

OATS - 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
	Rice (<i>Oryza sativa</i>).	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.
	Barley.	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.

TYPES OF CEREAL GRAINS

IMAGE	NAME	DESCRIPTION
 A close-up photograph of a sorghum grain, showing its golden-brown, textured surface and its characteristic shape.	Sorghum	Highly nutritious and used as a feed for livestock.
 A close-up photograph of a millet grain, showing its small, round, light-colored appearance.	Millet	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.
 A close-up photograph of a rye grain, showing its elongated, oval shape and light brown color.	Rye	The cereal grain of cold climates, used for making beer, breads, whiskeys, vodka and also use as animal fodder.

TYPES OF CEREAL GRAINS

IMAGE	NAME	DESCRIPTION
	Oats	Due to high content of fibre it is popular to reduce weight and for lowering blood sugar level.
	Wheat	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.
	Maize	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.

OATS

- ❖ Oats (*Avena sativa*) are grown in most of the temperate regions of the world, especially in the United States, Canada, and northern Europe.
- ❖ Most of the oats produced are used in animal feed, although they may also be processed for human consumption.
- ❖ Whether it's a bowl of overnight steel-cut , batch of oatmeal raisin muffins, or slice of comforting oatmeal pie, versatile oatmeal comes in many forms.



TYPES

- ❑ **Whole Oat Grain-** Also called whole oat kernels, whole oat grain are the purest, least processed type of oats. During processing, the husk is removed but the bran and germ remain. Due to their minimal processing, this variety can take up to an hour to cook. Simmer them overnight in a slow-cooker to make an easy and hearty breakfast in the morning.
- ❑ **Steel-Cut-oats** - Steel cut oats, or Irish oats , are toasted whole oat gr that have been cut into smaller pieces by a steel blade. As a result, steel-cut oats cook in about half the time of whole oat gr. Steel-cut oatmeal packs a chewy, creamy texture and subtle, sweet flavor. Overnight steel-cut oats in Mason jars are a perfect grab-and-go breakfast in the morning—top them with fresh fruit, nuts, honey, and more.

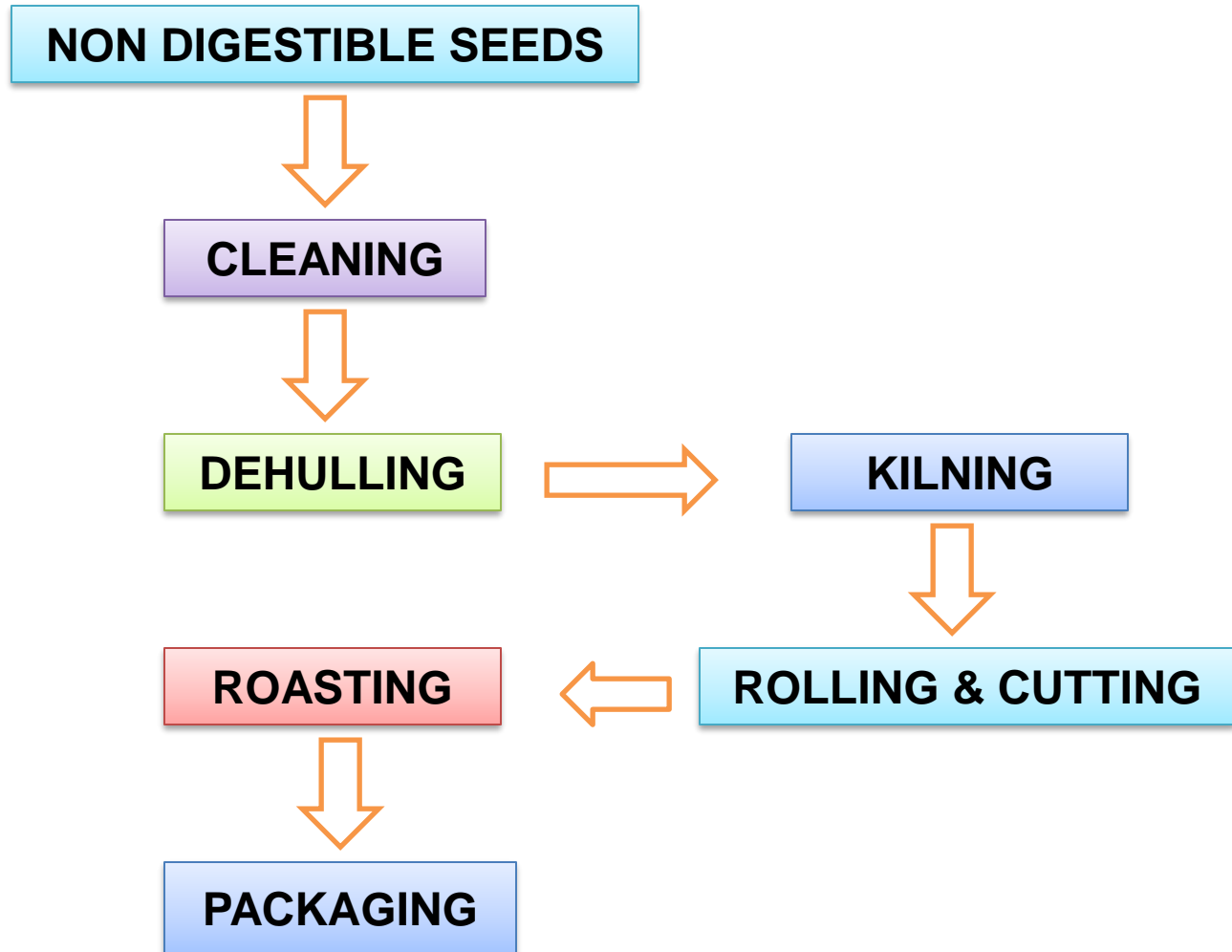
TYPES

- ❑ **Scottish oats-** This type of oatmeal is made using the traditional Scottish method where oats are stone-ground instead of rolled or cut with steel. Compared to steel-cut oats, which resemble broken rice, uncooked Scottish oats are more finely ground. med, rolled, and flattened whole oat gr. As a result, they cook much faster than steel-cut oats or Scottish . Rolled oats have a characteristic flat, disc shape.
- ❑ **Rolled** - Also called old-fashioned rolled oats, rolled oats are made from stea and a soft, fluffy texture when cooked. They're also the most common variety you'll find at the grocery store and are often used in baking.

TYPES

- ❑ **Oatmeal-** Oatmeal is a type of porridge made from milled, steel-cut, or rolled oat grains. An ancient cereal grain, come in many forms—from rolled to instant oatmeal to whole oat grain—but all start as seeds of the oat plant. When cooked, oatmeal typically has a subtle, sweet flavor and a creamy, sometimes chewy, texture.
- ❑ **Instant Oatmeal-** When you take rolled oats and steam them for even longer, you get instant oatmeal. As the most processed type of oat, instant oatmeal cooks in seconds and has a smooth, creamy consistency and mild flavor.

PROCESSING OF OATS



PROCESSING OF OATS

- ❖ **Cleaning:** Cleaning eliminates all unwanted materials from the oats. pass under magnetic separators and through a rotating screen which removes scraps, sticks, stones, corn, etc. Finally, oats go through aspiration and a dry stoner extracting hulls, lighter, low grade, pebbles, and other grains.
- ❖ **Hulling-** After cleaning, oats must be de-hulled, as the hulls of oats are indigestible. To remove the hull, rotating discs fling oats into rings that cause the hull to fall off without damaging the rest of the oat. This remaining oat is known as a groat.

PROCESSING OF OATS

- ❖ **Kilning-** The next stage of the process is drying or kilning. Due to the fat content in , must be dried to achieve browning and desired tastes. The oats are sent to long vertical cylinders where air and steam is injected to increase temperature and moisture. While the moisture helps increase the enzyme content, it's bad for shelf stability and can ruin the product. Radiant heating is used to remove this excess moisture. This step is important for developing the oat's nutty flavor, and it also kills any inactive yeast or bacteria.

PROCESSING OF OATS

- ❖ **Rolling or cutting-** Standard oats are those that have been steel-cut. The oats are run through a machine with razor-sharp knife blades. Quick-cooking oats are rolled between cylinders to produce a flatter, lighter flake. These processes are usually repeated several times to produce the type of oat flake that is desired. In both processes, the hull is separated from the grain. The hulls are sifted out and used for other purposes.
- ❖ **Roasting-** The hulled oats are then placed into a roaster where they are toasted at a preset temperature for a pre-determined amount of time.
- ❖ **Packaging-** Pre-printed containers are filled with pre-measured amounts of oatmeal. A lid is vacuum-packed onto the top of the container.

EQUIPMENTS FOR OATS PROCESSIN

- ❖ **Dry stoner** : The SCHULE dry stoners ST and ST D are used for the separation of stones in a continuous process. Due to its mode of operation, the dry stoner separates specifically heavier components from the lighter accepted product.



EQUIPMENTS FOR OATS PROCESSIN

- ❖ **De-hulling:** Before barley, spelt or oats can be industrially processed they have to be hulled, or polished.



EQUIPMENTS FOR OATS PROCESSIN

- ❖ **Paddy Separator:** A paddy separator then separates the grain from any unhulled oats that may have snuck through.



EQUIPMENTS FOR OATS PROCESSIN

- ❖ **Rolling/Cutting Machine:** The oats are run through a machine with razor-sharp knife blades. Quick-cooking oats are rolled between cylinders to produce a flatter, lighter flake.



EQUIPMENTS FOR OATS PROCESSING

❖ **Roasting Machine:** The oats roasting machine are full of cutting-edge technologies and innovations that make industrial processes easy to execute.



❖ **Packaging Machine:** It's a packing class machine, used to pack given efficiently. It's especially designed to handle with minimum wastage



MARKET POTENTIAL

- ❖ The **Global** Oatmeal Market was valued at \$10,475 million in 2017, and is projected to reach at \$11,907 million by 2027, growing at a CAGR of 1.3% from 2018 to 2027.
- ❖ The oats and cornflakes market in India have shown very tough competition over the year. The hot cereal market which consists of oats meal has been the fastest growing in the breakfast cereal market which has grown at a healthy CAGR of around 24% in the last five years.
- ❖ According to recently published report of Bonafide Research “**India Breakfast Cereal Market Outlook, 2021**”, the market for oats is poised to grow at a CAGR of 21% in the period between 2015 and 2021.

MARKET POTENTIAL

- ❖ Oats has already emerged as a popular breakfast cereal on the back of increasing demand for health food in metros and big cities, health benefits will perhaps be the biggest trigger to their adoption by Indians.
- ❖ As oats are usually cooked by boiling them in milk, the preference of Indians towards hot breakfasts is also satisfied.



HEALTH BENEFITS

- Oats have several unique properties that make their milling different from other cereal grains – their hull is not connected to the endosperm, they have a higher fat content than most cereal grains and they contain high levels of soluble dietary fibres.
- Whole oats are high in antioxidants and beneficial plant compounds called polyphenols. Most notable is a unique group of antioxidants called avenanthramides, which are almost solely found in oats.
- They're a gluten-free whole grain and a great source of important vitamins, minerals, fiber and antioxidants.

HEALTH BENEFITS

- Oats contain large amounts of beta-glucan, a type of soluble fiber. Beta-glucan partially dissolves in water and forms a thick, gel-like solution in the gut.
- Many studies have shown that the beta-glucan fiber in oats is effective at reducing both total and LDL cholesterol levels.
- may help lower blood sugar levels, especially in people who are overweight or have type 2 diabetes.
- Eating filling foods may help you eat fewer calories and lose weight.

HEALTH BENEFITS

- The FDA approved colloidal oatmeal as a skin-protective substance back in 2003. But in fact, oats have a long history of use in treatment of itch and irritation in various skin conditions.





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