PM Formalization of

Micro Food Processing Enterprises (PMFME) Scheme

HANDBOOK

OF

RAJMA

AATMANIRBHAR BHARAT

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Chapter – 1

Raw Material

1.1 Introduction

Rajma is the common name for kidney beans. These nourishing legumes are harvested from the herbaceous plant, scientifically named as *Phaseolus vulgaris.* They uphold as a popular dish in North Indian cuisine being an excellent source of protein and minerals like molybdenum, copper, iron, phosphorous, manganese, vitamin B1 and folate. Rajma is considered as an ideal addition to the diabetic diet because of the low Glycemic Index (GI) and high dietary fibres which ensures optimal metabolism, regulating blood sugar, lowering cholesterol, and boosting immunity.

1.2 Rajma Agri-farming in India

Jammu and Kashmir, Uttarakhand, Punjab, West Bengal, Tamil Nadu, Kerala, Maharashtra and Karnataka are the major producers of Rajma in India. It is known by various names locally, namely, Kidney beans (English), Rajma (Hindi, Marathi, Punjabi, Gujarati, Konkani, Malayalam), Barbati Beej (Bengali), Baragudi Chhuin (Oriya), Capparadavare (Kannada), Chikkuduginjalu/Nallachikkudu (Telugu). Popular varieties of rajma include VL Rajma 125 of Uttarakhand and RBL 6 of Punjab. Other improved varieties are VL Rajma 63, PDR-14, HUR-15 (Malviya Rajma 15), HUR-137 (Malviya Rajma 137), Amber, Utkarsh, Arun.

Land Preparation: Multiple ploughing (2-3 times) and leveling to avoid water stagnation is required as the crop is highly sensitive to water logging followed by addition of manure (well decomposed cow dung at 60-80qtl/acre.

Sowing: The crop is cultivated in both Rabi (February-March) as well as Kharif (May-June) season. The seeds are pre-treated with Thiram (4gm per Kg of seeds) followed by shade drying and immediate sowing. The recommended spacing between the rows is 45-60 cm and 10-15 cm between the plants with yhe sowing dept of 6-7 cm.

Table. 1. Threats to crop health

Pests related to the crop		
Pests	***Effect on plant***	***Solutions***
Thrips	Sucks sap from foliage resulting into curling of leaves and flower drop	Sticky traps at 6-8 per acre may be used to check the abundance of the pest. Depending on the abundance following solutions may be implemented: ➢ For mild to medium pests' population, spraying of Verticilium lecani at 5gm/ltr water ➢ For higher incidence, spraying of Imidacloprid 17.8SL or Fipronil or Acephate 75%WP at 1 ml/ ltr water
Aphids	They suck sap from the leaf and excrete honey like substance resulting in the development of sooty mould (blackish colour fungus) on the Calyx and pods	➢ Application of Acephate 75SP at 1gm/Ltr or Methyl demeton 25EC at 2ml/Ltr of water. ➢ Soil application of granular insecticides viz Carbofuran, Phorate at 4-8kg/acre on 15 and 60 days after transplanting.

Mites	They are serious pests and may cause yield loss of up to 80%. Nymphs and adults feed exclusively on the lower surface of the leaves. Infected leaves have cup shaped appearance. Heavy infestation results in defoliation, bud shedding and drying of leaves.	Infestation of yellow mite may be effectively treated by: ➢ Spray of Chlorfenapyr at 15ml/Ltr or Abamectin at 15ml/Ltr ➢ For much effective action spraying Spiromesifen 22.9SC at 200ml/acre/180Ltr of water can be considered.
Diseases related to the crop		
Diseases	***Effect on plant***	***Solutions***
Powdery Mildew	The plant is the food source resulting in patchy, white powdery growth on lower side of leaves. Severe infestation causes defoliation.	➢ Water lodging must be avoided in the field. ➢ Controlling measures include spraying with Hexaconazole at 1ml/ltr of water. ➢ Mild infestation may be treated with spray of water-soluble Sulphur at 20 g/10 ltr of water 2-3 times with interval of 10 days.
Wilt	It is a soil borne diseases, appearing due to moist and poorly drained soil resulting into damping off disease. Water soaking and shrivelling of stem occurs. Seedlings do not grow into plantlets.	➢ Drenching of soil with Copper oxychloride at 25gm/10 ltr or Carbendazim at 20gm/10 ltr of water. ➢ Wilting of plants due to root rot drenching with Trichoderma bio fungus at 2.5kg/500 ltr water, near to roots of plants must be implemented.
Yellow Mosaic	Yellowing, and appearance of chlorotic ring spots on leaves and fruits; hinders with the growth of plantlet at early stage.	➢ Selection of healthy and disease-free seeds for cultivation. Infected plants must be uprooted and destroyed away from field. ➢ Spraying of Acephate 75SP at 600 g/200 ltr or Methyl demeton 25EC at 2 ml/ ltr of water.

Manure and Fertilizers: This crop lacks biological nitrogen fixation because of poor nodulation and therefore, requires 100 to 125 kg/ha of nitrogen in addition to 60-70 kg/ha of phosphorous pentoxide.

Climatic Conditions: and grows well in tropical and temperate areas receiving the annual rainfall of 60-150 mm, the optimum growing temperature ranges from 15-25 ^{0}C, and the harvesting temperature of 28-30 ^{0}C.

Weed Control: This is a critical step during the initial stages of plantation and weed growth must be kept in check. Pre-emergence of Pendimethalin (1l/acre) or Fluchloralin (800ml/acre) may be employed as a part of pre-plantation processing.

Irrigation: There is a requirement of pre-sowing irrigation for better germination of the seed followed by four irrigations at 25, 50, 75 and 100 days after sowing for optimal yield, generally prior to blooming, during flowering and at pod development stage. Frequent irrigation may be skipped during rainy season and heavy water logging must be avoided.

Harvesting: The crop is ready for harvest when the pod turns yellow to brown in colour. Changing of leaves colour from green to yellow accompanied by falling is also a sign of readiness of the crop. Overall duration of crop cultivation ranges from 120-130 days and it is very critical to harvest at the right time as delaying may lead to shattering and loss of yield. Following harvest, the crop is sun-dried for three to four days which is then followed by threshing using bullocks or sticks.

Plant protection: The plant is prone to multiple pests and diseases; several precautions and vigilance is thus required throughout the process. An outline of various threats to the crop is given in Table. 1.

1.3 Insight on value-added product

Recently, there has been an increased demand of value addition of pulses motivated by the consumers awareness and inclination towards healthy food options along with the meals having shorter cooking time. Pulses being low cost and nutritionally rich source of daily protein and energy requirements are being explored and incorporated into food products like pasta, bread, and other snack items to enhance the nutritional properties of these products along with the fortification of breakfast cereals, Ready to Eat (RTE) and canned food products.

1.4 Export-import opportunities

Over the few years India has emerged as the major exporter of Rajma and it's variants like RTE as well as canned rajma products to many countries including UAE, New Zealand, Dubai, South Africa, Australia, USA and Russia.

1.5 Nutritional Value of Rajma

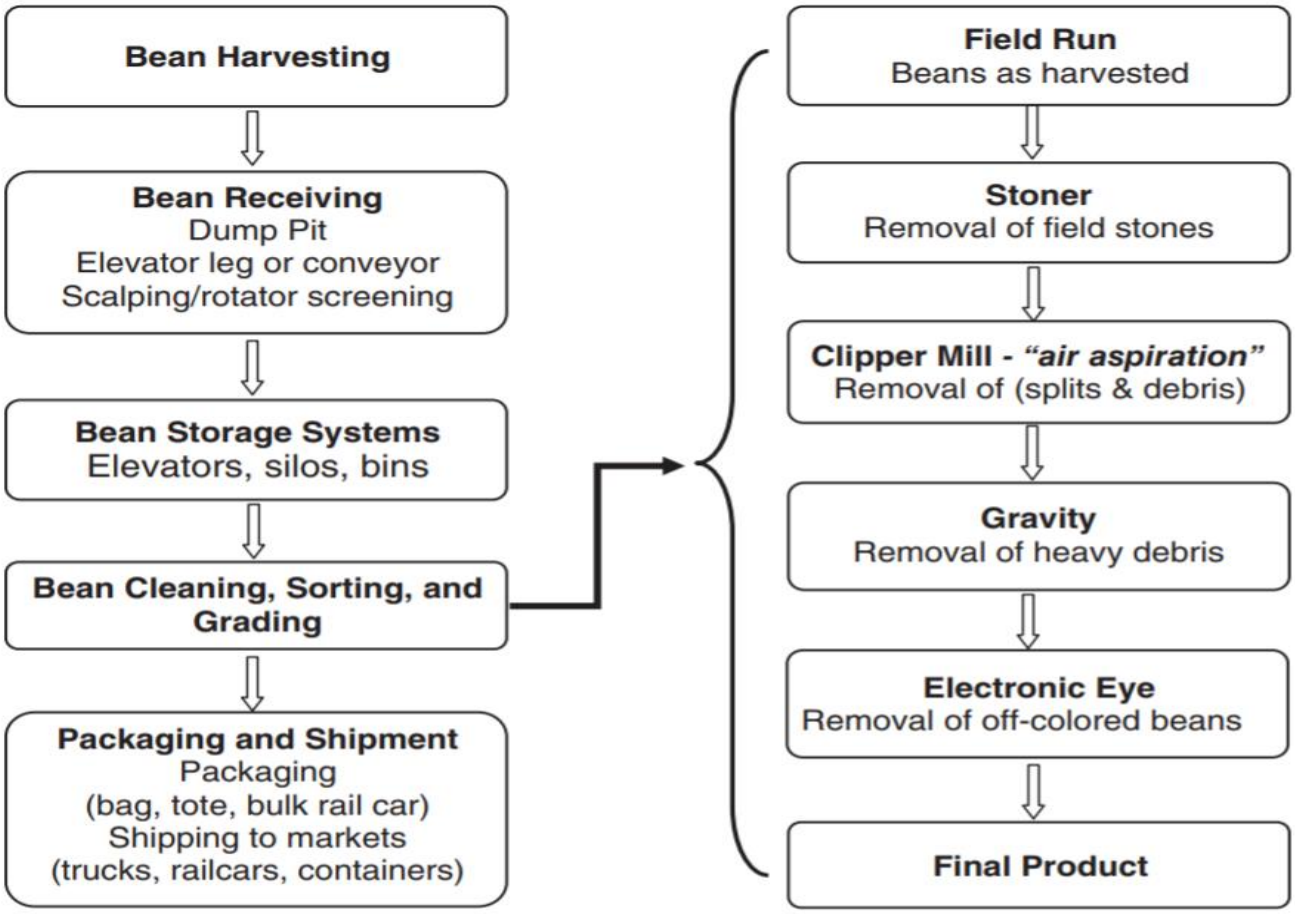
Table. 2. Nutritional value of Rajma

Nutritional components	Value per 100 grams	% Daily values
Energy	232 cal	12
Protein	9.5 g	17
Carbohydrates	28 g	9
Fibre	2.7 g	11
Fat	9.1 g	14
Cholesterol	7.5 mg	2
Vitamins		
Vitamin A	313.9 µg	7
Vitamin B1 (Thiamine)	0.1 mg	10
Vitamin B2 (Riboflavin)	0.1 mg	9
Vitamin B3 (Niacin)	0.5 mg	4
Vitamin B9 (Folic Acid)	161.7 µg	81
Vitamin C	14.7 mg	37
Minerals		
Calcium	136.9 mg	23
Iron	2.4 mg	11
Magnesium	78.6 mg	22
Phosphorous	178.6 mg	30
Sodium	34.5 mg	2
Potassium	634.2 mg	12
Zinc	1.8 mg	18

Chapter – 2

Post-harvest Processing and Machinery

2.1 Post-Harvest Processing Outline of Kidney Beans



1. Upon receiving, the beans are immediately processed with air aspiration to remove contaminants which are lighter than beans namely, leaves, pods and stem. This is an important step as these materials interfere with subsequent air flow and adsorb moisture resulting in accelerated spoilage and degrade quality.

2. Beans are then subjected to density separation using gravity table. This step involves the removal of heavier materials like stones, mud balls etc. by the application of vibrating mechanical force.

3. Bean size separation is achieved via screening over series of sieves. The ultimate goal of this step is to achieve uniformity of size and shape withing the specific lot by removal of extremely large as well as small beans, debris, split beans, stones etc.

4. The final cleaning step is the screening of beans for size and colour using the electronic eye system followed by storage prior to packing and distribution.

5. The dried beans are stored in large silos or steel bins prior to further processing. Care must be taken to minimise seed coat damage; bean ladder is implemented for the purpose. The bean ladder enables the circular motion of beans along the walls thereby minimizing the damage.

6. Moisture content is an important determinant of final product and bean with less than 18% moisture generally retain their stability while storage and hence drying prior to thrashing and storing is important. Retained moisture and low aeration results in moulding, off-flavours, off-odour development and significant product loss.

7. Adverse storage condition results into seed hydration defect and as a consequence decrease in digestibility and bioavailability of nutrients is observed. Other effects of poor stability include bin burn, hard-shell and hard to cook beans leading to poor economic value.

Figure: Bean storage steel bins with monitored air flow at the bottom.

2.2 Quality of Kidney beans

Quality of specific lot is kept in check by following food safety standards and programs including Good Agricultural Practices (GAPs); Good Manufacturing Practices (GMPs); ISO 9000; Hazard Analysis Critical Control Points (HACCP) and Safe Quality Food (SQF) standards. Post-harvest losses critically and extensively influence the product quality. These are substantiated by biological and environmental factors like pests, microorganisms, rodents, storage temperature, time and moisture.

2.2.1 Specific quality factors associated with beans are:

Moisture Content: The moisture levels between 15-18 % during the packaging and storage is recommended to ensure superior quality of the product.

Extraneous Matter: The term accounts for the presence of mineral or organic matter in the final product. Less than 1 % extraneous matter is permissible wherein mineral component must not exceed 0.25 % while the organic matter must be less than 0.10 %

Seed Discoloration: Tannins and polyphenols are the major influencing factors in deterioration of colour, flavour and nutritional quality of pulses and legumes by catalysing the precipitation of alkaloids, gelatine as well as proteins. Enzymatic oxidation of polyphenols is also associated with the development of Hard to cook beans.

Mould Development and toxins: High moisture content, high relative humidity and high temperature during storage results into mould growth on beans. Mould development might cause significant loss of the produce. Other microbial factors like bacterial bloom and root rot during the crop cultivation and development also influence to mould growth post-harvest. *Cladosporium, Aspergillus amstelodami, Aspergillus dimorphicus and Penicillium cyclopium* are the most common fungal strains infecting kidney beans during storage and the severity of the situation is further escalated by aflatoxin production. Aflatoxins

are carcinogenic secondary metabolites produced by *Aspergillus* fungi commonly associated with food poisoning and liver damage.

Heavy Metals: Presence of heavy metals in the final product at a range above the permissible limit may cause severe health issues to the consumers. According to WHO standard, the concentration of heavy metals must not be higher than 10 mg/kg.

Pesticide Residue: The maximum residue limits (MRL) for pesticides is as per the standards of Joint Fao/Who Food Standards Programme of Codex Alimentarius Commission wherein the MRL of dry beans is 0.4 mg/Kg.

Chapter – 3

Packaging

3.1 Introduction

Packaging plays a crucial role in safety and distribution of food commodities along with its role in silent marketing of the product. In recent years the packaging industry has become versatile providing ample choices of the packaging material to the producers depending upon the type of food product which is being dealt.

Figure: Packaging machine for beans.

Available packaging materials for cereals and pulses include:

1. **Jute bags:** Jut gunny bags are widely used packaging material for bulk transportations. As per National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED), Packaging of

Kidney beans must be done in New B Twill (Jute) bags in 100 Kg net. The major supplier of these bags is Directorate General of Supplies and Disposal (DGS & D), Kolkata.

2. **HDPE/pp bags:** High density polyethylene bags are generally used for packaging of small quantities to the consumers.
3. **Polyethylene impregnated jute bags:** These bags are blend of jute with synthetics having improved strength.
4. **Poly pouches:** With the growing demand of consumers for handy supplies of commodities, the packaging has been transformed and poly pouches with attractive label and brand name has became a indirect reference to the quality of the produce.
5. **Cloth bags:** These are generally used to transport and store seeds.

A good packaging must have following qualities:

- It must protect the food commodity during transport and storage
- Must comply to the standard labelling and packaging regulations as described ahead in this chapter
- Must be convenient to handle
- Must be cost-effective and attractive
- Must be free of adverse chemical residues
- Should ideally be bio-degradable or re-cyclable

3.2 Method of Packaging

i Pulse shall be packed in jute bags, poly woven bags, poly pouches, cloth bags or other suitable contamination free and sound packaging material which is permitted under the prevention of food adulteration rules, 1955.

ii When container packed, the quality of the material must be reassured to safeguard hygiene, nutritional and organoleptic qualities of the product.

iii The containers must be processed using non-toxic chemicals and must not have a toxic residue or undesirable odour which may otherwise impact the safety and quality of the packaged product.

iv The net weight of the commodity in the package must comply to the provisions prescribed under the Packaged commodities rules, 1977.

v Each package must contain the product of same quality and grade designation.

vi Each package must be securely sealed.

3.3 FSSAI standards for packaging

3.3.1 General rules for packaging of food commodities

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*) enameled containers which have become chipped and rusty;

   (*c*) copper or brass containers which are not properly tinned

   (*d*) containers made of aluminum not conforming in chemical composition to IS:20 specification for Cast Aluminum & Aluminum Alloy for utensils or IS:21 specification for Wrought Aluminum and Aluminum 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 terephthalates (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.

3. General packaging requirements for Canned products

   i All containers shall be securely packed and sealed.

   ii The exterior of the cans shall be free from major dents, rust, perforations and seam distortions.

   iii Cans shall be free from leaks.

3.3.2 Labelling of packaged food commodities

General Requirements

These regulations are as per Food Safety and Standards (Packaging and labelling) Regulations, 2011.

The following general regulations must be implemented unless the context otherwise requires:

1. "Best before" means the date which signifies the end of the period under any stated storage conditions during which the food shall remain fully marketable and shall retain any specific qualities for which tacit or express claims have been made and beyond that date, the food may still be perfectly safe to consume, though its quality may have diminished. However, the food shall not be sold if at any stage the product becomes unsafe.
2. "Date of manufacture" means the date on which the food becomes the product as described;
3. "Date of packaging" means the date on which the food is placed in the immediate container in which it will be ultimately sold;
4. "Infant" means a child not more than twelve months of age;
5. "Lot number" or "code number" or "batch number" means the number either in numerical or alphabets or in combination thereof, representing the lot number or code number or batch number, being preceded by the words "Lot No" or "Lot" or "code number" or "Code" or Batch No" or "Batch" or any distinguishing prefix by which the food can be traced in manufacture and identified in distribution.
6. "Multipiece package" means a package containing two or more individually packaged or labelled pieces of the same commodity of identical quantity, intended for retail either in individual pieces or packages as a whole.
7. "Non- Vegetarian Food" means an article of food which contains whole or part of any animal including birds, fresh water or marine animals or eggs or products of any animal origin, but excluding milk or milk products, as an ingredient;
8. "Prepackaged" or "Pre-packed 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.

   Note: The expression "package" wherever it occurs in these Regulations, shall be construed as package containing pre-packed food articles.
9. "Principal Display Panel" means that part of the container/package which is intended or likely to be displayed or presented or shown or examined by the customer under normal and customary conditions of display, sale or purchase of the commodity contained therein.

10. "Use – by date" or "Recommended last consumption date" or "Expiry date" means the date which signifies the end of the estimated period under any stated storage conditions, after which the food probably will not have the quality and safety attributes normally expected by the consumers and the food shall not be sold;
11. "Vegetarian Food" means any article of Food other than Non- Vegetarian Food as defined in regulation 7.
12. "Wholesale package" means a package containing:

(a) a number of retail packages, where such first mentioned package is intended for sale, distribution or delivery to an intermediary and is not intended for sale direct to a single consumer;

Or

(b) a commodity of food sold to an intermediary in bulk to enable such intermediary to sell, distribute or deliver such commodity of food to the consumer in smaller quantities

Every prepackaged food shall carry a label containing information as required here under unless otherwise provided, namely:

1. The particulars of declaration required under these Regulations to be specified on the label shall be in English or Hindi in Devanagari script provided that nothing herein contained shall prevent the use of any other language in addition to the language required under this regulation.
2. Pre-packaged food shall not be described or presented on any label or in any labelling manner that is false, misleading or deceptive or is likely to create an erroneous impression regarding its character in any respect.
3. Label in pre-packaged foods shall be applied in such a manner that they will not become separated from the container.
4. Contents on the label shall be clear, prominent, indelible and readily legible by the consumer under normal conditions of purchase and use.
5. Where the container is covered by a wrapper, the wrapper shall carry the necessary information or the label on the container shall be readily legible through the outer wrapper and not obscured by it.
6. License number shall be displayed on the principal display panel in the following format:

7. Provided that the existing products of a unit shall comply with the requirement of this clause on and after the six months of commencement of the Food Safety and Standards (packaging and labeling) Amendment Regulation ,2013.

Labelling of Pre-packaged Foods

In addition to the General Labelling requirements specified above every package of food shall carry the following information on the label, namely-

1. The Name of Food: The name of the food shall include trade name or description of food contained in the package.
2. List of Ingredients: Except for single ingredient foods, a list of ingredients shall be declared on the label in the following manner
   i. The list of ingredients shall contain an appropriate title, such as the term “Ingredients”;
   ii. The name of Ingredients used in the product shall be listed in descending order of their composition by weight or volume, as the case may be, at the time of its manufacture;
   iii. A specific name shall be used for ingredients in the list of Ingredients

3. Nutritional information – Nutritional Information or nutritional facts per 100 gm or 100ml or per serving of the product shall be given on the label containing the following:
   i Energy value in kcal
   ii The amounts of protein, carbohydrate (specify quantity of sugar) and fat in gram (g)
   iii The amount of any other nutrient for which a nutrition or health claim is made
   iv Provided that where a claim is made regarding the amount or type of fatty acids or the amount of cholesterol, the amount of saturated fatty acids, monounsaturated fatty acids and polyunsaturated

fatty acids in gram (g) and cholesterol in milligram (mg) shall be declared, and the amount of trans fatty acid in gram (g) shall be declared in addition to the other requirement stipulated above

v Wherever, numerical information on vitamins and minerals is declared, it shall be expressed in metric units

vi Where the nutrition declaration is made per serving, the amount in gram (g) or milliliter (ml) shall be included for reference beside the serving measure.

Provided that the food claimed to be enriched with nutrients, such as, minerals, proteins, vitamins, metals or their compounds, amino acids or enzymes shall give the quantities of such added nutrients on the label.

Provided that —

i The nutritional information may not be necessary, in case of foods such as raw agricultural commodities, like, wheat, rice, cereals, spices, spice mixes, herbs, condiments, table salt, sugar, jaggery, or non –nutritive products, like, soluble tea, coffee, soluble coffee, coffee-chicory mixture, packaged drinking water, packaged mineral water, alcoholic beverages or fruit and vegetables, processed and pre- packaged assorted vegetables, fruits, vegetables and products that comprise of single ingredient, pickles, papad, or foods served for immediate consumption such as served in hospitals, hotels or by food services vendors or halwais, or food shipped in bulk which is not for sale in that form to consumers.

ii The compliance to quantity of declared nutrients on the label shall be according to the established practices.

Explanation — For the purpose of this provision, at the time of analysis, due consideration, based on shelf-life, storage, and inherent nature of the food shall be kept in view in case of quantity declared nutrients.

a. “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

b. constituents, in the context of the total diet, to the reduced risk of developing a disease or health related condition;

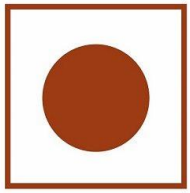
c. (*ii*) "Nutrition claim" means any representation which states, suggests or implies that a food has particular nutritional properties which are not limited to the energy value but include protein, fat carbohydrates, vitamins and minerals;

d. (*iii*) "Risk reduction" in the context of health claims means significantly altering a major risk factor for a disease or health-related condition;

e. Provided further that in the case of returnable new glass bottle manufactured and used for packing of such beverages on or after 19th March 2009, the list of ingredient and nutritional information shall be given on the bottle.

4. Declaration regarding Veg or Non veg –

i Every package of "Non-Vegetarian" food shall bear a declaration to this effect made by a symbol and colour code as stipulated below to indicate that the product is Non-Vegetarian Food. The symbol shall consist of a brown colour filled circle as per FSSAI standards inside a square with brown outline having sides double the diameter of the circle as indicated below:



ii Where any article of food contains egg only as Non-Vegetarian ingredient, the manufacturer, or packer or seller may give declaration to this effect in addition to the said symbol.

iii Every package of Vegetarian Food shall bear a declaration to this effect by a symbol and colour code as stipulated below for this purpose to indicate that the product is Vegetarian Food. The symbol shall consist of a green colour filled triangle as per FSSAI standards inside the square with green outline having size double the diameter of the circle, as indicated below:

Chapter – 4

Food Safety Regulations and Standards

4.1 Registration and Licensing of Food Business

All Food Business Operators in the country will be registered or licensed in accordance with the procedures laid down

Registration of Petty Food Business

a. Every petty Food Business Operator shall register themselves with the Registering Authority by submitting
b. An application for registration in Form A under Schedule 2 of these Regulations along with a fee as provided in Schedule 3.
c. The petty food manufacturer shall follow the basic hygiene and safety requirements provided in Part I of Schedule 4 of these Regulations and provide a self-attested declaration of adherence to these requirements with the application in the format provided in Annexure-1 under Schedule 2.
d. The Registering Authority shall consider the application and may either grant registration or reject it with reasons to be recorded in writing or issue notice for inspection, within 7 days of receipt of an application for registration.
e. In the event of an inspection being ordered, the registration shall be granted by the Registering Authority after being satisfied with the safety, hygiene and sanitary conditions of the premises as contained in Part II of Schedule 4 within a period of 30 days.
f. If registration is not granted, or denied, or inspection not ordered within 7 days as provided in above sub regulation (3) or no decision is communicated within 30 days as provided in above sub regulation (4), the petty food manufacturer may start its business, provided that it will be incumbent on the Food Business Operator to comply with any improvement suggested by the Registering Authority even later.
g. Provided that registration shall not be refused without giving the applicant an opportunity of being heard and for reasons to be recorded in writing.
h. The Registering Authority shall issue a registration certificate and a photo identity card, which shall be displayed at a prominent place at all times within the premises or vehicle or cart or any other place where the person carries on sale/manufacture of food in case of Petty Food Business.

i. The Registering Authority or any officer or agency specifically authorized for this purpose shall carry out food safety inspection of the registered establishments at least once in a year. Provided that a producer of milk who is a registered member of a dairy Cooperative Society registered under Cooperative Societies Act and supplies or sells the entire milk to the Society shall be exempted from this provision for registration.

4.2 Hygienic, Sanitary and Good Manufacturing Practices (GMP/GHP)

In addition to Part-II, the dairy establishment in which dairy based food is being handled, processed, manufactured, stored, distributed and ultimately sold by the food business operator, and the persons handling them should conform to the sanitary and hygienic requirement, food safety measures and other standard as specified below.

1. Sanitary requirements

a. Facilities for the hygienic handling and protection of raw materials and of non-packed or non-wrapped dairy products during loading and unloading, transport & storing including Bulk Milk cooling facilities.
b. Special watertight, non-corrodible containers to put raw materials or dairy products intended for human consumption. Where such raw materials or dairy products are removed through conduits, these shall be constructed and installed in such a way so as to avoid any risk of contamination of other raw materials or dairy products;
c. A waste water disposal system which is hygienic and approved;
d. Facilities for cleaning & disinfecting of tanks used for transporting dairy products and raw milk. These containers have to be cleaned after every use.
e. The occupier of a dairy establishment shall take appropriate measures to avoid cross-contamination of dairy products in accordance with the cleaning program as specified in point 9.1 of Part II.
f. Where a dairy establishment produces food stuffs containing dairy products together with other ingredients, which have not undergone heat treatment or any other treatment having equivalent effect, such dairy products and ingredients shall be stored separately to prevent cross-contamination.
g. The production of heat-treated milk or the manufacture of milk-based products, which might pose a risk of contamination to other dairy products, shall be carried out in a clearly separated working area.
h. Equipment, containers and installations which come into contact with dairy products or perishable raw materials used during production shall be cleaned and if necessary disinfected according to a verified and documented cleaning programme.

i. Equipment, containers, instruments and installations which come in contact with microbiologically stable dairy products and the rooms in which they are stored shall be cleaned and disinfected according to a verified and documented. Food Safety management programme drawn up by the owner/occupier of the dairy establishment.

j. Disinfectants and similar substances used shall be used in such a way that they do not have any adverse effects on the machinery, equipment, raw materials and dairy products kept at the dairy establishment. They shall be in clearly identifiable containers bearing labels with instructions for their use and their use shall be followed by thorough rinsing of such instruments and working equipment with potable water, unless supplier's instructions indicate otherwise.

2. Personal hygiene requirements

a. The Food Business Operator shall employ those persons only in such an establishment to work directly with and handle raw materials or dairy products if those persons have proved to the occupier's satisfaction by means of a medical certificate, on recruitment, that there is no medical impediment to their employment in that capacity.

b. Persons working directly with and handling raw materials or dairy products shall maintain the highest standards of personal cleanliness at all times. In particular they shall

- wear suitable, clean working clothes and headgear which completely encloses their hair;
- wash their hands at least each time work is resumed and whenever contamination of their hands has occurred; e.g. after coughing / sneezing, visiting toilet, using telephone, smoking etc.
- (cover wounds to the skin with a suitable waterproof dressing. No person with injury on hand, even with dressing, shall be placed in any product making/handling section.
- avoid certain hand habits - e.g. scratching nose, running finger through hair, rubbing eyes, ears and mouth, scratching beard, scratching parts of bodies etc. that are potentially hazardous when associated with handling dairy products, and might lead to food contamination through the transfer of bacteria from the employee to product during its preparation. When unavoidable, hands should be effectively washed before resuming work after such actions

3. Sanitary requirements for storage

a. Immediately after procuring, raw milk shall be placed in a clean place, which is suitably equipped so as to prevent any kind of contamination.

b. The cans/ containers made up of mild steel metal and plastic material used for storage and transportation of milk and milk products shall not be allowed.

c. If raw milk is brought to the dairy plant by a producer or farmer then it shall be ensured that he brings it within four hours of milking and it shall be cooled as soon as practicable to a temperature of 4ºC or lower and maintained at that temperature until processed.

d. Where raw milk is collected daily from a producer, it shall be cooled immediately to a temperature of 4ºC to 6ºC or lower and maintained at that temperature until processed;

e. When the pasteurization process is completed, pasteurized milk shall be cooled immediately to a temperature of 4ºC or lower. Subject to Paragraph 7 below, any dairy product not intended to be stored at ambient temperature shall be cooled as quickly as possible to the temperature established by the manufacturer of that product as suitable to ensure its durability and thereafter stored at that temperature.

f. Where dairy products other than raw milk are stored under cooled conditions, their storage temperatures shall be registered and the cooling rate shall be such that the products reach the required temperature as quickly as possible.

g. The maximum temperature at which pasteurized milk may be stored until it leaves the treatment establishment shall not exceed 5ºC.

4. Wrapping and packaging

a. The wrapping and packaging of dairy products shall take place under satisfactory hygienic conditions and in rooms provided for that purpose.

b. The manufacture of dairy products and packaging operations may take place in the same room if the following conditions are satisfied:

- The room shall be sufficiently large and equipped to ensure the hygiene of the operations;
- the wrapping and packaging shall have been brought to the treatment or processing establishment in protective cover in which they were placed immediately after manufacture and which protects the wrapping or packaging from any damage during transport to the dairy establishment, and they shall have been stored there under hygienic conditions in a room intended for that purpose;
- the rooms for storing the packaging material shall be free from vermin and from dust which could constitute an unacceptable risk of contamination of the product and shall be separated from rooms containing substances which might contaminate the products. Packaging shall not be placed directly on the floor;
- packaging shall be assembled under hygienic conditions before being brought into the room, except in the case of automatic assembly or packaging, provided that there is no risk of contamination of the products;

- packaging shall be done without delay. It shall be handled by separate group of staff having experience in handling and product wrapping and
- immediately after packaging, the dairy products shall be placed in the designated rooms provided for storage under required temperature.

c. Bottling or filling of containers with heat-treated milk and milk product shall be carried out hygienically.

d. Wrapping or packaging may not be re-used for dairy products, except where the containers are of a type which may be re-used after thorough cleaning and disinfecting.

e. Sealing shall be carried out in the establishment in which the last heat-treatment of milk or liquid milk-based products have been carried out, immediately after filling, by means of a sealing device which ensures that the milk is protected from any adverse effects of external origin on its characteristic. The sealing device shall be so designed that once the container has been opened, the evidence of opening remains clear and easy to check.

4.3 Packaging and Labelling

The packaging design and materials shall provide protection for products in order to prevent contamination, damage and accommodate required labelling as laid down under the FSS Act and the Regulations there under. Only food grade packaging materials shall be used as primary packaging material. Packaging materials like aluminium, tin and plastic shall conform to the Indian standards as mentioned under the FSS Regulations from time to time. The food packaging materials shall be inspected before use to avoid using damaged, defective or contaminated packaging, which may lead to contamination of the product. General requirements of packaging and labelling have been described in chapter 3, additional information is mentioned below:

Declaration regarding Food Additives-

(*i*) For food additives falling in the respective classes and appearing in lists of food additives permitted for use in foods generally, the following class titles shall be used together with the specific names or recognized international numerical identifications:

Acidity Regulator, Acids, Anticaking Agent, Antifoaming Agent, Antioxidant, Bulking Agent, Colour, Colour Retention Agent, Emulsifier, Emulsifying Salt, Firming Agent, Flour Treatment Agent, Flavour Enhancer, Foaming Agent, Gelling Agent, Glazing Agent, Humectant, Preservative, Propellant, Raising Agent, Stabilizer, Sweetener, Thickener:

(*ii*) Addition of colors and/or Flavors—

(*a*) Extraneous addition of coloring matter to be mentioned on the label – Where an extraneous coloring matter has been added to any article of food, there shall be displayed one of the following statements in

capital letters, just beneath the list of the ingredients on the label attached to any package of food so colored, namely:

CONTAINS PERMITTED NATURAL COLOUR(S)

OR

CONTAINS PERMITTED SYNTHETIC FOOD COLOUR(S)

OR

CONTAINS PERMITTED NATURAL AND SYNTHETIC FOOD COLOUR(S)

Provided that where such a statement is displayed along with the name or INS no of the food colour, the colour used in the product need not be mentioned in the list of ingredients.

(*b*) Extraneous addition of flavoring agents to be mentioned on the label.

Where an extraneous flavoring agent has been added to any article of food, there shall be written just beneath the list of ingredients on the label attached to any package of food so flavored, a statement in capital letters as below:

CONTAINS ADDED FLAVOUR (specify type of flavoring agent as per Regulation 3.1.10(1) of Food Safety and Standards (Food product standards and food additive) Regulation, 2011

(*c*) In case both colour and flavour are used in the product, one of the following combined statements in capital letters shall be displayed, just beneath the list of ingredients on the label attached to any package of food so colored and flavored, namely:

CONTAINS PERMITTED NATURAL COLOUR(S) AND ADDED FLAVOUR(S)

OR

CONTAINS PERMITTED SYNTHETIC FOOD COLOUR(S) AND ADDED FLAVOUR(S)

OR

CONTAINS PERMITTED NATURAL AND SYNTHETIC FOOD COLOUR(S) AND ADDED FLAVOUR(S)

Provided that in case of artificial flavoring substances, the label shall declare the common name of the flavors, but in case of the natural flavoring substances or nature identical flavouring substances, the class name of flavors shall be mentioned on the label and it shall comply with the requirement of label declaration as specified under the regulation 2.2.2 (5) (ii)

Note: When statement regarding addition of colors and/or flavors is displayed on the label in accordance with regulation 2.2.2(5)(ii) and regulation 3.2.1 of Food Safety and Standards (Food Product Standards and Food Additive) Regulation, 2011, addition of such colors and/or flavors need not be mentioned in the list of ingredients. Also, in addition to above statement, the common name or class name of the flavour shall also be mentioned on label.

Provided further that when combined declaration of colors and flavors are given, the International Numerical Identification number of colors used shall also be indicated either under the list of ingredients or along with the declaration.

Provided also further that every package of synthetic food color preparation and mixture shall bear a label upon which is printed a declaration giving the percentage of total dye content.

Name and complete address of the manufacturer

(*i*) The name and complete address of the manufacturer and the manufacturing unit if these are located at different places and in case the manufacturer is not the packer or bottler, the name and complete address of the packing or bottling unit as the case may be shall be declared on every package of food;

(*ii*) Where an article of food is manufactured or packed or bottled by a person or a company under the written authority of some other manufacturer or company, under his or its brand name, the label shall carry the name and complete address of the manufacturing or packing or bottling unit as the case may be, and also the name and complete address of the manufacturer or the company, for and on whose behalf, it is manufactured or packed or bottled.

(*iii*) Where an article of food is imported into India, the package of food shall also carry the name and complete address of the importer in India.

Provided further that where any food article manufactured outside India is packed or bottled in India, the package containing such food article shall also bear on the label, the name of the country of origin of the food article and the name and complete address of the importer and the premises of packing or bottling in India.

Net quantity

(*i*) Net quantity by weight or volume or number, as the case may be, shall be declared on every package of food; and

(*ii*) In addition to the declaration of net quantity, a food packed in a liquid medium shall carry a declaration of the drained weight of the food.

Explanation 1. For the purposes of this requirement the expression “liquid medium” include water, aqueous solutions of sugar and salt, fruit and vegetable juices or vinegar, either singly or in combination.

Explanation 2. In declaring the net quantity of the commodity contained in the package, the weight of the wrappers and packaging materials shall be excluded:

(*iii*) Where a package contains a large number of small items of confectionery, each of which is separately wrapped and it is not reasonably practicable to exclude from the net weight of the commodity, the weight of such immediate wrappers of all the items of the confectionery contained in the package, the net weight declared on the package containing such confectionary or on the label thereof may include the weight of such immediate wrapper if the total weight of such immediate wrapper does not exceed –

(*a*) eight per cent, where such immediate wrapper is a waxed paper or other paper with wax or aluminum foil under strip; or

(*b*) six per cent. In case of other paper of the total net weight of all the items of confectionery contained in the package minus the weight of immediate wrapper.

Lot/Code/Batch identification

A batch number or code number or lot number which is a mark of identification by which the food can be traced in the manufacture and identified in the distribution, shall be given on the label.

Provided that in case of packages containing bread and milk including sterilized milk, particulars under this clause shall not be required to be given on the label.

Date of manufacture or packing

The date, month and year in which the commodity is manufactured, packed or pre-packed, shall be given on the label:

Provided that the month and the year of manufacture, packing or pre-packing shall be given if the "Best Before Date" of the products is more than three months:

Provided further that in case any package contains commodity which has a short shelf life of less than three months, the date, month and year in which the commodity is manufactured or prepared or pre-packed shall be mentioned on the label.

10. Best Before and Use by Date

(*i*) the month and year in capital letters upto which the product is best for consumption, in the following manner, namely:

"BEST BEFORE ..... MONTHS AND YEAR

OR

"BEST BEFORE ..... MONTHS FROM PACKAGING

OR

"BEST BEFORE .....MONTHS FROM MANUFACTURE

(Note: blank be filled up)

(*ii*) In case of package or bottle containing sterilised or Ultra High Temperature treated milk, soya milk, flavored milk, any package containing bread, dhokla, bhelpuri, pizza, doughnuts, khoa, paneer, or any uncanned package of fruits, vegetable, meat, fish or any other like commodity, the declaration be made as follows:

"BEST BEFORE ……. DATE/MONTH/YEAR"

OR

"BEST BEFORE.....DAYS FROM PACKAGING"

OR

"BEST BEFORE …….. DAYS FROM MANUFACTURE"

Note: (*a*) blanks be filled up, *(b)* Month and year may be used in numerals, (*c*) Year may be given in two digits

(*iii*) On packages of Aspartame, instead of Best Before date, use by date/recommended last consumption date/expiry date shall be given, which shall not be more than three years from the date of packing;

(*iv*) In case of infant milk substitute and infant foods instead of Best Before date, Use by date/ recommended last consumption date/expiry date shall be given,

Provided further that the declaration of best before date for consumption shall not be applicable to (*i*) wines and liquors

(*ii*) alcoholic beverages containing 10 percent or more by volume of alcohol.

Provided further that above provisions except net weight/net content, nutritional information, manufacturer's name and address, date of manufacture and "best before" shall not apply in respect of carbonated water (plain soda and potable water impregnated with carbon dioxide under pressure) packed in returnable glass bottles

Country of origin for imported food:

(*i*) The country of origin of the food shall be declared on the label of food imported into India.

(*ii*) When a food undergoes processing in a second country which changes its nature, the country in which the processing is performed shall be considered to be the country of origin for the purposes of labelling.

Instructions for use:

(*i*) Instructions for use, including reconstitution, where applicable, shall be included on the label, if necessary, to ensure correct utilization of the food.

4.4 Manner of declaration

General Conditions

1. Any information or pictorial device written, printed, or graphic matter may be displayed in the label provided that it is not in conflict with the requirements of these Regulations.

2. Every declaration which is required to be made on package under these regulations shall be:

(*i*) Legible and prominent, definite, plain and unambiguous (*ii*) Conspicuous as to size number and colour,

(*iii*) as far as practicable, in such style or type of lettering as to be boldly, clearly and conspicuously present in distinct contrast to the other type, lettering or graphic material used on the package, and shall be printed or inscribed on the package in a colour that contrasts conspicuously with the background of the label

Provided that —

(*a*) Where any label information is blown, formed or moulded on a glass or plastic surface or where such information is embossed or perforated on a package, that information shall not be required to be presented in contrasting colours:

(*b*) Where any declaration on a package is printed either in the form of a handwriting or hand script, such declaration shall be clear, unambiguous and legible.

3. No declaration shall be made so as to require it to be read through any liquid commodity contained in the package.

4. Where a package is provided with an outside container or wrapper, such container or wrapper shall also contain all the declarations which are required to appear on the package except where such container or wrapper itself is transparent and the declarations on the package are easily readable through such outside container or wrapper.

5. Labels not to contain false or misleading statements: A label shall not contain any statement, claim, design, device, fancy name or abbreviation which is false or misleading in any particular concerning the food contained in the package, or concerning the quantity or the nutritive value or in relation to the place of origin of the said food:

Provided that this regulation shall not apply in respect of established trade or fancy names of confectionery, biscuits and sweets, such as, barley, sugar, bull's eye, cream cracker or in respect of aerated waters, such as, Ginger Beer or Gold-Spot or any other name in existence in international trade practice.

Principal display panel: The information required under these Regulations shall be given on the principal display panel of the package or container and such information may be given in the following manner.

(*a*) All information should be grouped together and given at one place. OR

The pre-printed information be grouped together and given in one place and ,

(*b*) Online information or those not pre-printed be grouped together in another place. 1. Area of the principal display panel

The area of principal Display panel shall not be less than —

(*a*) In the case of a rectangular container, forty percent of the product of height and width of the panel of such container having the largest area;

(*b*) In case of cylindrical or nearly cylindrical, round or nearly round, oval or nearly oval container, twenty percent of the product of the height and average circumference of such container; or

(*c*) In the case of container of any other shape, twenty percent of the total surface area of the container except where there is label, securely affixed to the container, such label shall give a surface area of not less than ten percent of the total surface area of the container.

Provided that in the case of package having a capacity of five cubic centimeters or less, the principal display panel may be card or tape affixed firmly to the package or container and bearing the required information under these regulations.

The height of numeral in the declaration

(*i*) The height of any numeral required under these regulations, on the principal display panel shall not be less than—

(*a*) as shown in Table - I below, if the net quantity is declared in terms of weight or volume and (*b*) as shown in Table II below, if the net quantity is declared in terms of length, area or number.

TABLE – I When net quantity is in weight or volume Sl. No	Weight/volume	Minimum height of numeral in mm	
Normal case		When blown, formed Moulded,	
or perforated on container			
1.	Upto 50g/ml	1	2
2.	Above 50g/ml upto 200g/ml	2	4
3.	Above 200 g/ml upto 1 kg/litre	4	6
4.	Above 1 kg/litre	6	8
TABLE – II When net quantity is in length, area, number			
Sl. No	Area of principal display panel	Minimum height of numeral in mm	
Normal case		When blown, formed Moulded,	
or perforated on container			
1.	Upto 100 cms square	1	2
2.	Above 100 cms. Square upto 500 cms. Square	2	4
3	Above 500 cms. Square upto 2500 cms. Square	4	6

The date, month and year in which the commodity is manufactured, packed or pre-packed, shall be given on the label:

Provided that the month and the year of manufacture, packing or pre-packing shall be given if the "Best Before Date" of the products is more than three months:

Provided further that in case any package contains commodity which has a short shelf life of less than three months, the date, month and year in which the commodity is manufactured or prepared or pre-packed shall be mentioned on the label.

4.7 Documentation and Record Keeping

Every organization has to maintain records of raw material procurement, production processes, and sales. This is to ensure that the business runs effectively and is profitable. Listed below are some reasons why there is a need for documentation:

1. It gives detailed knowledge about running the business.
2. It helps to control product quality.
3. It helps to keep track of the money invested in the business.
4. It helps to identify the separate costs of raw material or product ingredients.
5. It helps to identify the production cost of a particular process.
6. It helps to make sure that all the quality assurance practices were followed during the production.
7. It helps to make sure that the production equipment is running smoothly/effectively.
8. It works as an evidence for legal procedures.
9. It helps to set an appropriate product price.
10. It helps to take corrective measures at the right time.

4.8 How to Keep Records?

Every food processing organization follows a more or less similar way of keeping records. Production records keep a log of the following:

- The quantity and type of raw materials received
- The quantity and type of ingredients used during processing
- The processing conditions in which production took place (e.g. the temperature set or the air pressure applied)
- The product quality produced

Product quality can be maintained only when:

- The same quantity and quality of ingredients and raw materials are mixed in every batch

- A standard formulation is used for every batch
- Standard process parameters are applied for every batch

Every batch of food is given a batch number. This number is recorded in:

- Stock control books (where raw material procurement is noted)
- Processing logbooks (where production process is noted)
- Product sales records (where sales and distribution is noted)

The batch number must correlate with the product code number, which is printed on labels. This helps the processor to trace any fault found in a batch back to the raw material used or the production process.