## FREQUENTLY ASKED QUESTIONS (FAQs)

**Q.No. 1:** What is the contribution of food processing?

**Ans:** Processing contributes to food security by minimizing waste and losses in the food chain and by increasing food availability and marketability. Food is also processed in order to improve its quality and safety.

**Q.No. 2:** What do you mean by food safety?

**Ans:** Food safety is a scientific discipline that provides assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use.

**Q.No. 3:** What is the use of biotechnology in food processing?

**Ans:** Biotechnology as applied to food processing in most developing countries makes use of microbial inoculants to enhance properties such as the taste, aroma, shelf-life, texture and nutritional value of foods.

**Q.No. 4:** Define fermentation?

**Ans:** The process whereby micro-organisms and their enzymes bring about these desirable changes in food materials is known as fermentation. Fermentation processing is also widely applied in the production of microbial cultures, enzymes, flavours, fragrances, food additives and a range of other high value-added products.

**Q.No. 5:** Define the term safe food?

**Ans:** Safe food is food in which physical, chemical or microbiological hazards are present at a level that does not present a public health risk.

**Q.No. 6:** Explain briefly the role of biotechnology in food fermentation?

**Ans:** Microorganisms are an integral part of the processing system during the production of fermented foods. Microbial cultures can be genetically improved using both traditional and molecular approaches, and improvement of bacteria, yeasts and moulds is the subject of much academic and industrial research. Traits which have been considered for commercial food applications in both developed and developing countries include sensory

quality (flavour, aroma, visual appearance, texture and consistency), virus (bacteriophage) resistance in the case of dairy fermentations, and the ability to produce antimicrobial compounds (e.g. bacteriocins, hydrogen peroxide) for the inhibition of undesirable microorganisms. In many developing countries, the focus is on the degradation or inactivation of natural toxins (e.g. cyanogenic glucosides in cassava), mycotoxins (in cereal fermentations) and anti-nutritional factors (e.g. phytates).

**Q.No. 7:** What is the use of GM yeasts in beer production?

**Ans:** GM yeasts appropriate for brewing and baking applications have been approved for use (e.g. approval was granted in the United Kingdom for use of a GM yeast (*Saccharomyces cerevisiae*) in beer production, containing a transferred gene from the closely related *Saccharomyces diastaticus*, allowing it to better utilize the carbohydrate present in conventional feedstocks). None of these GM yeasts are, however, used commercially.

**Q.No. 8:** Name the traditional methods of biotechnology in food fermentation?

**Ans:** Traditional methods of genetic improvement such as classical mutagenesis and conjugation have been the basis of industrial starter culture development in bacteria (a culture used to start a food fermentation is known as a starter culture), while hybridisation has been used in the improvement of yeast strains which are widely applied industrially in baking and brewing applications.

**Q.No. 9:** Which food ingredients are used in food fermentation?

**Ans:** The flavouring agents, organic acids, food additives and amino acids are all metabolites of microorganisms during fermentation processes. Microbial fermentation processes are therefore commercially exploited for production of these food ingredients.

**Q.No. 10:** Name the molecular methos involved in food testing?

**Ans:** Molecular typing methodologies, commonly involving the polymerase chain reaction (PCR), ribotyping (a method to determine homologies and

differences between bacteria at the species or sub-species (strain) level, using restriction fragment length polymorphism (RFLP) analysis of ribosomal ribonucleic acids (rRNA) genes) and pulsed-field gel electrophoresis (PFGE, a method of separating large DNA molecules that can be used for typing microbial strains), can be used to characterize and monitor the presence of spoilage flora (microbes causing food to become unfit for eating), normal flora and microflora in foods.

**Q.No. 11:** What is the primary use of biotechnology in food industry?

**Ans:** The use of biotechnology in the food industry is primarily based on the use of enzymes that are to be found in different microorganisms. This is of course nothing new. Although we seldom emphasize this fact, several food products of day to day use that have been around for hundreds of years like alcohol, beer, vinegar, cheese, bread and curd are products of biotechnology, since enzymes and microorganisms have had a role to play in their making.

**Q.No. 12:** What is role of biotechnology in making fruit juices?

**Ans:** In making fruit juices too biotechnology has a role, as for example, the use of proprietary enzymes mostly pectinases helps increase the quantity of antioxidants and color in vegetable and fruit juices made by pressing and other means. Citrus fruits have some bitter compounds and that can be eliminated using certain enzymes too.

**Q.No.13:** How does the application of biotechnology in food processing helped for future?

**Ans:** It is important that countries recognize the potential of fermented foods and prioritize actions to assure their safety, quality and availability. A number of specific options can be identified for developing countries to help them make informed decisions regarding adoption of biotechnologies in food processing and in food safety for the future.

**Q.No.14:** Why food biotechnology should be included in educational curricula?

**Ans:** Food biotechnology should be included in educational curricula in order to improve the knowledge base in countries on the contribution of fermented foods to food and nutritional security and to generate awareness of the growing market opportunities for fermented foods and high-value products derived from fermentation processes.

**Q.No.15:** How IPR is related to food industry?

**Ans:** Many of the traditional fermentation processes applied in developing countries are based on traditional knowledge. Enhanced technical and scientific information is required in order to claim ownership of the traditional knowledge of the craft of indigenous fermented foods. Lack of technical knowledge has resulted in the failure to realize the benefits of the industrialization of indigenous fermented foods by individuals who are the rightful owners of the technology. Greater focus is required on issues of relevance to IPR and on the characterization of microbial strains involved in traditional fermentation processes. Emphasis must be placed on IPR education for scientists. National governments should put in place the requisite infrastructure for IPR to facilitate the process. At the institutional level, this infrastructure would include technology management offices for assisting scientists in procedures relating to intellectual property matters. The processes used in the more advanced areas of agricultural biotechnology are generally covered by IPR, and the rights are generally owned by parties in developed countries.