FREQUENTLY ASKED QUESTIONS

1. **Discuss the different changes in unopened containers during spoilage of canned foods?**

Ans. During spoilage, cans may progress from normal to flipper, to springer, to soft swell, to hard swell which are described below:

Flipper: This is due to the mild positive pressure resulted inside the can due to overfilling or under exhausting. The can may be of normal appearance but the end if struck sharply against a solid or table top it becomes convex but it can be pushed back to its normal condition by a little pressure.

Springer: The one end of the can becomes bulged and on pressing or pushing, the other end bulges in the places of preveious one and a can in this condition is known as “Springer”. Springer may be due to the initial stage of hydrogen swell or by over filling the cans or by insufficient exhausting. Product is fit for consumption.

Soft swell: The ends of can are slightly bulged due to the formation of gas within the can as a result of decomposition caused by microbial or chemical activity. The end of the swell can remain convex and spring back to this position if pressed inward.

Hard Swell: A hard swell has such high gas pressure from within that the ends are too hard to dent by hand. Often the high gas pressures distort or buckle the ends or side seam of the cans.

Breather: If the pressure guage shows no vacuum inside a can it is called as “Breather”. An air may pass in and out due to presence of small leak.

2. **Discuss the chemical spoilage of canned foods?**

Ans. The chemical spoilage in most cases is due to production of hydrogen gas produced in can because of action of acid of food on iron of can. This spoilage is termed as Hydrogen swell. It occurs due to following factors:

a) Increased storage temperature.

b) Increased acidity of food

c) Improper exhaust

d) Presence of soluble sulfur and phosphorous compounds

e) Improper timing and lacquering of can at internal surfaces

3. Name different classes of biological spoilage of canned foods?

Ans. The cause of biological spoilage is microbial activity. The microbial spoilage of canned food is classified as caused by thermophilic bacteria and mesophilic organisms. Most common spoilages of microbial origin are known as flat sour spoilage, Thermophilic anaerobic (TA) spoilage and putrefaction.

4. **What are the reasons for growth of microorganisms in heat treated cans?**

Ans. In heat treated cans, the growth of microorganisms occur due to:

Leakage of can*:* It occurs because of manufacturing defects, punctures or rough handling. Bacteria are introduced into can by either in holes or improper seams. In this type, the microorganisms are not usually heat resistant and wide array of organisms had been found to cause spoilage as it is post processing contamination. Microbes may also get entry into can due to cold water, used to cool cans after heat treatment. Leakage may also be responsible for release of vacuum, which can favor the growth of microorganisms. Presence of low heat resistance organisms usually indicates leakage of can.

Under processing*:* It includes sub-optimal heat treatment, faulty retort operations, excessive microbial load and contamination in product and change in consistency of the product.

5. **Define flat sour spoilage of canned foods?**

Ans. This is caused by souring bacteria. One characteristic of this spoilage is that ends of can remain flat during souring. Because of this condition, the detection of spoilage from outside is not possible thereby culturing of contents become necessary to detect the type of organisms. Main organisms involved are *Bacillus,* while it occurs more frequently in low acid foods. *Bacillus* spp. has ability to produce acid without gas formation.

6. **Define TA spoilage of canned foods?**

Ans. This type of spoilage is caused by thermophilic anaerobe not producing hydrogen sulfide. *Clostridium thermosaccharolyticum* is the main organism involved. It produces acid and gas in foods. Spoiled food produces sour or cheesy smell.

7. **Discuss the spoilage of canned foods by non-Spore forming bacteria.**

Ans. Presence of non spore formers in cans indicate post processing contamination. The organisms whose vegetative cells are heat resistant are more readily found. Following organisms are more prominent: *Enterococcus, Streptococcus thermophilus, Micrococcus, Lactobacillu, Leuconostoc, Microbacterium.* Presence of these organisms indicates leakage of container. Cooling water is one of the important source of contamination, thus coilforms also gain entry into the can through leakage.

8. **What is the effect of canning on sensory properties of canned plant foods?**

Ans. The heat process itself has a major effect upon the quality of a food product and is responsible for a range of changes taking place. Starch gelatinization and structural protein denaturation have a direct influence on the texture of a food. Heat-induced reactions such as the Maillard reaction affect the color and flavor as well as the nutritional status of the food. In general, changes that occur before the heat process are less important than those during or after processing since it is the manipulative and thermal procedures of food production that have the greatest effect on tissue damage and the resultant mixing of cell contents from different materials.

9. **Why fruits and vegetables undergo slight changes in flavour during canning?**

Ans. Canning preservation does not significantly alter the basic flavors of sweetness, bitterness, acid, or salt. In fruits and vegetables, changes are due to complex reactions, which involve the degradation, recombination, and volatilization of aldehydes, ketones, sugars, lactones, amino acids, and organic acids.

10. **Define oxidative rancidity?**

Ans. Oxidative rancidity is caused by oxidation in unsaturated oils or fats. When these types of oils or fats are exposed to oxidation, they begin decomposing into short-chain

fatty acids, such as butyric acid, which gives the fats a rancid taste.

11.**What is the effect of canning on colour of meat and meat products?**

Ans. The time–temperature combinations used in canning have a substantial effect on most naturally occurring pigments in meat foods. The red oxymyoglobin pigment is converted into brown metmyoglobin, and purplish myoglobin is converted into red-brown myohemichromogen. Maillard browning and caramelization also contribute to the color of sterilized meats.

12.**Discuss the effect of canning on flavour and aroma of canned meat products?**

Ans. In canned meats, there are complex changes (for example, pyrolysis, deamination and decarboxylation of amino acids, degradation, Maillard reactions and caramelization of carbohydrates to furfural and hydroxymethyl furfural, and oxidation and decarboxylation of lipids). Interactions between these components produce more than 600 flavor compounds. Other volatiles have been identified as having a significant effect on the flavor of foods, and perhaps one of the most dramatic is the development of “catty taint.” This is an extremely unpleasant and potent odor produced by the reaction of unsaturated ketones, notably mesityl oxide, with natural sulfur-containing components of the food. Heating is essential in the formation of the taint and incidents have been widespread due to the diverse availability of the unsaturated ketones. Examples include processed meat products using meat from cold store, painted with a material containing mesityl oxide as a solvent contaminant, canned ox tongues, which had been hung on hooks coated with protective oil, and pork packed in cans with a side seam lacquer, which had been dissolved in impure solvent.

13.**What is the reason for softening of meat products during canning?**

Ans. Softening is caused by hydrolysis of collagen, solubilization of the resulting gelatin, and melting and dispersion of fats through the product.

14.**What is the effect of canning on protein quality?**

Ans. The total amount of crude protein, generally, appears relatively unchanged due to heat processing but can suffer from leaching into the liquid component of some products. The crude protein levels, however, appear to be stable during subsequent storage of canned vegetables. The changes occurring are associated with tertiary

structure, functionality, chemical changes related to digestibility, and amino acid availability.

15.**What is the role of polyphosphates in canned meat products?**

Ans. Polyphosphates are added to some meat products to bind water. This increases the tenderness of the product and reduces shrinkage.