

POPCORN PROCESSING



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.

INTRODUCTION




- ❖ Cereals form a major portion of human diet and are an important source of starch and other dietary carbohydrates (dietary fibre), which play an important role in the energy requirement and nutrient intake of human.






TYPES OF CEREAL GRAINS

IMAGE	NAME	DESCRIPTION
	<p>Rice (<i>Oryza sativa</i>).</p>	<p>Rice is an excellent source of calories because of its starch content. It contains 75-80% of starch, 7% of protein, 0.4-0.8% of lipids and 12% of water. Rice oats protein is of highly digestible quality and contains lysine 4.1mg/100g of protein higher than wheat.</p>
	<p>Barley.</p>	<p>It is highly nutritious and important for malting. Mostly used as a breakfast cereal with oat, it is also used as a feed for animals. It is mostly grown on land which is not capable of growing wheat.</p>

TYPES OF CEREAL GRAINS

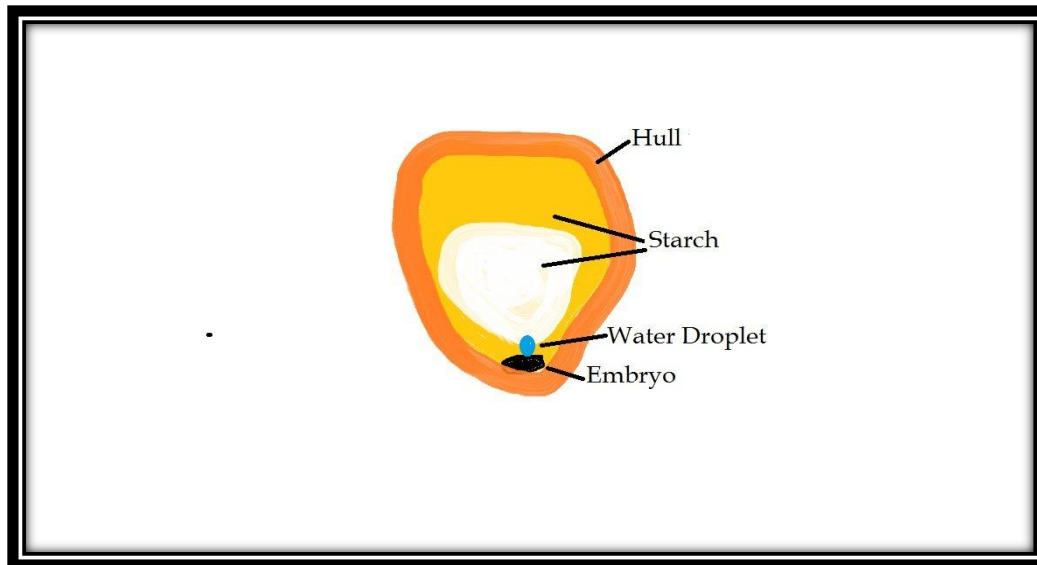
IMAGE	NAME	DESCRIPTION
	<p>Sorghum</p>	<p>Highly nutritious and used as a feed for livestock.</p>
	<p>Millet</p>	<p>Mostly grown Asia and Africa, wheat porridge is popular in China, Russia and Germany. It can also be used to make alcoholic beverages, as an animal feed and bird feed.</p>
	<p>Rye</p>	<p>The cereal grain of cold climates, used for making beer, breads, whiskeys, vodka and also use as animal fodder.</p>

TYPES OF CEREAL GRAINS

IMAGE	NAME	DESCRIPTION
	<p>Oats</p>	<p>Due to high content of fibre it is popular to reduce weight and for lowering blood sugar level.</p>
	<p>Wheat</p>	<p>Wheat is a major cereal crop and one of the oldest domesticated grains. In modern times, wheat is used to produce meal, breakfast cereals, and oats for bakery products.</p>
	<p>Maize</p>	<p>Corn is a staple cereal in continents like South America and Africa, and used as an animal feed worldwide. Cornflakes are also a popular cereal globally.</p>

CORN KERNELS

- ❖ 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.



CORN KERNELS

- ❖ As heat is applied to the dried kernels, the droplet of water converts to steam, and pressure begins to build. Once the hull can no longer hold the pressure of the steam, the kernel explodes. The starch inside the kernel turns into the white fluffy, crunchy stuff we call popcorn.
- ❖ Popcorns come in a wide variety and flavours. In India, popcorn is mostly made with 'butterfly' corn kernels which form more elongated, irregular shapes upon popping up. Another variant called 'mushroom' corn results in larger, rounded pieces of popcorn that are easier to cover in a consistent coating of toppings like caramel or melted chocolate.

VARIETIES

There are many varieties of corn :

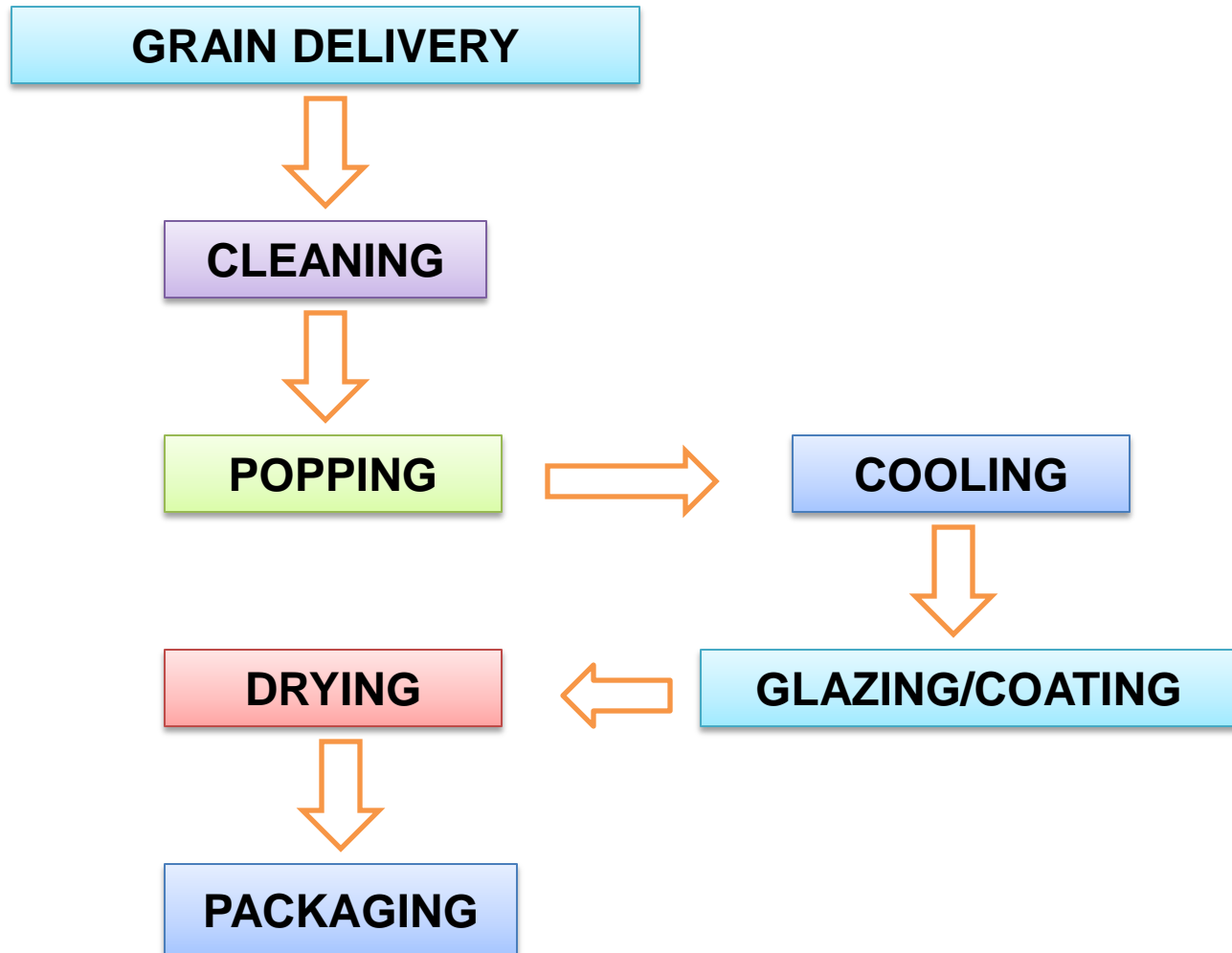
- **Sweet Corn** – the corn that we eat on the cob
- **Field Corn** – the corn that is used to feed animals
- **Flint Corn** – Also called Indian corn, used as a decoration
- **Popcorn** – the only corn that pops There are several varieties of popcorn, including rice popcorn, pearl popcorn, red, black, rainbow, yellow, white, and blue. These are known as gourmet specialty popcorn varieties. Some larger popcorn companies employ scientists who are constantly creating new strains and hybrids to improve popcorn's "pop".

MAJOR COMPONENT OF POPCORN

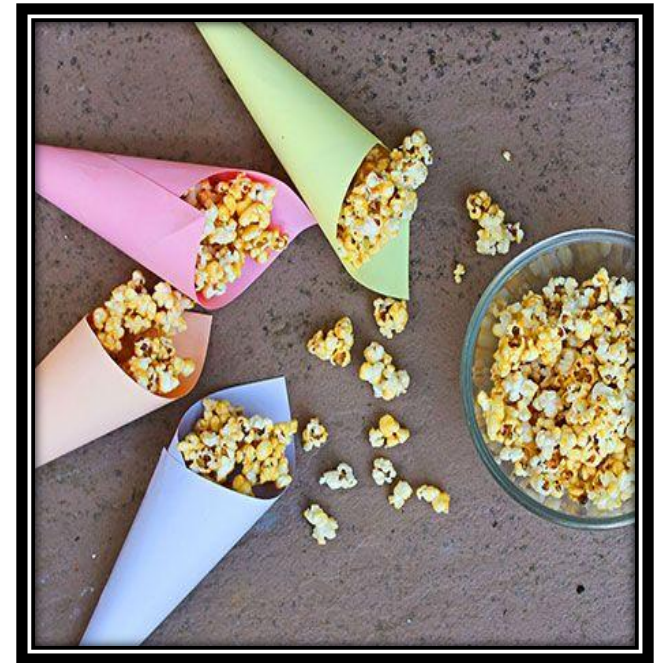
Crude fat	3.8–4.6%
Crude protein	8.1–10.5%
Reducing sugars	0.07–0.23%
Starch	61.0–67.9%
Amylose	27.0–28.5%



PROCESSING OF POPCORN



- **GRAIN DELIVERY:** Grain is delivered to mills by covered trucks and hopper railcars. The distance the grain has travelled varies greatly. Grain deliveries will frequently have gone through a number of aggregation steps prior to arriving at the mill (farmer, country elevator, terminal elevator etc.). The number of conveyances making deliveries of grain can vary depending on the time of year with more deliveries at harvest time.



- **CLEANING THE POPCORN:** The dried ears of popcorn are then transferred by conveyor belt to the factory and a machine called a scalper. The scalper strips the kernels from the cobs. Simultaneously, a cleaner and de-stoner sort out the shucking and any dirt or particles by passing it through a series of screens to separate the kernels.



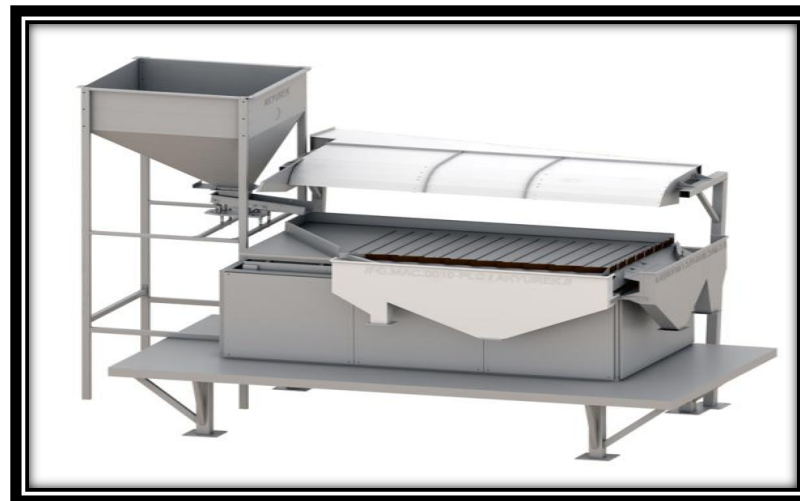
- **POPPING:** There are two methods. The dry method consists of putting the unpopped grain in a basket or wire cage, agitating it over a heat source like the campfire or coal stove, allowing the corn to pop, and seasoning it with butter and salt.
- The general method in caramel popcorn used is the wet-pop method, corn is placed in a container with a solid bottom. Oil is added (either before the corn or poured on top), and the oil helps to distribute the heat and cause more even and complete popping.
- Sugar, baking powder and sugar powder is added to popcorn caramelizing machine for it to melt and mix.

PROCESSING OF POPCORN

- Next the Popped corns are put into the caramelizing machine and are coated or glazed with the mixture.
- After flavor coating the popcorn is entered to the oven to vaporize water inside the sugar.
- **Packaging of Product:** Finally popcorns are packed by a packing machine, which simply seals one end of continuous packaging first, then it simply fills the packet as per required weight & seals the other end, generating the required packet.

EQUIPMENT FOR POPCORN PROCESSING

- ❑ **GRAVITY SEPARATOR:** Gravity separator machine may be used to separate any type of dry bulk particles that are similar in size and shape but differs in weight. Gravity separator are suitable for processing of the seeds of corn, Wheat, rice, soybean, sorghum, various vegetables and other agricultural and sideline products.



EQUIPMENT FOR POPCORN PROCESSING

- ❑ **Popcorn Making Machine:** The hot air popcorn popper is used to dry and puff the corn. It is equipped with compelling ventilation heating system, inner layer airflow baffle, accurate temperature control and tricked insulation layer.



EQUIPMENT FOR POPCORN PROCESSING

- ❑ **POPCORN CARAMELIZING MACHINE-** The dried popcorn is put into the machine for caramel coating.



EQUIPMENT FOR POPCORN PROCESSING

- ❑ **ELECTRICITY OVEN-** After the coating, the popcorn is put into the oven to vaporize the water inside sugar.



EQUIPMENT FOR POPCORN PROCESSING

- **POPCORN FILLING MACHINE:** This machine is used to package the coated popcorns in the boxes or plastics packages.



MARKET POTENTIAL

- ❖ The popcorn market in India is dominated by the unorganized sector with more than 60% of the share in the overall market.
- ❖ However, the scenario is expected to change due to the growth in the number of multiplexes and popularity of popcorn.
- ❖ The market of popcorn in India is expected to grow at a compound annual rate of 36% between 2016 and 2022. It is considered as the high profit margin industry with minimal processing.
- ❖ There has been a steep rise in the demand of gourmet popcorns these days. Caramel Market is poised to touch USD 2,940.9 Million by 2025 at an impressive 5.6% CAGR during the forecast period (2018-2023), reveals the latest report by Market Research Future (MRFR).

MARKET POTENTIAL

- ❖ The geographical analysis of the global Caramel Market encompasses four regions – Asia Pacific, North America, Europe, and the Rest of the World (RoW).
- ❖ Among these, Asia Pacific accounted for a major share of the market in 2017 accounting for 34.07% share. It is projected to exhibit a comparatively higher CAGR of 5.9% across the forecast period.



HEALTH BENEFITS

- ✓ Popped corn contains large amounts of protein, vitamins, and minerals. Among other health benefits, popped corn helps build bones and muscle tissues and assists in digestion.
- ✓ It is also rich in antioxidants (polyphenols). Most of the nutrients are found in the “hull” or shell rather than the fluffy, white part. However, popcorn that has too much butter, oil or salt compromises its health benefits.



HEALTH BENEFITS

- ✓ Popcorn is a rich and concentrated source of nutrients such as proteins, antioxidants, fiber, vitamin B complex, and others, which makes it popular among households as a healthy alternative for breakfast and meals.
- ✓ In addition to fiber, popcorn also is a good source of polyphenols, which are antioxidants that have been linked to better blood circulation and digestive health, as well as a potentially lower risk of certain cancers.





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