FREQUENTLY ASKED QUESTIONS

1. **Define food spoilage?**

Ans. Food spoilage can be considered as any change which renders a product unacceptable for human consumption. Food spoilage is a complex event in which a combination of microbial and chemical activities may interact. During spoilage the original nutritional value, texture and flavour of the food are damaged, the food becomes harmful to health and unsuitable for consumption.

2. **Enlist different factors affecting proliferation of microorganisms in foods.**

Ans.The parameters affecting proliferation of microorganisms in foods can be categorized into four groups: (i) intrinsic parameters; (ii) extrinsic parameters; (iii) modes of processing and preservation; and (iv) implicit parameters.

3. **Define osmoprotective compounds?**

Ans. Cells have to maintain a positive turgor by keeping the osmolarity of the cytoplasm higher than the environment and they generally achieve this using so-called osmoprotective compounds such as proline and betaine.

4. **What is the difference between specific spoilage organisms and chemical spoilage index?**

Ans. The cell concentration of specific spoilage organisms (SSO) at rejection may be called the minimal spoilage level and the concentration of the metabolite that corresponds to spoilage can be used as an objective chemical spoilage index (CSI).

5. **How off-odours and off-flavours are formed during food spoilage?**

Ans. During food spoilage the production of lipases or proteases will liberate fatty and amino acids from food components which after metabolism can result in off-odours, off-flavours and rancidity.

6. **Name the bacterial species causing spoilage of cured meat?**

Ans. *Micrococcus* spp. are able to grow in the presence of salt and may be responsible for the spoilage of cured meat products such as bacon producing slime, souring or pigmented growth.

7. **How lipolytic rancidity of milk occurs during microbial spoilage?**

Ans. Lipase activity has been reported for most psychotrophs isolated from milk and milk products. *Pseudomonas, Flavobacteria*, and *Alkaligenes* species are the most lipolytic bacteria. Microbial lipases are heat stable. Lipase activity in milk leads to the preferential release of medium and short-chain fatty acid from triglycerides, hydrolysis of as little as 1-2'% triglycerides leading to rancid off-flavour. Milk naturally also contains high levels of indigenous lipase. It is therefore extremely likely that indigenous as well as microbial lipases are important in development of lipolytic rancidity in milk.

8. **What is the reason for bitterness in milk and milk products during storage?**

Ans. The major cause of bitterness in milk and milk products is the formation of bitter peptides due to the action of proteinases. Proteinase activity has been detected in many bacterial species, in particular *Pseudomonas, Aeromonas, Serriatia* and *Bacillus* species. Heat stability of proteinases from several bacterial species has also been reported. Strict quality control is therefore critical in UHT milk products to ensure that heat-stable proteinases do not cause bitter off-flavours. The most investigated source of bitter peptides is the casein.

9. **What is the role of lactic acid bacteria in food spoilage?**

Ans. Lactic acid bacteria spoil foods by the fermentation of sugars to form lactic acid, slime and CO_2, leading to a drop in pH and off-flavours.

10. **Discuss briefly the endogenous enzymatic changes in foods?**

Ans. The endogenous enzymatic changes in foods include a) the post-harvest senescence and spoilage of fruit and vegetables; b) oxidation of phenolic substances in plant tissues by phenolase (leading to browning); c) sugar - starch conversion in plant tissues by amylases; d) post-harvest demethylation of pectic substances in plant tissues (leading to softening of plant tissues during ripening, and firming of plant tissues during processing).

11. **Discuss the role of lipoxygenase in lipid oxidation?**

Ans. Lipoxygenase occurs in many plants and catalyzes the oxidation of unsaturated fatty acids containing a cis, cis 1, 4-penttadiene system to their corresponding

monohydroperoxides. These peroxides have the same structure as those obtained by autoxidation. Lipoxygenase is a metal bound protein with a Fe-atom in its active centre. Plant lipoxygenases produce cis, trans conjugated monohydroperoxides as primary products.

12.**What is the role of PPO in food spoilage?**

Ans. Polyphenoloxidases (PPO) found in fruit tissues can catalyze oxidation of certain endogenous phenolic compounds to quinones that polymerize to form intense brown pigments.

13.**Define oxidative rancidity?**

Ans. Lipid oxidation is one of the most common causes of deterioration of food quality. The unsaturated fatty acid components undergo oxidation due to exposure to atmospheric air giving rise to oxidative rancidity in fat rich foods. The susceptibility to and the rate of oxidation increase as the number of double bonds in the fatty acid increases. Among the products of oxidative rancidity are hydroperoxides, ROOH. These have no taste, but they decompose easily to form aldehydes, ketones and acids, which give rancid flavours.

14.**Name different factors affecting the rate of oxidative rancidity in foods?**

Ans. The rate of oxidative rancidity and course of reaction is influenced by light, local oxygen concentration, high temperature, the presence of catalysts (generally transition metals such as iron and copper) and water activity. Control of these factors can significantly reduce the extent of lipid oxidation in foods.

15.**How antioxidants inhibit lipid oxidation?**

Ans. Antioxidants inhibit lipid oxidation by acting as hydrogen or electron donors, and interfere with the radical chain reaction by forming non radical compounds that will not propagate further radical reaction.