

Processing and applications of Corn oil and Corn sauce

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Introduction

Corn and corn products has been in the use for over several centuries now and there has been a lot of development in the production of types of corn products. Many products emerged as new ideas came pouring out man's brain leading to various technological improvements and revolutionary machineries which helped human in developing different products. And two of those products derived from the corn are corn sauce and corn oil. Corn sauce also known as fermented corn sauce which denotes that the product has been obtained by the process of fermentation using corn starch as the main ingredient. The fermentation as we know gives a savory taste to the sauce making it a viable ingredient in soups, gravies and broths. Corn oil on the other hand in has nothing to do with fermentation as it is extracted from the germ of the corn. The oil is extracted through solvent extraction method using hexane or iso-hexane. The extracted corn oil cannot be directly used for production of food items unless it is refined. Corn oil can also be used for biodiesel. Other uses for corn oil are salve, insecticide, inks, paint, erasers, helps prevent rusting of metal surfaces and has a vital role in the production of textiles.

Corn Oil

Corn oil is yellow fatty oil obtained from the germ of corn kernels. The first commercial manufacturing of corn oil took place in 1889. Corn having oil content of 6-7% is known as High oil corn. It is a rich source of linolenic acid, which is one of the essential acids required for cell membranes, gastro intestinal functions and immune system. Corn oil is more expensive than most other types of vegetable oils.

Processing of Corn oil

A typically corn oil is derived from the germ of the kernel. It is a part of corn plant, which is recognizably different from the usual nutrients that are found in Endosperm. The fat content of corn germ is between 20-47% accounting for about 85% of the total fat of corn. The endosperm is a tissue which is produced inside seed of the plant.

i. Corn germ separation

It is the first step in corn oil processing. The corn germ separation is also known as Germ extraction or corn embryo extraction.

Types

- Y Dry type corn germ separation
- Y Wet type corn germ separation
- Y Half wet corn germ separation



Figure 1: Corn germ

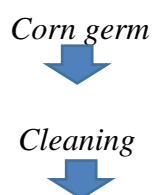
ii. Corn germ oil extraction

The amount of oil in kernels is around 85% of the oil in whole seed. It is produced by expeller pressed method. After this method, Oil is solvent extracted by using isohexane. The solvent is recovered for reuse by evaporation method. The extracted crude corn oil is then sent to the refining plant to get high quality corn germ oils.

ii. Refining

During this process, Alkali treatment or degumming is used to remove phosphates. Alkali treatment neutralizes free fatty acids and removes the color of crude oil. To removes the waxes in crude oil, Winterization process is used. After this process, the crude oil is deodorized by steam distillation at 230-266 C under high vacuum.

Flow chart for making corn oil



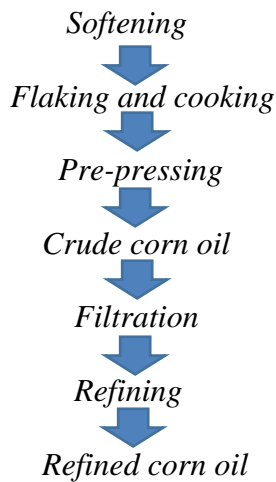


Figure 2; corn oil

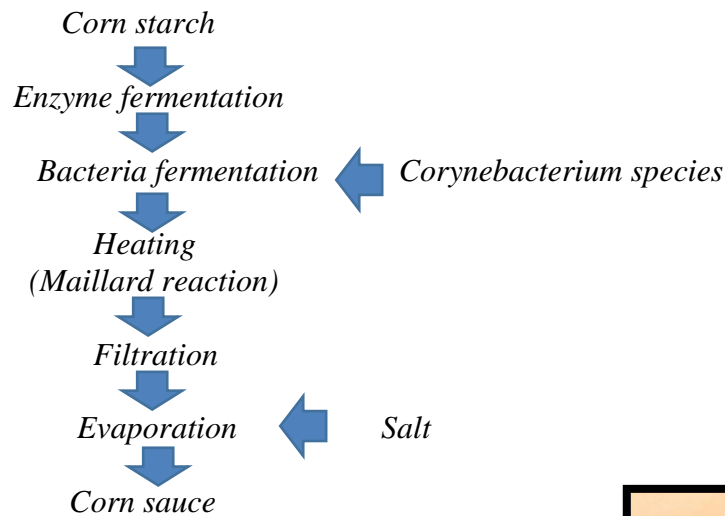
Applications of corn oil

- Y It is used as a refined vegetable oil and commonly used for industrial purposes or as a ingredient in cosmetics.
- Y Because of its taste and vitamin content, it is used in salads, vinaigrettes, mayonnaises and sauces.
- Y It is a major source of biodiesel and minorly used for cosmetic purposes.
- Y It is used in hair and skin care and used as baby oil.
- Y Other industrial uses such as paint, soap, salve, inks, rust proofing for surfaces of metals, nitroglycerin and textiles.
- Y Used as a carrier for drug molecules in the preparation of pharmaceuticals.

Corn Sauce

Corn sauce is also known as fermented corn sauce. It is produced by fermentation by using corn starch as the main substrate. It is a mix of free amino acids, minerals and salts. *Corynebacterium* species is used in this fermentation process. The fermentation parameters are controlled for temperature, time and pH. After this process, the broths go through a step of cooking to destroy the microorganisms. It induce Maillard reaction and the cell mass is removed by filtration. During evaporation process, iodine is added to increase its microbial stability.

Production flow chart for corn sauce production



Applications of corn sauce

- * Used as both paste and powder form
- * Used to flavor dishes such as gravies, broths and soups



Figure 3: Corn sauce

Conclusion

Although, corn is not being produced all around the world it still has a major part in the food business. One way or the other every human being must have consumed corn directly or indirectly in their life. On the contrary being one of the most important crop it does not satisfy all the cravings of a person and also lacks in some nutritional values where many other crops have plenty. In this article, we explained the industrial processes involved in the production of corn sauce and corn oil and also listed out some of their applications.

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