Frequently asked questions:

1. Why millets are suited for dry farming?

Ans: Millets are hardy plants capable of growing where most other grain cereals would fail. They are mostly grown in areas with low rainfall, poor irrigation facilities and low fertility. Therefore, they are well suited for “dry farming”.

2. Discuss about the Dry Milling of Maize.

Ans: In dry milling of Maize, the grains are cleaned and conditioned by addition of cold/hot water/steam, which results in the loosening of and toughening of the germ and bran. The endosperm is moistened to an ideal moisture content such that the yield of grits is maximum. The conditioned grain is passed through a suitable machine to separate bran and germ. The stock after degermination is dried to 15-50% moisture content and then sifted to produce a number of fractions. The large, medium and finer fractions (hominy) are finished grits, meal (corn meal is a product somewhat smaller than grits, but still much coarser than corn flour) and flour are sifted. The yield of products in dry maize milling is as follows: grits-40; coarse meal-20; fine meal-10’ flour-5; germ-14 and hominy feed-11%.

3. Discuss about the Wet Milling of Maize.

Ans: In wet milling of Maize, the first step in wet milling is steeping. The cleaned maize is steeped for 48 hours in warm water (50°C) containing sulphur dioxide. Steeping in water softens the kernel and assists separation of the hull, germ and fibre from each other. After steeping, the steeped water is drained off, and the maize is coarsely ground in degerminating mills to free the germ from the grain. Then the ground material flows down separating troughs in which hulls and grits settle, while the germ overflows. The germ is then separated, dried and oil extracted by hydraulic pressing or by using a solvent. The degerminated material in the separating troughs is then finely ground in a bhur or attrition mill. The hulls and fiber, which are not reduced so much in size, can then be separated from the protein and starch by sieving. The suspensions of starch and protein from wet screening is adjusted to a specific gravity of 1.04 by dewatering over string filters and the starch is separated from the protein by continuous centrifugation. Finally, the starch is filtered and dried. The protein in the steep water is recovered by vacuum evaporation and dried as “gluten feed” for animal feeding.

4. What are the byproducts obtained during wet milling of maize? What are the uses of Maize?

Ans: In wet milling, maize is milled to obtain starch, oil, cattle feed and the products of starch hydrolysis, viz, liquid and solid glucose and syrup. Maize is also used for the manufacture of starch, sugar (corn sugar, dextrin), syrup (corn syrup) and industrial alcoholic beverages.

5. How corn flour is produced?

Ans: First, dried maize is soaked in a solution of water with lime, often with ashes mixed in. The grain is then cooked, steeped, drained, and rinsed multiple times. The grain is then ground to make a wet dough from which tortillas are formed or allowed to dry into flour.

6. What is corn flakes? What is the objective in making corn flakes?

Ans: Corn flake is a ready-to-eat breakfast cereal that only requires the addition of milk. The basic objective in making flaked cereals is to obtain grain grits from the whole grain that would each produce a flake.

7. Discuss about Milling of Barley.

Ans: Barley is cleaned and conditioned, *i.e.*, its moisture content is adjusted by drying or damping. The conditioned barley is next subjected to blocking (shelling) and pearling (rounding). Both blocking and pearling are abrasive processed differing in degree of the removal of the superficial layers of the grain. Blocking removes part of the husk, and pearling the remainder of the husk and part of the endosperm. Aspiration of the blocked or pearled grain removes the abraded portions. The grain is then cut into portions known as grits. The grits are graded by size and then rounded in a pearling machine and polished.

8. What is Pearl Barley?

Ans: Pearl barley has had the bran removed and has been steamed and polished. It comes in three sizes-coarse, medium and fine-and can be used as an ingredient in soups, stews and salads. While pearl barley is much more tender and quicker to cook than the whole grain variety, it is also slightly lower in nutrients.

9. Explain the processing in milling of Oats.

Ans: The processing of oats in mills is different from that of wheat because of the difference in the structure and composition between two cereals. In milling, cleaned oats are subjected to klin-drying to inactivate lipase. This process is known as stabilization. Stabilization also reduces moisture content and facilitates the subsequent shelling of the oats. The klin-dried oats are then shelled resulting in the splitting off the husk. The shelled graots are then polished and after removal of oat dust, they are transversely cut so that each kernel gives about four to five pieces (pinhead meal). This is subjected to further grinding when oatmeal is obtained.

10. Discuss the dry milling process of Sorghum.

Ans: The dry milling process of Sorghum starts with the cleaning of grains. The cleaned grain is conditioned, by addition of water, to soften the endosperm, and milled by the conventional roller mills to separate endosperm, germ and bran from each other. The endosperm is recovered in the form of grits, with the minimum production of flour. Yields of various fractions from the dry milling process are grit-76.7%, bran-1.2%, germ-11%, fibre-10%. Bran and germ are further processed, as in the case of maize, by dry milling for the preparation of oils and feeds.

11. Discuss the uses of Pearl millet.

Ans: Pearl millet is a native of Africa and is successfully cultivated in India. Pearl millet is ground into flour and made into chapathies. It is also made into thin porridge. The grain is sometimes eaten after it is parched, the product being similar to popcorn. The grain is suitable for the preparation of malt.

12. How ragi can be milled? What are the uses of Ragi in Indian cuisine?

Ans: Ragi can be milled by wet conditioning. It can be steamed followed by milling in a hammer or plate mill or a roller flourmill. Ragi is usually converted into flour and a variety of preparation like ragi balls, chapathi, dosa and porridge. The grain is also malted and the flour of the malted grain is used as a nourishing food for infants and geriatrics. Malted ragi flour is called

ragi malt, and is used in the preparation of milk beverages. A fermented drink or beer is also prepared from the grain in some parts of the country.

13. What is Triticale?

Ans: Triticale is a *wheat* and *rye* hybrid, first produced in the United States in the late 1800s. Work for the introduction of triticale as a cereal grain in India is being carried out since 1974. As a crop, it offers the disease resistance of wheat and the hardiness of rye. It has more protein than either grain alone, but the overall crop yield is not high, so its use is not widespread. Triticale was developed to have the baking property of wheat (good gluten-forming potential) and the nutritional quality of rye (high lysine).

14. What are the products of milled Rye?

Ans: The products of rye milling are flour for soft breads, coarse rye meal for hard breads and rye flakes for hot breakfast cereals.

15. What are the Health benefits of Millets?

Ans: Being economically feasible and high nutritious diet, millets also comprise other essential health benefits. Its outstanding composition makes it an effective food for the treatment of cancers, anaemia, diabetes, constipation, non-communicable diseases and allergies. Millets contain several nutrients that supports in potential health benefits and thus accepted as functional and nutraceutical food. Few Millets contains high amount of Iron but many non-nutrient components are responsible for decreasing the bio accessibility of iron. By the use of household processing technologies, such as germination and fermentation, the amount of non-nutrient components can be reduced and can support the cure of anaemia. The high fiber content of millets is helpful for those people who are dealing with the problem of obesity and constipation. Millets are good source of fibre and can be used to prepare healthy foods. Millet grains are rich in antioxidants and phenolics so they can contribute to antioxidant activity important in health, aging, and metabolic syndrome. Phenolic compounds have also anticancer property. These compounds are concentrated in the pericarp and testa. Flavonoid, a phenolic compound, helps to inhibit tumor development and reduce the risk of breast cancer. Gluten intolerance, is a

physiological and lifelong disorders affecting humans in many areas of the world. Being a gluten free grain, millets are useful for those people who are suffering from celiac disease. Millet diet considerably decreases blood glucose levels. Various millet-based food products have a lower glycemic index than those based on wheat. Low glycemic index of foods are useful because it improves the metabolic control of blood pressure and low density lipo protein cholesterol levels.