I. FAQ

1. What are the Traditional and Bioprocess Technologies?

The Traditional and Bioprocess Technologies are

- Germination or malting
- Fermentation and enzymatic hydrolyzation
- Popping or puffing
- Soaking and cooking

2. What is the effect of decortication on the nutritional attributes of millets?

The decortication characteristics and nutritional composition (iron, zinc, phytates, lipids, fibers, & starch) of decorticated grains were measured. The results showed that decortication had numerous effects on grain composition, but no significant differences were observed between the by hand-pounding or using a mechanical device methods of decortication. Furthermore, decortication was found to have no effect on the protein and fat content of millets; however, it significantly decreased the content of crude fiber, dietary fiber, minerals, total phenols content, and antioxidant capacity

3. How can the protein and carbohydrate digestibility content in Millets improved?

flour was comparable to whole flour, except for the fat content (1.3%). Milling and heat treatment during chapati making lowered polyphenols and phytic acid and improved the protein digestibility and starch digestibility to a significant extent. Pearl millet varieties were milled into whole flour, semirefined flour, and a bran- rich fraction. These fractions when evaluated for nutrients, antinutrients, and mineral bioaccessibility. The results showed that nutrient content of semirefined

4. **How does malting affect the protein digestibility?**

The improvement in protein digestibility after germination, soaking, debranning, and dry heating can be attributed to the reduction of antinutrients such as phytic acid, tannins, and polyphenols, which are known to interact with proteins to form complexes

5. **What are the advantages of decortication?**

The decorticated millet could be cooked as discrete grains similar to rice to obtain soft edible texture. The pasting and the dough properties and also some of the functional characteristics of the product indicated its versatility for diversified food uses.

6. **Write a note on the phytochemicals present in millets.**

Millets are also rich sources of phytochemicals and micronutrients. Phytochemicals such as phenolics (bound phenolic acid-ferulic acid, free phenolic acid - protocatechuic acid), lignans, β - glucan, inulin, resistant starch, phytates, sterols, tocopherol, dietary fiber and carotenoids are present in millets. The main polyphenols are phenolic acids and tannins, while flavonoids are present in small quantities; they act as antioxidant and play many roles in the body immune system. Ferulic acid is very strong antioxidant, free radical scavenging and anti-inflammatory activity. Antioxidants significantly prevent tissue damage and stimulate the wound healing process.

7. **Write an essay on the benefits on the consumption of millets**.

Various traditional foods and beverages such as roti, bread (fermented or unfermented), porridge, snack and fast foods, baby foods, millet wine, millet nutrition powder etc are made up of millets. Millets are also rich sources of phytochemicals and micronutrients. They act as antioxidant and play many roles in the body immune system. Fermented millet products act as a natural prebiotic treatment for diarrhea in young children. Prebiotics are non-digestible food ingredients that beneficially affect the host by selectively stimulating the growth and

activity of one or a limited number of bacteria in the colon. Millet's whole grain also shows prebiotic activity, which helps to increase the population of friendly bacteria that plays a key role to promote digestion. Malting induces important beneficial biochemical changes in the millet grain.

Millets as Nutraceutical

Millets have nutraceutical properties in the form of antioxidants which prevent deterioration of human health.

Health Benefits of Millets

Millets have many nutraceutical properties that are helpful to prevent many health problems such as lowering blood pressure, risk of heart disease, prevention of cancer and cardiovascular diseases, decreasing tumor cases etc.

Millets and Diabetes

Lower incidences of diabetes have been reported in millet-consuming population. Finger millet feeding controls blood glucose level improves antioxidant status and hastens the dermal wound healing process in diabetic rats.

Millets and Cardiovascular Disease

Millets are good sources of magnesium that is known to be capable of reducing the effects of migraine and heart attack. Millets are rich in phyto-chemicals containing phytic acid which is known for lowering cholesterol..

Millets and Celiac Disease

Celiac disease is an immune-mediated enteropathy triggered by the ingestion of gluten in genetically susceptible individuals. Millets are gluten-free, therefore an excellent option for people suffering from celiac diseases and gluten-sensitive patients often irritated by the gluten content of wheat and other more common cereal grains.

Millets fraction and extract have been found to have antimicrobial activity. Seed protein

extracts of pearl millet, sorghum, Protein extracts of pearl millet are highly effective in inhibiting the growth of phytopathogenic fungi like *Rhizoctonia solani, Macrophomina phaseolina, and Fusarium oxysporum*.

8. What are the effect of millet phenolics on diabetes?

Lower incidences of diabetes have been reported in millet-consuming population. Millet phenolics inhibits enzymes like alpha-glucosidase, pancreatic amylase reduce postprandial hyperglycemia by partially inhibiting the enzymatic hydrolysis of complex carbohydrates. Inhibitors like aldose reductase prevents the accumulation of sorbitol and reduce the risk of diabetes induced cataract diseases. Finger millet feeding controls blood glucose level improves antioxidant status and hastens the dermal wound healing process in diabetic rats.

9. How does Blending of millet flour in composite flours helps?

For improvement of the nutritive value of food and diet to avoid malnutrition and certain diseases, different approaches are needed to offer adults and children improved food with low-cost and locally available food formulations. It has been established that porridges prepared from extruded millet and press-dried cowpea had high nutritional quality with acceptable properties of weaning food (an intermediate consistency, smooth texture and pleasant color and flavor).

10.Explain the prebiotic property of millets.

Prebiotics aid the existing flora or help repopulate the colon when bacteria levels are reduced by antibiotics, chemotherapy or disease. Probiotics are “living microorganisms” which when administered in adequate amounts confer a health benefit on the host. Fermented millet products act as a natural prebiotic treatment for diarrhea in young children. Millet porridge is prepared and drink and lactic acid-fermented porridge. Prebiotics are non-digestible food

ingredients that beneficially affect the host by selectively stimulating the growth and activity of one or a limited number of bacteria in the colon. Millet's whole grain also shows prebiotic activity, which helps to increase the population of friendly bacteria that plays a key role to promote digestion. Malting induces important beneficial biochemical changes in the millet grain.

11.Write a note on the anti- nutritional factors of millets

Millets are also known to have anti-nutritional factors. In developing country, cereal-based foods have low bioavailability of minerals like iron, zinc initiate critical problem for infants and young children. These anti-nutritional factors which acting on iron and zinc bioavailability are certain phenolic compounds, phytates, and fibres. The proportions of these anti-nutrients in diet can be reduced by some household food processing techniques like decortication, germination, malting, fermentation etc, which may also change mineral content and bioavailability.

12.Write a note on the fortification of millets with other foods.

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13.Can zine be fortified to pearl millet flour? Discuss.

It has been established that fortified pearl millet flour seems to be a satisfactory candidate for fortification with zinc, and so can be exploited to address zinc deficiency. On the other hand, heat processing of FMF improved the bioaccessibility of iron from both unfortified and

fortified flour. Fortification with iron also did not affect the bioaccessibility of the native zinc from the flour. Furthermore, double fortification of FMF with ferrous fumarate, zinc stearate, and EDTA did not negatively alter the sensory quality of the products prepared from them.

14.What are the major millets of the world?

Millets are small-seeded cereals with different varieties. Millets would have been originated in Africa and Asia from a group of annual grasses arid and semiarid regions Common ones are pearl millet (*Pennisetum glaucum*), finger millet (*Eleusine coracana*), kodo millet (*Paspalum setaceum*), foxtail millet (*Setaria italic*), little millet (*Panisum sumatrense*), and barnyard millet (*Echinochloa utilis*). They are known as coarse cereals beside maize (*Zea mays*), sorghum (*Sorghum bicolor*), oats (*Avena sativa*), and barley (*Hordeum vulgare*).

15.Write a note on the millet production in the world.

The world total production of millet grains was about 762712 metric tons of which the highest producer being India with an annual production of 334500 tons (43. 85%). The countries who are the next major producers are Nigeria and Niger.

16.In terms of carbohydrates which country consumes millets the highest?

The per capita consumption of millets is the highest in the countries of Western Africa. In the Sahel region countries of Gambia, Burkina Faso, and Chad, 35% of the total cereal consumption contained millet. In Niger and Namibia, 60% of the cereal consumption involves millets while the cereal accounts for 40% of the cereal intake in Mali and Senegal.