HTST). Commonly followed methods are:

a) Holding pasteurization: In this method, the prepared juice is filled into glass bottles with a proper head space and the bottles are sealed airtight. After sealing the bottles are pasteurized. However, this method is not followed for commercial scale products.

b) Pasteurization by overflow method: In this method, the juice is heated to a temperature about 2.5^{o}C higher than the pasteurization temperature and filled into the hot sterilized bottles up to the brim. Care should be taken to maintain the temperature during filling and sealing operation. The sealed bottles are processed in boiling water for specified period. After processing the bottles are cooled. On cooling, the juice contracts to leave a small headspace in the bottle which does not contain any air. The method is commercially followed in preservation of all types of juices in the food industry.

c) Flash Pasteurization: In this process, the juice is heated only for short time at a temperature about -5.5^{o}C than the pasteurization temperature, filled into the containers and sealed air tight under cover of a steam to sterilize the seal and then cooled. This process is also known as HTST (High temperature and short time) method and the juice is heated vary rapidly. Flash pasteurization helps to minimize the loss of flavour, better retention of vitamins, keep juice uniformly cloudy and minimize the cooked taste of the juice.

ii) Aseptic processing and packaging of RTS

Aseptic processing and packaging are defined as the process in which a commercially sterile product is packed into pre-sterilized container in a sterile environment. The system makes use of high temperature short time (HTST) sterilization in the temperature range of 90-110^{o}C for acid products (pH4.6). The commercial aseptic sterilization process takes place in a continuous, closed system. Aseptic processing may produce products with better retention of nutrients and excellent sensory quality. Kiwi RTS in tetra pack are processed commercially using aseptic processing and packaging system.

iii) Preservation with chemical

RTS drinks etc, are preserved with chemical preservatives. Fruit juice and pulps in bulk are preserved with chemical preservatives. Two chemical preservatives most commonly used in preservation of fruit products are: -

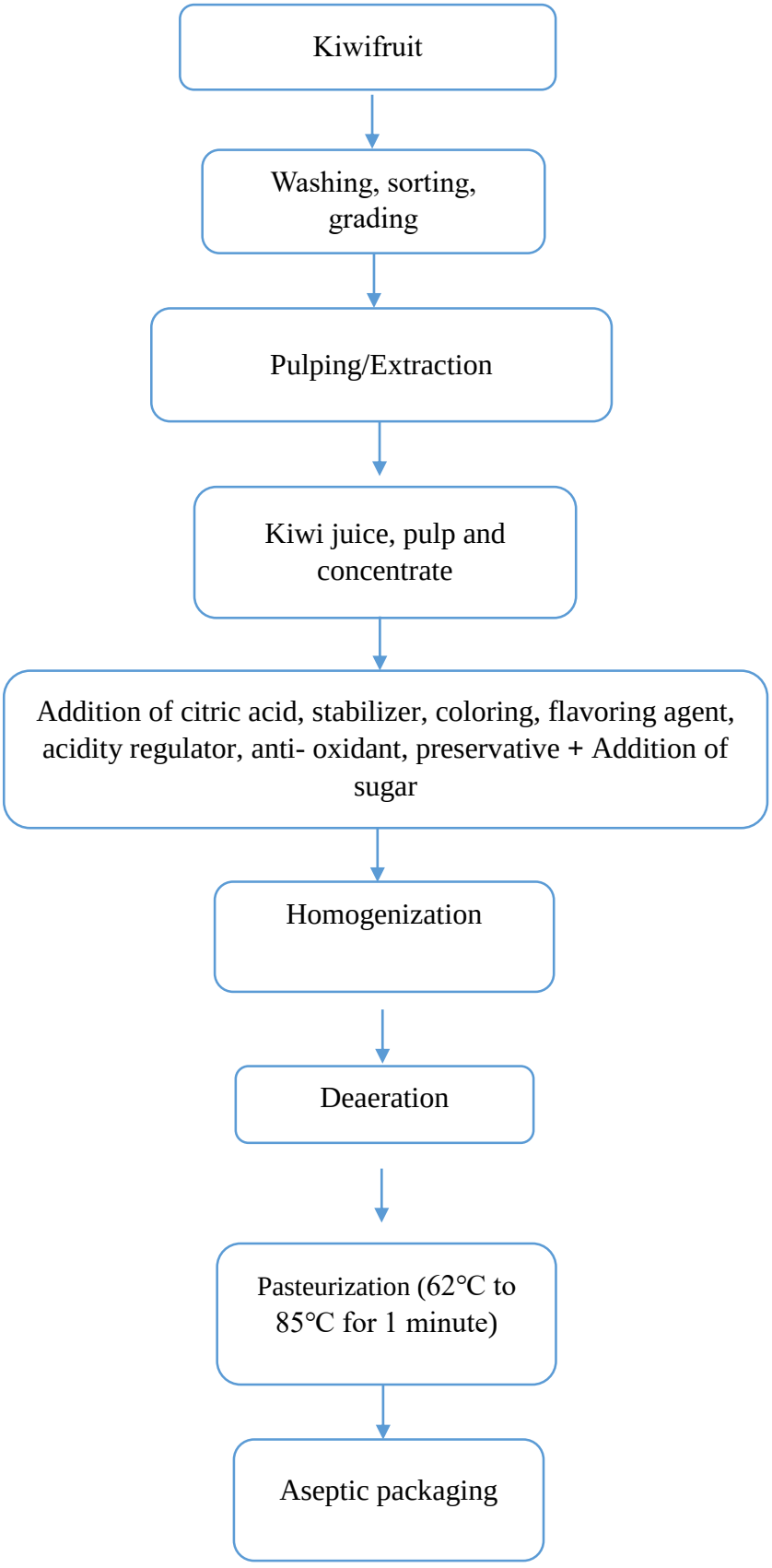
i. **Benzoic acid**: Benzoic acid is the effective agent but sparingly soluble in water, thus its sodium salt, which is water soluble, is generally used. Benzoic acid is more effective against yeast as compared to moulds. However, it does not stop lactic acid and acetic acid fermentation. The quantity of sodium benzoate required depends on the nature of the juice, its acidity and type of microbial infection.
ii. **Sulphur dioxide:** Potassium meta-bi-sulphite is commonly used as a source of sulphur dioxide. On addition to fruit juice or beverage it reacts with acid of the juice

and form potassium salt and sulphur dioxide, which is liberated and form sulphurous acid with the water of the juice. Sulphur dioxide is more effective against mould spores and bacteria than yeast and also inhibits enzymes etc. It acts as antioxidant and bleaching agent thus help in the retention of ascorbic acid, carotene and other oxidisable compounds. It also retards nonenzymatic browning or discoloration of the product. Its effectiveness depends on the acidity, pH, temperature and other substances present in the fruit juice.

9. Filling

Bottles are thoroughly washed with hot water and filled leaving 1.5- 2.5 cm headspace. The bottles meant for heat processing are sealed by using crown corks whole those preserved by using chemical preservative can be sealed by using PP (pilfer proof) caps.

2.3 Flow Chart



2.4 MACHINES USED

1. **Industrial bubble washer**

To remove adhering dirt, to remove latex strains, to remove surface organism if any, wash with 50 ppm chlorine to prevent the microbial contamination.

2. **Peeler/ Pulper**

Graded kiwis are washed in the bubble washing machine then transferred through the conveyer belt for peeling, fruits passed to pulping machine to get puree.

3. **Juice Extraction**

Using spiral type screw extractor.

4. **Homogenizer**

The Kiwi juice will be homogenized under 20-25 MPa pressure for 2-3 times in a homogenizer. Then the big particles in kiwi juice are crushed to under the size of 1-5 μm. Homogenization can unify the particles in fruit juice, regulate sediments and improve drink taste.

5. **Pasteurizer**

The sterilization temperature can be adjusted from 62℃ to 85℃ for 1 minute. It can eliminate bacteria, yeast and inhibit enzyme activity in fruit juice

6. Packaging machine

For bottling filling and sealing, pouch packaging.

CHAPTER 3

PACKAGING

3.1 DETERIORATING QUALITY FACTORS THAT AFFECT KIWI RTS

- High storage temperatures combined with oxygen are the main factors involved in quality deterioration over time.
- The results are loss of nutritional value concerning vitamin C, unpleasant colour changes, and off-flavour formation, which is caused predominantly by chemical changes in the RTS matrix and, to a lesser degree, by changes in the volatile flavour fraction.
- Almost all changes can occur under anaerobic storage conditions and are greatly accelerated by oxygen (headspace and dissolved oxygen, and oxygen permeating through the package).

In general, packaging for Kiwi RTS should contain an aroma barrier to prevent aromas permeating out through the package.

3.2 ROLE OF PACKAGING

In addition to its most obvious function of containing the product, a consumer package must protect the specific quality parameters of Kiwi RTS. Therefore, these quality parameters should be protected during a given shelf life.

- Protect the relevant flavour compounds
- Protect the high vitamin C content
- Prevent colour changes
- Prevent microbial growth

Package properties	**Storage conditions**
Barrier against	Protection against
1. Time	**1.** Temperature
2. Light	**2.** Non-aseptic
3. Flavour losses	**3.** Oxygen
4. Microorganisms	

3.3 Major Classification of Packaging

- Primary packing
- Secondary packing
- Tertiary packing

Types of Primary Packing Available for RTS in Market

Primary Packing – is the material that first envelops the product and hold it. This Usually is the smallest unit of distribution or use and is the package which is in direct contact with the contents. For Kiwi RTS, primary packaging available in the market are:

1. Glass
2. Metal Containers
3. Flexible packaging
4. HDPE bottles
5. PET bottles
6. Carton Based Packages

1. Glass Containers

The use of glass bottles for the packaging hot-fill/hold/cool process. Glass bottles are preferred packaging medium for high quality fruit beverages. More care needed to avoid breakage of the containers.

Advantages

Surface coating to increase abrasion resistance

Use of wide mouth containers fitted with easy-open-caps

2. Metal Containers

Tinplate cans made of low carbon mild steel of 99.75% purity, coated with tin with easy open ends are used. These tinplate containers are either 3 piece or 2-piece containers. They are lacquered internally to prevent corrosion.

Advantages

- Light weight
- Metals like aluminum are very easy to sterilize
- The durability and high barrier protection.
- Convenient

3. Flexible packaging

Flexible packaging minimizes the permeability to oxygen. Flexible laminated pouches like metallized polyester/polyester/ polyethylene are used for hot fill packaging method without retorting for acidic fruit juices. These are used either as flat pouches or stand-up pouches.

Advantages

- Provides resistance to moisture, vapors, dust, and even UV light.

- Modern printing techniques that create crisp, clear imagery.
- Promotes recycling and helps keep used pouches or bags out of landfills

4. HDPE Bottles

As HDPE has a poor oxygen barrier, plain HDPE bottles allow relatively high oxygen ingress and are used for chilled RTS of short shelf life only (about three weeks). The oxygen barrier can be improved by adding intermediate layers of polymers with superior barrier properties. The most common barrier layers in HDPE bottles for Kiwi RTS are ethylene vinyl alcohol (EVOH) and polyamide (PA). These also provide an aroma barrier and can allow ambient storage for six months or longer, depending on the choice and thickness of the barrier layer.

5. Pet bottles

Kiwi RTS packaged in PET bottles is found in both the chilled and ambient segments; ambient RTS is either filled aseptically or hot filled. The bi-oriented material gives the bottle high tensile strength and an increased gas barrier, which allows for lightweight bottles.

6. Carton-based packages

The laminated carton material normally consists of layers of paperboard coated internally and externally with polyethylene, and a barrier layer. The most commonly used barrier layer today is Al-foil. Other barriers include ethylene vinyl alcohol (EVOH) and polyamide (PA). Depending on the packaging system used, the packaging material is delivered to the RTS packer as prefabricated carton blanks or printed and creased in rolls. Oxygen-barrier properties of a laminated carton package depend not only on the barrier properties of the packaging material itself, but also on the barrier properties of strips and closures and the tightness of seals.

Types of Secondary Packing Available for RTS In Market

- It is outside the primary packaging perhaps used to group primary packages together.
- Provides extra protection and transport strength
- Paper boards
- Cartons
- Reusable Plastic Crates

Tertiary packaging

- Used for handling of bulk during storage and transport.
- Carton palletized unit of secondary package. Package for any product is selected based on their characteristics and stability

CHAPTER 4

FSSAI FOOD REGULATIONS AND STANDARDS

4.1 Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011

Category 2.3.10: Thermally Processed Fruit Beverages / Fruit Drink/ Ready to Serve Fruit Beverages under regulation 2011

1. Thermally Processed Fruit Beverages / Fruit Drink/ Ready to Serve Fruit Beverages (Canned, Bottled, Flexible Pack and/ Or Aseptically Packed) means an unfermented but fermentable product which is prepared from juice or Pulp/Puree or concentrated juice or pulp of sound mature fruit. The substances that may be added to fruit juice or pulp are water, peel oil, fruit essences and flavors, salt, sugar, invert sugar, liquid glucose, milk and other ingredients appropriate to the product and processed by heat, in an appropriate manner, before or after being sealed in a container, so as to prevent spoilage.

2. The product may contain food additives and microbiological requirements permitted as per the regulations of standards and additives 2011. The product shall meet the following requirements: —

(i) Total Soluble solid (m/m): Not less than 10.0 percent

(ii) Fruit juice content (m/m) : should be not less than 10.0 percent

3. The container shall be well filled with the product and shall occupy not less than 90.0 percent of the water capacity of the container, when packed in the rigid containers. The water capacity of the container is the volume of distilled water at 20ºC which the sealed container is capable of holding when completely filled.

Microbiological Requirements for Non-Carbonated Water Based Beverages (Non-Alcoholic)

S.No.	Parameters	Limits
1.	Total Plate count per ml.	Not more than 50 CFU per ml.
2.	Yeast and mould count per ml	Not more than 2 cfu per ml.
3.	Coliform count	Absent in 100 ml.

Note: - Non-carbonated beverages shall be free from pathogens]

Use of food additives in food products

Food products may contain additives as specified in these regulations and in the following Tables.

Food Category System	Food Category Name	Food Additive	INS No	Recommended maximum level	Note
14.1.4.2	Non-carbonated water-based flavoured drinks including punches and ades, ginger cocktail (ginger beer and gingerale), thermally processed fruit beverages/ fruit drinks/ready to serve fruit beverages	Lauric arginate ethyl Ester	243	50 mg/kg	165,188
		RIBOFLAVINS		50 mg/kg	
		SACCHARINS		300 mg/kg	
		L-Tartaric acid	334	GMP	
		Curcumin	100	200 mg/kg	
		beta-Carotenes, vegetable	160a(ii)	200 mg/kg	
		CAROTENOIDS		200 mg/kg	
		Annatto	52[160b (i), (ii)]	200 mg/kg	
		Saffron		GMP	
		Ponceau 4R	124	200 mg/kg	XT99
		Carmoisine	122	200 mg/kg	XT99
		Erythrosine	127	100 mg/kg	XT99
		Tartarzine	102	200 mg/kg	XT99
		Sunset yellow FCF	110	200 mg/kg	XT99
		Indogotine (Indigo carmine)	132	200 mg/kg	XT99
		Brilliant Blue FCF	133	200 mg/kg	XT99
		Fast green FCF	143	200 mg/kg	XT99
		BENZOATES		600 mg/kg	
		SULFITES		350 mg/kg	XT100
		Propylene glycol alginate	405	GMP	
		Alginic acid	400	GMP	
		Sodium alginate	401	GMP	
		Calcium alginate	404	GMP	

		Glycerol ester of wood rosin	445(iii)	100 mg/kg	
		Sodium aluminium silicate	554	5 g/kg	

4.2 Food Safety and Standards (Contaminants, Toxins and Residues) Regulations, 2011

Contaminants, Toxins and Residues

Metal Contaminants

1. Chemicals described in monographs of the Indian Pharmacopoeia when used in foods, shall not contain metal contaminants beyond the limits specified in the appropriate monographs of the Indian Pharmacopoeia for the time being in force.

2. table below shall contain any metal specified in excess of the quantity specified in column of the said table:

Name of metal contaminant	**Article of food**	**Parts per Million (mg/kg or mg/L)**
TIN	Canned beverages	2.5

CROP CONTAMINANTS AND NATURALLY OCCURRING TOXIC SUBSTANCES

Name of naturally occurring toxic substances (NOTS)	**Article of food**	**Maximum limits (ppm)**
Saffrole	Non-Alcoholic Beverages	10

4.3 Food Safety and Standards (Packaging and Labelling) Regulations, 2011

Packaging Requirement for Fruit and Vegetables Products

- Fruit product is packed shall be so sealed that it cannot be opened without destroying the licensing number and the Lot number to be displayed on the top or neck of the bottle.

- For Canned fruits, juices and vegetables- sanitary top cans made up of suitable kind of tin plates shall be used.
- For Bottled fruits, juices and vegetables, only bottles/ jars capable of giving hermetic seal shall be used.

Provided further that in case of any bottle containing liquid milk or liquid beverage having milk as an ingredient, soft drink, carbonated water or ready-to-serve fruit beverages, the declarations with regard to addition of fruit pulp and fruit juice shall invariably appear on the body of the bottle.

FSSAI general packaging requirements

1. A utensil or container made of the following materials or metals, when used in the preparation, packaging and storing of food shall be deemed to render it unfit for human consumption:— (a) containers which are rusty; (b) enamelled containers which have become chipped and rusty; (c) copper or brass containers which are not properly tinned (d) containers made of aluminium not conforming in chemical composition to IS:20 specification for Cast Aluminium & Aluminium Alloy for utensils or IS:21 specification for Wrought Aluminium and Aluminium Alloy for utensils.

2. Containers made of plastic materials should conform to the following Indian Standards Specification, used as appliances or receptacles for packing or storing whether partly or wholly, food articles namely: —

(i) IS: 10146 (Specification for Polyethylene in contact with foodstuffs);

(ii) IS: 10142 (Specification for Styrene Polymers in contact with foodstuffs);

(iii) IS: 10151 (Specification for Polyvinyl Chloride (PVC), in contact with foodstuffs);

(iv) IS: 10910 (Specification for Polypropylene in contact with foodstuffs);

(v) IS: 11434 (Specification for Ionomer Resins in contact with foodstuffs);

(vi) IS: 11704 Specification for Ethylene Acrylic Acid (EAA) copolymer.

(vii) IS: 12252 - Specification for Poly alkylene terephathalates (PET).

(viii) IS: 12247 - Specification for Nylon 6 Polymer;

(ix) IS: 13601 - Ethylene Vinyl Acetate (EVA);

(x) IS: 13576 - Ethylene Metha Acrylic Acid (EMAA);

(xi) Tin and plastic containers once used, shall not be re-used for packaging of edible oils and fats; Provided that utensils or containers made of copper though not properly tinned, may be used for the preparation of sugar confectionery or essential oils and mere use of such utensils or containers shall not be deemed to render sugar confectionery or essential oils unfit for human consumption.

Labelling Requirements

All food products sold in India that are pre-packaged are required to comply with the Food Safety and Standards (Packaging and labelling) Regulations, 2011. The Food Safety and Standards Regulation, 2011 is a notification issued by the Food Safety and Standards Authority of India under the Ministry of Health and Family Welfare.

Applicability of Food Labelling Regulations

The food labelling regulations require all "Pre-packaged" or "Pre-packed food" to comply with the labelling regulations in India. As per the rules, pre-packaged food means food, which is placed in a package of any nature, in such a manner that the contents cannot be changed without tampering it and which is ready for sale to the consumer.

General Labelling Requirements

The following labelling requirements must be complied with by all pre-packaged food sold in India:

- The label must be in English or Hindi or Devnagri language. In addition to the above, the label can contain information in any other language, as required.
- The label must not contain information about the food that could be deemed to be false, misleading, deceptive or otherwise create an erroneous impression regarding the product.
- The label must be affixed to the container in such a manner that it would not easily be separated from the container.
- The contents or information presented in the label should be clear, prominent, indelible and readily legible by the consumer.
- If the container is covered by a wrapper, then the wrapper must contain necessary information or make the label of the product inside readily legible by not obscuring.

- The name of the food must be mentioned along with the trade name and description of the food contained. In case the food contains more than one ingredient, then a list of ingredients must be presented in descending order of their composition by weight or volume, as the case may be, at the time of its manufacture;

Nutritional Information

- Nutritional Information or nutritional facts per 100 gm or 100ml or per serving of the product must be given on the label along with the following information:
- energy value in kcal;
- the amounts of protein, carbohydrate (specify the quantity of sugar) and fat in gram (g) or ml;
- the amount of any other nutrient for which a nutrition or health claim is made:

It is important to note that any "health claim" or "nutrition claim" or "risk reduction" claim made in the label will be thoroughly scrutinized by the FSSAI authorities. Hence, any such claim must be validated by test data. As per the rules, the following is the definition for "health claim", "nutrition claim" and "risk reduction" claim:

- **"Health claims"** means any representation that states, suggests or implies that a relationship exists between a food or a constituent of that food and health and include nutrition claims which describe the physiological role of the nutrient in growth, development and normal functions of the body, other functional claims concerning specific beneficial effect of the consumption of food or its constituents, in the context of the total diet, on normal functions or biological activities of the body and such claims relate to a positive contribution to health or to the improvement of function or to modifying or preserving health, or disease, risk reduction claim relating to the consumption of a food or food constituents, in the context of the total diet, to the reduced risk of developing a disease or health-related condition;

- **"Nutrition claim"** means any representation which states, suggests or implies that a food has particular nutritional properties which are not limited to the energy value but include protein, fat carbohydrates, vitamins and minerals;
- **"Risk reduction"** in the context of health claims means significantly altering a major risk factor for a disease or health-related condition

Veg or Non-Veg Symbol

All packaged food that is “Non-Vegetarian” must have a symbol that is a brown colour filled circle inside a square with a brown outline. If a food contains only egg as a non-vegetarian ingredient, then the manufacturer may provide a declaration that the product contains only egg and add the non-vegetarian symbol

Veg Symbol

Non-Veg Symbol

Information Relating to Food Additives, Colours and Flavours

Food additives contained in the food product must be mentioned along with class titles along with the specific names or recognized international numerical identifications. Addition of colouring matter should be mentioned on the label along with certain statements like “CONTAINS PERMITTED NATURAL COLOUR(S)”, just beneath the list of the ingredients on the label. In case of addition of extraneous flavouring agent, then it should be mentioned in a statement like “CONTAINS ADDED FLAVOUR” just beneath the list of ingredients on the label.

Name and Complete Address of the Manufacturer

The name and complete address of the manufacturer must be mentioned on every package of food. In the case of imported food, the package must contain the name and complete address of the importer in India.

Net Quantity

All packaged food must carry the bet quantity by weight or volume or number, as the case may be. The net quantity of the commodity contained in the package must exclude the weight of the wrappers and packaging materials.

Lot Number of Batch Identification

A lot number or batch number or code number must be mentioned on all packaged food so that it can be traced while manufacturing and distribution. Only bread and milk including sterilised milk are not required to comply with this regulation.

Date of Manufacture or Packing

The date, month and year in which the commodity is manufactured, packed or pre-packed must be mentioned on the label. In the case of food products having a shelf life of more than three months, then the month and the year of manufacture can be given with the "Best Before Date". In case of products having a shelf life of fewer than three months, the date, month and year in which the commodity is manufactured or prepared or pre-packed must be mentioned on the label with best before date.

Country of Origin for Imported Food

For imported food, the country of origin of the food should be declared on the label of the food. In case a food product undergoes processing in a second country which changes its nature, the country in which the processing is performed should be considered to be the country of origin for the purposes of labelling.

Instructions for Use

Instructions for use, including reconstitution, should be included on the label, if necessary, to ensure correct utilization of the food.

4.4 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.

Contact Us

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