

Recent Packaging Trends and Market Developments in Edible Oil



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Discussion

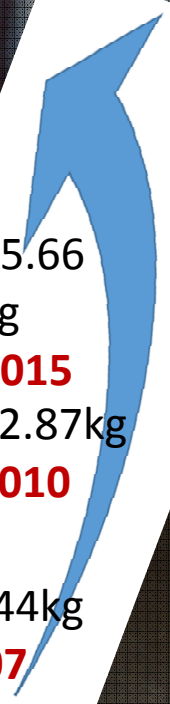
- ✓ **The Edible Oil Industry**
- ✓ **Changing Demography**
- ✓ **Packaging Needs for Edible Oil (EO).**
- ✓ **Packaging Materials.**
- ✓ **Indian and Global Scenario.**
- ✓ **Conclusion...**

THE EDIBLE OIL INDUSTRY

- India –fourth largest edible oil consuming after USA, China & Brazil.
 - India Accounts 9.3 % of world oilseed production of 8.2 million MT.
 - 35-40% of the demands meet by imports
 - High penetration of 90% in India.
- 

Consumption Pattern.....

- Extreme variation in consumption.
- The country's top 10% of the population consumes 20kg per capita & the bottom 30%, less than 5kg per capita .



15.66
kg
2015
12.87kg
2010
11.44kg
2007

Per capita consumption

Market trends in the Indian edible oil segment

In the recent years one major trend that the edible oil industry has witnessed is the import of premium oils like olive oil & canola oil like palm oil, soya bean oil, gingerly and mustard oil.

Olive oil - earlier used for personal care purpose has gained a foothold in the premium segment.

Market trends in the Indian edible oil segment

Edible oil companies are also entering the fortified oil segment where these oils have the presence of vitamin content like A, D and E.

- Rising demand for health aspect & enables major trend witnessed in this industry.
- There is also a rise in demand for branded edible oil market with sunflower and soy oils leading the market.

Market trends in the Indian edible oil segment

Also buying edible oil in bulk vs smaller quantities is another major trend where sectors like hospitality do bulk purchase like purchasing 15 litres tins, whereas a general household purchase oil units like 1 litre and 2 litre pouches or 5 litres cans.

Why emphasis on Packaging

Product

- **Safety & Hygiene**
 - Freshness
- Beats Seasonality

Package

- Shelf Appeal
 - **Branding**
- Size – Mix and Safety

Packaging

Distribution

- Low Wastage
- Better Logistics
- **Wider Reach**

Marketing

- Greater Visibility
- Convenience
- Premium feeling
- **Assurance of Quality**

**Packaging for Edible Oil-
Branding and Wider reach of To the consumer**

Growth Drivers of Packaged EO

Booming Indian Economy

Youth Population

Spending Capacity & Disposable Income

People on move.

Nuclear Families

Consolidation of Oil industry.

Hyper market replacing Kiranas

Safety & Hygiene awareness.

Branding in Hyper markets.

Convenience Factor:

Shift towards packed products.

Rural Markets: 'Last mile reach'.

Retail Outlets and Packaging

Emphasis on Pack clarity .

Shelf visibility, Better Looking

Increasing mall culture >> Increased Packed EO

Perception towards Edible Oil Packaging...

- 25 % of urban housewives favour trying new packed product.
- 49% of them agree on difference in loose and packed item.
- 41 % of all housewives are brand loyal

Preference for rigid transparent pack
Able to see & feel quality of content.
Perceives it to be good quality product.
No inconvenience of spillage in usage.

Apparent shift towards Transparent rigid Packs.....

Factor Effecting the Packaging of Edible Oil Quality

☐ Salient Parameters:

- The basic factors that may alter the quality of packed oils are:
- **Dissolved oxygen** in the oil, that is the oxygen that remains in the container free space after it is sealed & the oxygen diffused through the walls
- **Light**, which passes through containers, activates the oxidation process
- **Autocatalytic oxidation**
- Temperature & Humidity during storage
- **Migration** of substances from the container to the oil

Packaging & filling addresses Quality issues

Selection Criteria for Edible Oil Packaging Materials

- Loss of flavor / pungency - storage.
- Sunlight accelerates rancidity in oil
 - Oxidation of oil > foul smell, off-flavour
- Softening of filled bottle (esp mustard oil).
 - Oxidation > Vacuum > Softening.
- Reduction of oxygen in the packaging headspace and light exposure are key factors in lowering lipid oxidation and off-flavour development, thus keeping quality.
- Using of inert gases, as argon and nitrogen, can solve many problems and provide an optimal product storage in several production steps during storage and bottling. Change in Colour and Odour of EO.

Selection Criteria for Edible Oil Packaging Material

❑ Other Packaging Criteria :

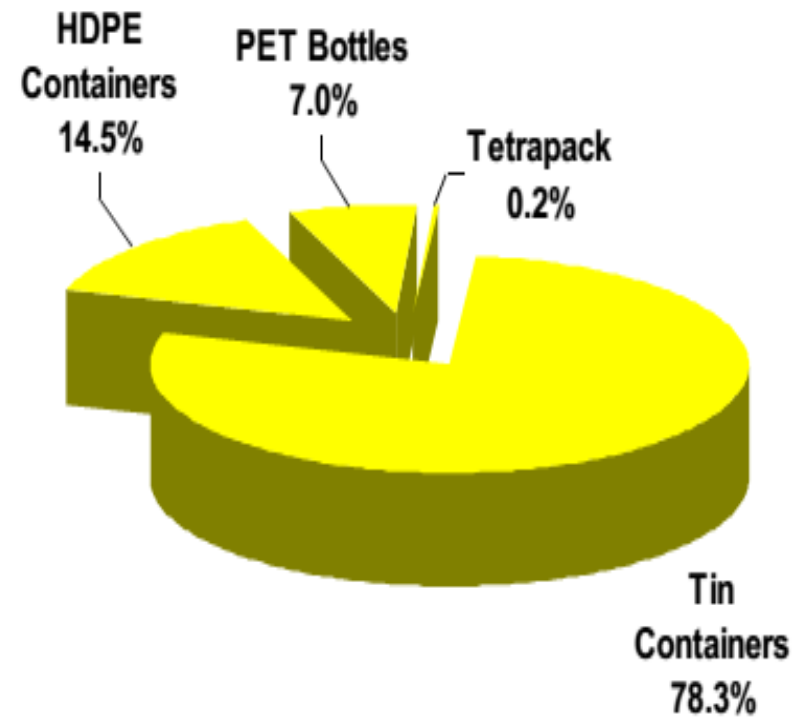
- Leak-proof/Transport-worthy/Branding.
- Various Factors are focused on Edible oil packaging are package design which effect the impulse during purchase.
- The nature of the packaging material has a notable influence on oil quality

❑ Package types – Options:

- **Rigid** : PET, HDPE, Tin plate.
- **Flexible** : Pouch, **Semi-rigid** : Tetra Pak

Packaging – Market Share for EO Industry

- Quantity of oil in different packaged variants:
 - Pouch: 33 Lac MT,
 - Tin : 40 Lac MT
 - HDPE : 15 L : 6 Lac MT.
 - HDPE : 1L,2 L:3 Lac MT, 5L: 6 Lac MT
 - Tetrapak : 0.50 Lac MT
 - PET : 7 Lac MT.



... Amongst rigid containers, share of Tin Container is ~ 78.3%.

Tin Materials

- Primarily & Bulk pack :
 - **EO is largest user of tinplate.**
 - Good Shelf life, re-sale value.
- Pack for bulk sales (15 kg & 15 L)
- Consumer packs (< 5 kg: 'Premium Brand').
- In EO, tin being substituted by alternates.
 - Bulk packs: Plastic ↑.

Specs, gram
930

Issues

- High cost, availability issues at time.
- Use of second hand tin is prevalent**
- In printed sheets: Ink health hazard.
- Seam leakages Possibilities
- Adulteration can't be ruled out.
- Damages in transit, Injury while opening
- Bulky
- Tin: **930g, HDPE: 630g, PET : 300 g**

Flexible Pouches

Requirements for materials :

- Barrier property
- Good substrate bond & Heat seal property

Lighter in weight and Economical.

Structures used in EO : 3 and 5 layer

- LD - LLD-HMHDPE- LD
- LDPE/LLDPE/Metallocene + Masterbatch-Tie layer - Nylon
Barrier Layer - Tie Layer – LDPE/LLDPE / Metallocene.
- Laminates

Pouches from 5 layer nylon barrier film:

- **Prevent oil oxidation, seal strength**

Issues

Leakages in transportation:

- Losses
- ‘Printing ink dissolves in oil’.

More Shelf space,

Difficult to display

Rodent problem in rural areas

Spillage while refilling: wastage.

Recyclability

Tetra Pack

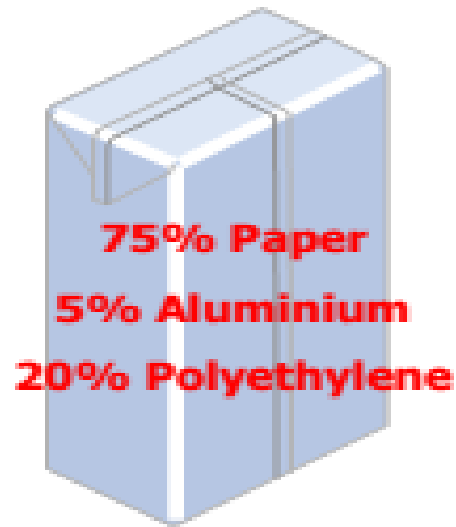
Salient Features

- Sterilization of container
- Sterile filling.
- LDPE (outer)+Board+ LDPE+Aluminium foil+ LDPE+LDPE film (inne

Pack, ml	Specs
200	9 g
1000	30 g

Issues

- Limited pack size option .
- Issue of visibility of product.
- High entry cost
- No flexibility in shape.
- Re-cyclability



Tetra pack has limited scope in EO

HDPE - Jar

Salient Features

- Available in 1 / 2 / 5 / 15 L sizes
- Customized shape and design
- Moisture barrier, Impact strength.
- Issues**
 - Oxygen Barrier inferior to PET.
 - Non transparent
 - Opacity kills 'feel good factor'.
 - Gives feel of 'non-food' pack.
 - Possible use of **regrind**.
 - 1 L and lower pack variants.
 - HDPE less popular with consumers.
 - Costlier than PET package (15-20%).

Pack Litre	Specs, gram
5	200
15	640

PET Bottles for EO - Functional USPs

- Product Visibility
 - Assurance of Good Quality
- Good Oxygen barrier properties.**
- Meets USFDA/EU/BIS regulations.
- Inert and good chemical resistance.
 - Safe and Hygienic.
- Value-added Capping.
 - No Oil seepages.
- Light weight.
- In - Line blowing and Filling
 - Inventory advantage.
 - Hygienic Packaging.
 - Economical (10-20 % savings).

PET Bottles for EO - Functional USPs

- Superior Aesthetics - Crystal clear.
 - Transparency, Gloss, Display value
 - Lower shelf space and Shelf visibility.
- Flexibility in bottle design.
 - Niche shapes > Impulse Buying.
 - POP differentiation > Stimulate sales.
- Shift from 'me too' to 'premium look'.
- Booming Retail
 - Shift to transparent rigid pack.
- Preferred pack for market launches.
- Eco-friendly Package- 100 % recyclable
- Complete Range: 100 ml to 15 L
- Cost-competitiveness.

Size	gram	Neck, mm
200ml	12	PCO
500ml	16	PCO
1 L	24	PCO
2 L/5 L	46/ 100	PCO

PET: Safe value-added package for EO branding

PET : Conveniences of Sizes

Pack Variants

- 0.25, 0.50 and 1.0 L
 - Transparent, CTC.
- 2 L and 5 L
 - Bottles and Jars.
- 15 L
 - Potential area.
- Reduced weight.
- Opaque PET.
- Typical weights encl.



Size, ml	Weight, g
200	10-12
500	15-18
1000	24-28
2000	45-70
5000	95-115



15 L PET Bottle

- ❑ Good Aesthetics.
 - 'Different shape other than regular'.
- ❑ Salient features
 - Light weight.
 - Wide mouth
 - Odorless Container
 - Attractive printing or labelling
 - Easy to lift with handle
 - Tap can be attached
 - Various colours, opaque or translucent.
 - Easy and controlled dispensing

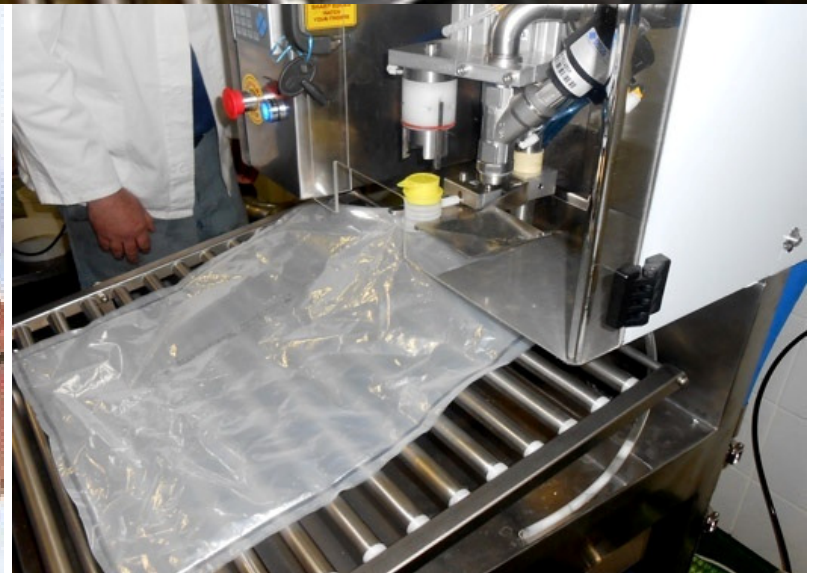


PET : New Packaging system for 15 L.

NEW DEVELOPMENT IN EO MARKET



Case Study : Bag-in-Box in Edible Oil



15 L PET Bottle

- ❑ Salient Features contd...
 - Tamper evident cap
 - Pilfer proofing till customer.
 - Stackable, Space saving design.
 - Can be made as per customer need.
- Perceived value of empty container after use- Re
 - High
- ❑ 300-350 g PET:15 L, Butterfly handle.
- ❑ 15 L PET Pack developed in India.
- ❑ Design Criteria: Top load.
 - 40 kgs in filled condition.
- Cost – Competitive Package
 - Convenience of Handling,
 - Brand-Value and
 - Price-competitiveness



Potential area for PET in EO sector.

Supermarket Concept !!!

When we take a walk along the supermarket aisles & look at the packaging. Consumer can't be impressed by the design, if almost all have a same dull shape

What is missing in many packages is the ergonomic aspect of structural design.

Design is a balancing act between creative design and technical feasibility.

Case Study : EDIBLE OIL BOTTLE DESIGN

The balance between creativity & feasibility is the interaction of the bottle with the consumer.

In other words - consumer is able to handle the bottle conveniently.

For example- interesting design, a twitch, a turn, a screw are few of the ergonomic aspects

Case Study : EDIBLE OIL BOTTLE DESIGN

Italian designer Martin Broen intended to create a packaging that offers an ideal gripping geometry, a distinctive shape and strong presence.

The back part is dedicated to maximize the handling comfort by offering in the centre a reduced gripping area, located at a height that allows outstanding handling with different liquid volumes inside the bottle.

At an angle the grip area facilitates the pouring action, providing besides the grip a spherical lower surface that fits in the palm of the hand and an upper surface that helps loading the weight on the hand reducing the grabbing force needed.

And still there is sufficiently left for marketing as the design generates a distinctive front and back of the bottle. The front facade offers two single curvature surfaces for labelling, the upper one reserved for immediate brand recognition and the lower one to place the supplementary and legal information.



New Development in Edible Oil Market

Bag-in-Box is a cost-effective and high performance packaging format for edible oil which can be designed to accommodate the needs of the institutional user or incorporate dispensing options to satisfy customer.

Benefits

- Materials that can offer 66% weight reduction compared with bottles
- Space saving solution for the collection of waste
- No splash, no drip and consistent air control
- Monomeric recyclable PE structure for the bag, gland and cap
- Suitable for all types of edible oils and oil-base ingredients
- User-friendly packaging

Features

Bag volumes: 5-20 L

Popular volume: 10

Bag material: EVOH/PE

Popular Closure: Yellow Pourer

Markets

Restaurants

HOTELS

Bakeries

Recent Packaging and Filling Solutions

❑ Liquid Nitrogen Dosing System:

- Nitrogen: completely inert, totally tasteless, odorless.
 - Accepted in the food and beverage industry.
 - Salient Features:
 - Liquid nitrogen replaces head-space oxygen.
 - Extends shelf life, Addresses rancidity
 - Preserves the freshness and taste of product.
 - Increases Top load
 - Averts bottle paneling or collapsing.
 - No deformation of filled container.
 - Possible reduction of weight: 2-3 g for 1 L PET.
 - Consistent pressure from container to container.
- ❑ Used by EO industry globally:
- Cargill, Areej Vegetable Oil, Oman, Castello Brazil
- ❑ Tests by EO majors: 'no Paneling, weight Reduction, no rattling voice, retains pungency, rigidity helps labeling,
- ❑ Suppliers: Sidel and Cryotec (rep by Vibgyor),



Nitrogen Dosing improves Shelf Life

Recent Packaging and Filling Solutions

❑ UV Additives for 'Colour and Nutritional value of Oil':

- Oil Colour darkens on storage
- PET : Inherent UV resistance (up to 320 nm).
- UV additive enhances shelf life (320 – 390 nm).
 - Concern: 'mustard, soyabean & sunflower'.
 - UV additive will slow down 'oil colour change'.
 - Improves aroma retention.
- Available both for transparent & opaque bottle
 - ~ 0.15 - 0.25 % LDR.

❑ Oil Colour in 'Bulk Transparent' Pack (mustard oil)

- In 1 L & small pack : No issue of 'Product colour'.
- In Bulk pack (say 5 L and above): 'Appears Dark'.
 - Based on physical observation of filled bottle.
 - Design rectangular bottles to reduce 'bulkiness'.
 - Surface area modifications ('diamond textures').
 - Coloured bottles or with translucent tinge.

UV & Niche Design : Enhancing Shelf Life & Branding.

Recent Packaging and Filling Solutions

❑ Handling System for PET Bottle:

- Built-in hand grips (with recess).
- Butterfly handles (2 L & above).
- Injection moulded handle (2 L, 3 L).

❑ Opaque PET:

- Glossy PET: 2 L and 5 L pack.
- ISBM surface advantage,
- Distinct package appeal,
- Enhanced UV resistance.

❑ Aesthetics:

- PVC sleeves give impression of seepage in mustard oil
- Feel of 'sweating effect' (doesn't actually happen).
- Use of 'Pearlised BOPP' sleeves.
 - No 'sweating effect' in PET.
 - Cost – competitive
 - Aesthetics improvement

Opaque Glossy PET: Enhances Shelf Appeal

Recent Packaging and Filling Solutions

- ❑ **Capping Systems:**
 - Weight Savings
 - CTC : 'Super Shorty' cap: Adani, Recon,...etc
 - To address pilferage: Shrink sleeving of cap.
- ❑ **Shrink Wrapping of Filled Bottles:**
 - Replacement of Cardboard Packaging
 - Cost – Competitive and Greener option
- ❑ **HTW Concept**
 - In-line Blowing and Filling Processes
 - Single stage machine option available
 - Cost-Competitive & Enhanced Quality
- ❑ **PET Package Quality:**
 - Quality Preform and Caps sourcing.
 - Weight Optimisation: minimises de-shaping.
- ❑ **Bottle Designing : Ribs in body & base area**

Capping systems & Process Control for Package Quality.

Recent Packaging and Filling Solutions

- ❑ PET clarity helps promote bottle as source of 'Quality Oil'.
 - 'Value-addition' both for manufacturer and end-user.
- ❑ 'Hole Through Wall' (HTW) system for economics & hygiene.
 - Used by EO majors globally & relevant in Indian scenario.
- ❑ Implementation of 'Packaging order' regulation for packed oil.
 - Key to avoid adulteration related health hazards in oil.
- ❑ Joint Studies : Testing facilities
- ❑ Key drivers for PET Packaging :
 - Assurance of Quality,
 - Cost-Competitiveness,
 - Customised designs & P.O.P. differentiation.

Migration of substances from the container to the oil

- Test specimen is kept in contact with simulant for specified temperature and time duration IS – 9845 test method.
- After exposure, the simulant is evaporated to dryness & the extractive is weighed & calculated in mg/dm² or mg/l or ppm.

Selection of Simulant

Sr.no	Product Characteristics	Simulant
1	Distilled Water or Equivalent	"A" – Distilled Water
2	Acidic	"B" – 3% Acetic Acid
3	Alcoholic – Less than 10 %	"C ¹ " – 10 % Ethanol
4	Alcoholic – Greater than 10 %	"C ² " – 50 % Ethanol
5	Fatty	"D" – n-Heptane

Time-Temperature Exposure Condition

Conditions Of Use	Water	3 % Acetic Acid	10% Alcohol	50% Alcohol	N-Heptane
High temperature heat sterilized (Retorting)	121°C 2 Hours	121°C 2 hours	-	-	66°C for 2 hours
Hot filling or pasteurized above 66°C, below 100°C	100°C 2 Hours	100 °C 2 hours	- -	- -	49°C for 30 minutes
Hot filling or pasteurized below 66°C	70°C 2 Hours	70°C 2 Hours	70°C 2 Hours	70°C 2 Hours	38°C for 30 minutes
Room Temperature filled and stored	40°C 10 days	40°C 10 days	40°C 10 days	40°C 10 days	38°C for 30 days

E Rectified Olive oil or mixture of synthetic triglycerides or sunflower oil

Limits of Migration

- Limits of overall migration for different types of materials are specified in various national standards
e.g - IS 10146 specifies migration limits of polyethylene as 60 ppm or 10 mg/dm²
- Apart from overall migration of plastic in food simulant, there should not be any colour migration into the simulant apparent to the naked eye, even though the extractive value is within the limit.
- Limits of specific migration of monomers of PVC, Polystyrene, Polyacrylonitrile, Nylon-6 are as under:
 - ✓ PVC 0.1 ppm
 - ✓ Polystyrene 0.2 ppm
 - ✓ Polyacrylonitrile 11 ppm
 - ✓ Nylon-6 -10 ppm

Regulation of Labeling for Edible Oil Packaging

Labeling serves as a primary link of communication between the manufacturer or packer of food on the one hand and distributor, seller, and user or consumer on the other hand.

Labeling Requirement for Edible Oil

As per Food Laws every packaged food article has to be labelled and it has to be labelled in accordance to the law applicable in the country of the user. The Food Safety and Standards (Packaging and Labelling) Regulations

- The Name Of Food
- List Of Ingredients,
- Nutritional Information,
- Declaration Regarding Veg Or Non-veg,
- Declaration Regarding Food Additives,
- Name And Complete Address Of The Manufacturer Or Packer
- Net Quantity,
- Code No./Lot No./Batch No.,
- Date Of Manufacture Or Packing,
- .Best Before And Use By Date,
- .Country Of Origin For Imported Food And
- .Instructions For Use

Note: OFFENCES & PENALTIES

- Misbranded Food Up to 3lakh rupee
- Misleading advertisement Up to 10lakh rupees

Labeling Requirement for Edible Oil

Considering the importance of correct labelling, We have made this course for awareness of the Food Business Operator on labelling of packaged food products in accordance to food Safety and Standards (Packaging and Labelling) Regulations, 2011, notified by FSSAI which is effective in India w.e.f. August 5, 2011. This Packaging and Labelling Regulations are summarized in the following modules:

- The name of Food and List of Ingredients,
- Nutritional Information,
- Declaration regarding Veg or Non-veg,
- Declaration regarding Food Additives,
- Name of Manufacturer or packer and Country of Origin
- Net Quantity
- Lot No. /Batch No./Code No.
- Date of manufacture or packing and Best Before or Use By Date,
- Instructions for Use
- Specific Requirements and Manner of Labelling for Infant Milk Substitute and Infant Foods
- Specific Labelling Requirements of edible oils and fats, permitted food colors and irradiated foods
- Specific Requirements and Manner of Labelling of Other Food Products
- Specific Restrictions on product labels and advertisement
- Exemptions from labelling requirements

Labeling Requirement for Edible Oil

Nutritional facts per 100gm	
Energy	k.cal
Protein	g
Carbohydrate	g
Sugars	g
Fat	g
Saturated Fatty Acids	g
Monounsaturated Fatty Acid	g
Polyunsaturated Fatty Acids	g
Cholesterol	mg

Declaration of Veg
Non Veg

Labeling Requirement for Edible Oil

GREEN COLOR



BROWN COLOR



- **GREEN COLOR**

There are some products like carbonated water and liquid milk which are exempted from this provision. Hence these markings are not required on these products.

So, it is mandatory that labeling of every food product should indicate “Veg” or “ Non-Veg” element in the ingredients through recommended marks on the label enabling the user to make a choice.

- **BROWN COLOR**

- If any article of food contains egg only as Non-vegetarian ingredient, the manufacturer, or packet or seller has to mention the same along with the said symbol.

The package of Vegetarian Food shall bear a symbol and color code as given below to indicate that the product is Vegetarian Food. The symbol shall consist of a green color filled circle, having a specified diameter not less than the minimum size inside the square with green outline having specified size.

Labeling Requirement for Edible Oil

Size of the logo		
Sl. No.	Area of principal display panel	Minimum size of diameters in mm
1.	Up to 100cms.	Square. 3
2.	Above 100 cms. Square upto 500 cms.	Square. 4
3.	Above 500 cms. Square upto 2500 cms.	Square. 6
4.	Above 2500 cms.	Square.8

The symbol shall be prominently displayed

- i. On the package having contrast background on principal display panel;
- ii. Just close in proximity to the name or brand name of the product;
- iii. On the labels, containers, pamphlets, leaflets, advertisements in any media;

Provided also that the provisions of regulation shall not apply in respect of mineral water or packaged drinking water or carbonated water or alcoholic drinks, or liquid milk and milk powders.

Labeling Requirement for Edible Oil

The specific requirements and restrictions labelling of packages of edible oils and fats are as given below:

1. The words like, “Super Refined”, “Extra- Refined”, “ Micro- Refined”, “ Double- Refined”, “ Ultra- Refined”, “ Anti- Cholesterol”, “ Cholesterol Fighter”, “ Soothing to Heart”, “ Cholesterol Friendly”, “ Saturated Fat Free” or any other words which are an exaggeration of the quality of the product are not allowed to be used on the package, label or the advertisement of edible oils and fats.
2. The containers of solvent-extracted oil packed for sale shall bear the following additional label declaration:
 - i. If the oil is not conforming to the standards of “refined” solvent extracted oils specified in regulation of Food Safety and Standards(Food Products Standards and Food Additive) Regulation, 2011 for Edible Vegetable oil Vanaspati, then a declaration as given below shall be given on the label.

“NOT FOR DIRECT EDIBLE CONSUMPTION”

- ii. If the oil is complying with the requirements for the “ semi-refined” or “raw-grade I” grades of oil specified in regulation of Food Safety and Standards(Food Products Standards and Food Additive) Regulation, 2011, then a declaration as given below shall be given on the label.

“FOR INDUSTRIAL NON- EDIBLE USES ONLY”

Every container of solvent shall bear the Indian Standards Institution certification mark.

Thank
you

