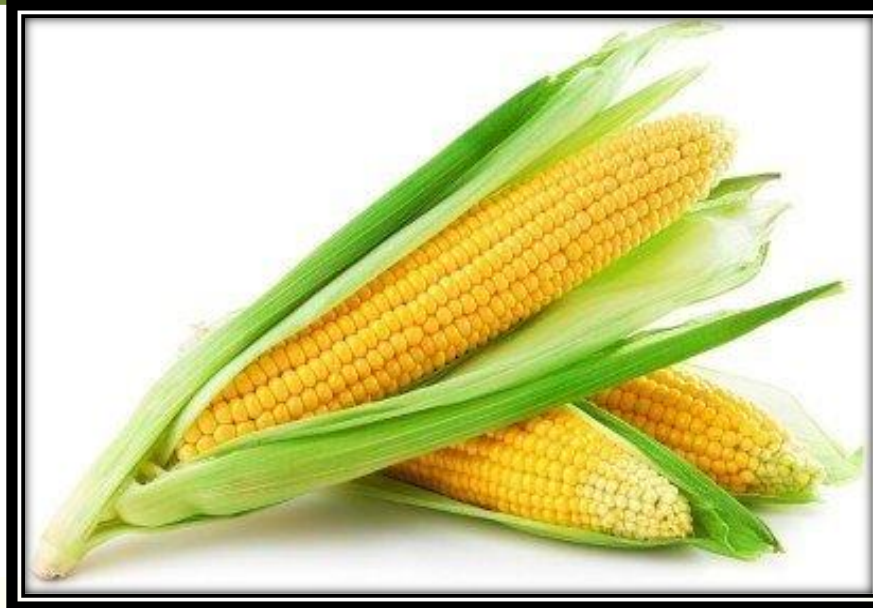


## SWEET CORN - PACKAGING



**AATMANIRBHAR BHARAT**

PM Formalisation of Micro Food Processing  
Enterprises Scheme (PM FME Scheme)

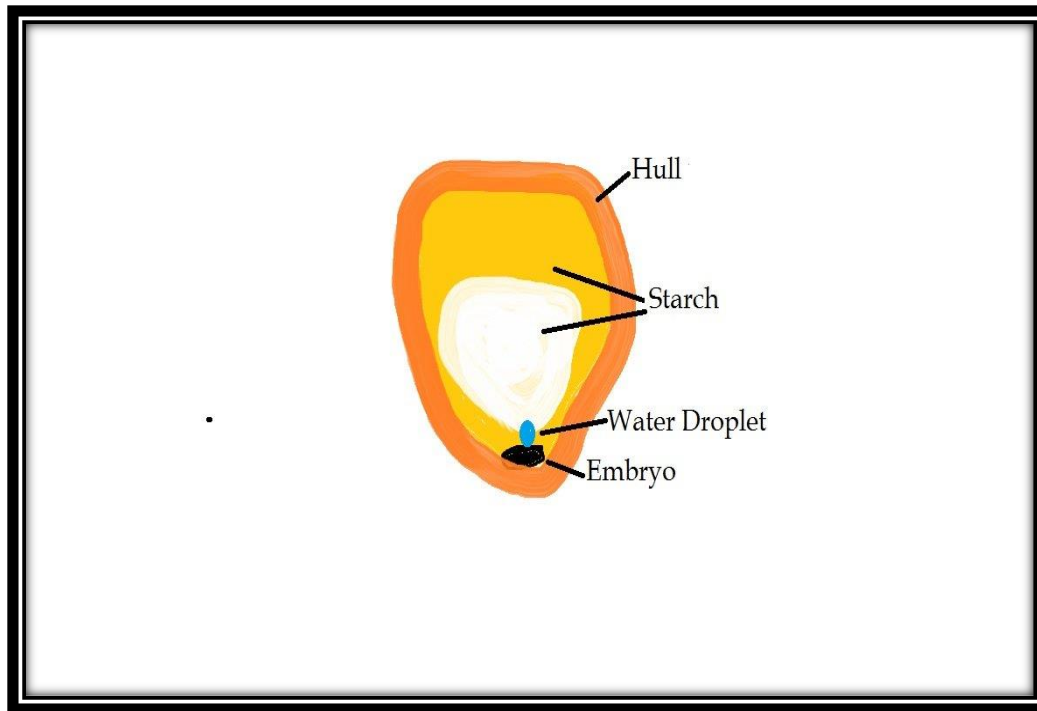
# INTRODUCTION

## CEREAL GRAINS

- ❖ Cereal grains (or simply grains) are small, hard and edible dry seeds that grow on grass-like plants called cereals.
- ❖ They are a staple food in most countries, and provide more food energy worldwide than any other food group, by far.
- ❖ Grains have played a major role in human history, and grain agriculture is one of the main advancements that fueled the development of civilization.
- ❖ They are eaten by humans, and also used to feed and fatten up livestock. Then grains can be processed into various different food products.

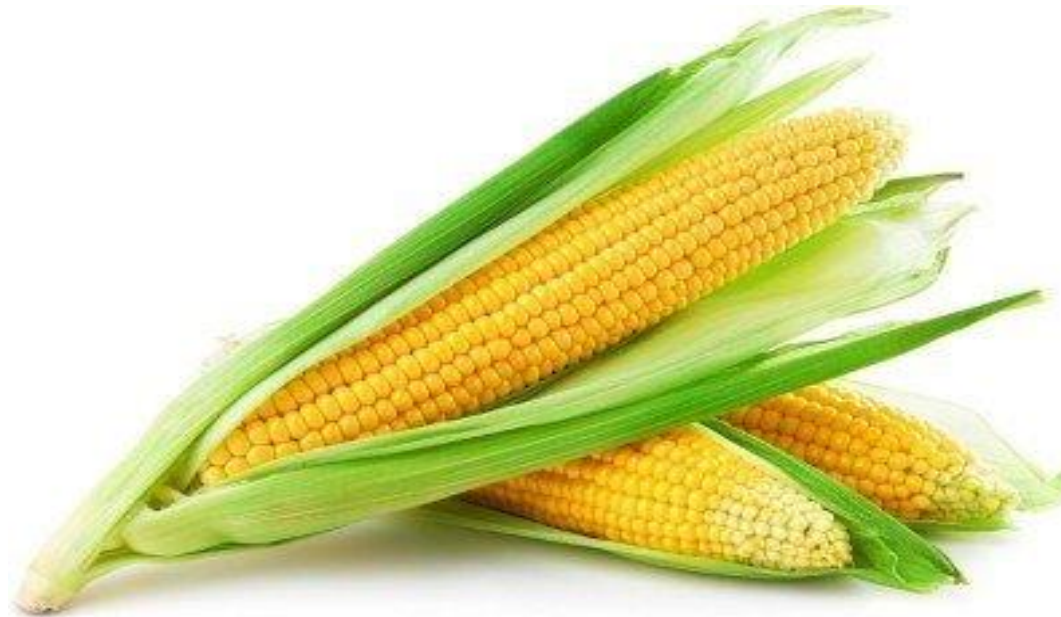
# SWEET CORN

- ❖ Corn kernels are the fruits of corn (called maize in many countries). Maize is a grain, and the kernels are used in cooking as a vegetable or a source of starch. The kernel comprise endosperm, germ, pericarp, and tip cap. One ear of corn contains roughly 800 kernels in 16 rows.



# SWEET CORN

- ❖ The outer layer of the kernel comprised of pericarp, a component of seed coat. The thickness of the layer determines the kernel skin level of tenderness. This feature is important for the estimation of kernel quality for processing. The thickness of pericarp in sweet corn ranges from 25-30 $\mu$ m.



# PACKAGING

- Packaging is an important part of food manufacturing process. It protect the food products from physical ,chemical, biological damages.
- Without packaging, materials handling would be a messy, inefficient and costly exercise and modern consumer marketing would be virtually impossible.
- Packaging Institute International defined packaging as the enclosure of products, items or packages in a wrapped pouch, bag, box, cup, tray, can, tube, bottle or other container form to perform one or more of the following functions: containment, protection, preservation, communication, utility and performance. If the device or container performed one or more of these functions, it was considered a package.

# NEED OF PACKAGING

- **CONTAINMENT** : protecting the environment from the myriad of products that are moved from one place to another.
- **PROTECTION** : to protect its contents from outside environmental influences such as water, water vapor, gases, odors, microorganisms, dust, shocks, vibrations and compressive forces.
- **CONVENIENCE** : Products designed to increase convenience include foods that are prepared and can be cooked or reheated in a very short time, preferably without removing them from their primary package.

# NEED OF PACKAGING

- **COMMUNICATION** : Packaging contains a lot of information such name of its manufacturer, product name, terms and uses, date of manufacturing, best before. nutritional information thus helping the consumer to be more informed.



# TYPES OF PACKAGING

- **PRIMARY PACKAGING** : Primary package are those package which directly came into contact with food products. It provides first or initial layer of protection to the food products. Examples of primary packaging includes Metal cans, tea bag, paperboard cartons, glass bottles and plastic pouches.
- **SECONDARY PACKAGE** : Secondary package are those package which surrounds or contains the primary package. Ex. Corrugated case, Boxes
- **TERTIARY PACKAGE** : It contains number of secondary package together. Mainly used for bulk handling of food products.



# SELECTION OF PACKAGING MATERIAL

- ❖ **Tensile Strength & Elongation:** Tensile Strength and Elongation properties of materials need to be studied as their running on high-speed machines should be suitable.
- ❖ **Tear Strength:** For sweet corn processed product, tear strength is of importance as low tear values are necessary and useful for opening packages by hands.
- ❖ **Heat Seal Strength:** The performance of a finished package is determined by the effectiveness of the package seal i.e. the permeability to water vapor, gases and volatiles increase if the seal is not perfect. Thermoplastic films such as polyethylene give excellent heat seals.

# SELECTION OF PACKAGING MATERIAL

- ❖ **Performance Properties** : Apart from the above mentioned important properties, a material has to perform well on machines; therefore knowledge of physical properties like slip, stiffness, blocking resistance is also necessary.
- ❖ Twist retention for twist wrap is also of importance. The initial function of packaging is to protect. However, the emotional role played by packaging is also of importance, especially when the confection is a gift. A sophisticated packaging using deluxe materials is often used as a way of expressing feelings.

# PACKAGING MATERIAL

## 1. LDPE :

- Low-density polyethylene is heat sealable, inert, odour free and shrinks when heated.
- It act as a barrier to moisture and has high gas permeability
- It is less expensive, therefore widely used.
- Has ability of fusion welded to itself to give good, tough, liquid-tight seals.



# PACKAGING MATERIAL

## 2. PET :

- PET can be made into film by blowing or casting.
- Melting point of PET is higher than PP which is around 260°C and due to the manufacturing conditions does not shrink below 180°C.
- PET is ideal for high-temperature applications.
- It also act as good barrier of oxygen and water vapor.



# PACKAGING MATERIAL

## 3. POLYPROPYLENE :

- Polypropylene films have better clarity than polyethylene and enjoy superior machinability due to stiffness.
- Lack of good salability has been a problem; however, PVDC and vinyl coating have been used to overcome this problem.
- Some varieties of PP have been specially developed for twist-wrap applications as they have the ability to lock in position after twisting.

# PACKAGING MATERIAL

**4. GLASS :** Now a day glass container has been also used for packaging the sweet corn. It has following advantages:

- act as strong barrier to moisture, gases, odours and micro-organisms.
- do not react with food products.
- suitable for heat processing when hermetically sealed
- glass are re-useable and recyclable
- they are transparent to display the contents
- they are rigid, to allow stacking without container damage.



# PACKAGING MATERIAL

## 5. ALUMINIUM:

- Aluminium is used for packaging as it is highly malleable.
- It can be easily converted to thin sheets and folded, rolled or packed.
- Aluminium foil acts as a total barrier to light and oxygen odours and flavors, moistness, and used broadly in food packaging, including long-life packs.



# PACKAGING MATERIAL

## 6. POLY VINYL CHLORIDE (PVC) :

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



# PACKAGING MACHINES



# SOME RECENT TRENDS IN PACKAGING :

## MODIFIED ATMOSPHERE PACKAGING:

- MAP can be defined as packaging of food items where atmosphere inside the packet has been modified to increase the shelf life of food products. It involves active modification or passive modification.
- In active modification air is displaced with a controlled, desired mixture of gases, and the process is called as gas flushing.
- Passive modification occurs due to respiration and the metabolism of microorganisms associated with the food.

# SOME RECENT TRENDS IN PACKAGING :

## ACTIVE AND INTELLIGENT PACKAGING :

- Active packaging is defined as packaging in which subsidiary constituents have been deliberately included in or on either the packaging material or the package headspace to enhance the performance of the package system.
- Intelligent packaging is defined as packaging that contains an external or internal indicator to provide information about the history of the package and/or the quality of the food.
- Various functions performed by intelligent packaging includes: Oxygen absorber, Carbon dioxide absorber or emitter, Ethylene absorber, Ethanol emitter, Moisture absorber.

# SOME RECENT TRENDS IN PACKAGING :

## ASEPTIC PACKAGING :

- Aseptic packaging is the filling of sterile containers with a commercially sterile product under aseptic conditions, and then sealing the containers so that reinfection is prevented; that is, so that they are hermetically sealed.
- **Active packaging are used for :**
  - ✓ To take advantage of high temperature.
  - ✓ Increase shelf life of food products at normal temperature.
  - ✓ In package sterilization.

# LABELING

- Labeling is a means of performing the communication function of packaging, informing the consumer about nutritional content, net weight, product use and so on. Labeling acts as a silent salesman through distinctive branding, as well as facilitating identification at check-outs through the Universal Product Code (UPC).



# PACKAGING & LABELING LAWS - FSSAI

## General requirement for packaging:

- 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 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.

# PACKAGING & LABELING LAWS - FSSAI

- **Labeling should contain following information:**
  - ✓ Name of the food product.
  - ✓ List of ingredients.
  - ✓ Nutritional information.
  - ✓ Declaration of VEG and NON VEG.
  - ✓ Declaration of added food additives.
  - ✓ Name and address of manufacturer.



# PACKAGING & LABELING LAWS - FSSAI

- ✓ Net quantity
- ✓ Code number
- ✓ Lot number/ Batch number.
- ✓ Date of manufacturing.
- ✓ Best before date
- ✓ Country of origin.
- ✓ Instruction for uses.





# QUALITY CONSIDERATIONS DURING PACKING

Quality control of packed products is the last time the product is checked before reaching the customer.

❖ ***Documented checking of the packages entails:***

- ✓ Weight of the package
- ✓ Weight of the sweet corn
- ✓ Arrangement of the sweet corn
- ✓ Defects; and Moisture content

# QUALITY CONSIDERATIONS DURING PACKING

- ❖ ***The surrounding area is also checked:***
- ✓ Cleanliness of the handling equipment during processing
- ✓ Calibration of the scales (automatic or manual);
- ✓ Writing on the packages;
- ✓ Satisfactory working of the metal detector (installed on every retail packing line);
- ✓ Repackaging installations and marking; and
- ✓ Qualification for international standards such as ISO and HACCP



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