FAQ

Qno. 1: How did the production of margarine come into existence?

Ans 1: During the 1860's large sections of the European population migrated from country to town and changed from rural to urban occupations. At the same time, there was a rapid increase in population in Europe and a general recession in agriculture leading to a shortage of butter, especially for the growing urban population. Consequently, the price rose beyond the reach of many poor people. The situation in France demanded a butter substitute, which would be cheaper and would also keep better. A French chemist, Hippolyte MeÁge MourieÁs who produced margarine as a substitute for butter, resolved the crisis, and margarine production came into being.

Qno. 2: What is margarine?

Ans 2: Margarine is an imitation butter spread used for spreading, baking, and cooking. Whereas butter is made from the butterfat of milk, modern margarine is made mainly of refined vegetable oil and water, and may also contain milk. In some locales, it is colloquially referred to as "oleo", short for oleomargarine. Margarine, like butter, consists of a water-in-fat emulsion, with tiny droplets of water dispersed uniformly throughout a fat phase in a stable crystalline form. Margarine can be used for spreading, baking, and cooking. It is also commonly used as an ingredient in other food products, such as pastries and cookies, owing to its versatility.

Qno. 3: What types of oils are employed to manufacture margarine?

Ans 3: Table margarine is made from appropriate oils and fats (soybean, rape/canola, cottonseed, palm, palm kernel, coconut) which may have been fractionated, blended, hydrogenated in varying degrees and/or interesterified. Fish oil (hydrogenated or not) may also be included. Other ingredients include surface-active agents, proteins, salt, and water along with preservatives, flavours and vitamins.

Qno. 4: Briefly describe the manufacture of margarine.

Ans 4: Margarine production involves three basic steps: emulsification of the oil and the aqueous phases, crystallisation of the fat phase and plastification of the crystallised

emulsion. Water-in-oil emulsions are cooled in scraped-wall heat exchangers during which time fat crystallisation is initiated, a process known as nucleation, and during which the emulsion drop size is reduced. There follows a maturing stage in working units during which crystallization approaches equilibrium, though crystallisation may continue even after the product has been packed.

Qno. 5: List a few formulations for manufacturing margarine.

Ans 5: A few formulations employed to produce margarine are as follows:

- Blends of hydrogenated soybean oils with or without unhydrogenated soybean oil,
- Blends of canola oil, hydrogenated canola oil and hydrogenated palm oil or palm stearin,
- Blends of various hydrogenated cottonseed oils,
- Blends of edible tallow with vegetable oils (soybean, coconut),
- Blends of palm oil with hydrogenated palm oil and a liquid oil (rapeseed, sun-flower, soybean, cottonseed, olive),
- Palm oil (60%), palm kernel oil (30%) and palm stearin (10%),
- Palm stearin (45%), palm kernel oil (40%) and liquid oil (15%).

Qno. 6: What is margarine composed of?

Ans 6: Margarine contains 80% oil**,** with 40% in the half-fat margarines or minarines. The oil phase contains the fat-soluble ingredients. These are usually fat soluble flavors, vitamins as well as emulsifiers and carotenes. The aqueous phase holds the water-soluble ingredients, which are generally water-soluble flavors, salt, milk or milk solids, and in special cases, preservatives. Margarines with lower-fat content also contain stabilizers, e.g., gelatin, and ingredients to increase the dry matter content, e.g., milk powder.

Qno. 7: What considerations are to be made while employing a fat blend for margarines?

Ans7: The choice of the fat blend of the margarine follows three criteria, namely, the achievement of certain physical properties, the presence of claims or declaration on the pack and nutritional physiological considerations. Considering those criteria, a fat blend can vary within relatively wide limits, because oils and fats are themselves refined to be mainly neutral in taste and have equal or at least similar physical properties and chemical composition. Bearing in mind the above criteria, the fat blend composition can be optimized to give the lowest cost.

Qno. 8: What role does salt play in the margarine?

Ans8: Salt has two functions. One is to decrease the microbiological sensitivity; the other is to act as a flavor. Salt content differs greatly from country to country. The other role for salt results from its bacteriostatic behavior. In margarines with salt contents >2% product weight, this value is reached in the aqueous phase because the water content of margarine is 20% at maximum. In addition to these properties, salt levels ~ 0.2% work as an antispattering agent during shallow frying.

Qno. 9: What factors are responsible for the hardening of margarine?

Ans 9: Hardness of margarine is determined by many factors. If it crystallizes in the pack, i.e., after production, this results in a much harder product because the margarine can no longer be overworked mechanically. The lower the oil content, the harder the product. Primary bonds between the crystals stay intact even during the mechanical overworking; secondary bonds are broken up. Strong primary bonds therefore contribute greatly to hardness. The higher the shear stress during overworking, the more the continuous structure turns into a grainy structure. Air or gas, whipped in intentionally or unintentionally, also influences hardness.

Qno. 10: What are the various steps of margarine production?

Ans 10: The following diagram highlights the manufacture of margarine.

Qno. 11: What is the need for adding acid in margarine?

Ans 11: Acids lower the pH value, improving bacteriological stability. They also create a better, fresh taste. The use of lactic acid gives a peaked, fresh taste. Citric acid is a milder acid with the additional benefit of binding metals such as iron in a complex, which tremendously reduces the sensitivity of the oil to autoxidation.

Qno. 12: What type of preservatives are used in margarine making?

Ans 12: Commonly benzoic acid and sorbic acid are used as preservatives in the manufacture of margarine. Benzoic acid works as a preservative in the undissociated form only. The working mechanism of benzoic acid is based on the inhibition of enzymes belonging to the acetic acid cycle. It also inhibits oxidative phosphorylation as well as the citric acid cycle and has a negative influence on cell walls.

Sorbic acid usually is allowed up to 0.12%, but the amount used is normally lower. Sorbic acid is 50% more effective than benzoic acid and is used mainly in reduced fat margarines. Sorbic acid forms covalent bonds with SH-groups of the enzymes**,** thus inactivating them. In addition, it has negative influence on the cell walls**.**

Qno. 13: List the ingredients that are used in the manufacture of margarine.

Ans 13: The following ingredients are employed to manufacture margarine:

Fat blend, emulsifiers, milk components, acids, salt, flavors, preservatives, thickening agents, stabilizers, colorants, vitamins, water, and starch.

Qno. 14: What is bakery margarine?

Ans 14: Bakery margarines have a higher melting point (35-38°C) than those products produced for direct consumption. They do not have to melt in the mouth, but are designed to separate the crumbs as long as possible by breaking the continuity of the protein starch structure. This characteristic and their function as nuclei for boiling (steam formation that puffs the baked goods) ensure tender cake.

Qno. 15: What is half-fat margarine?

Ans15: Half-fat margarines have fat contents prescribed 40%. In such reduced-fat products, the water phase has to be stabilized with thickeners, because the emulsion and the crystal network alone are not able to guarantee temperature stability and good shelf life properties. In addition, dry matter is increased by the addition of milk proteins as milk powder. Half-fat margarines normally contain preservatives, because the water droplet distribution is much coarser than with normal margarine, and therefore they are much more sensitive toward microorganisms that find ideal conditions in which to grow.