

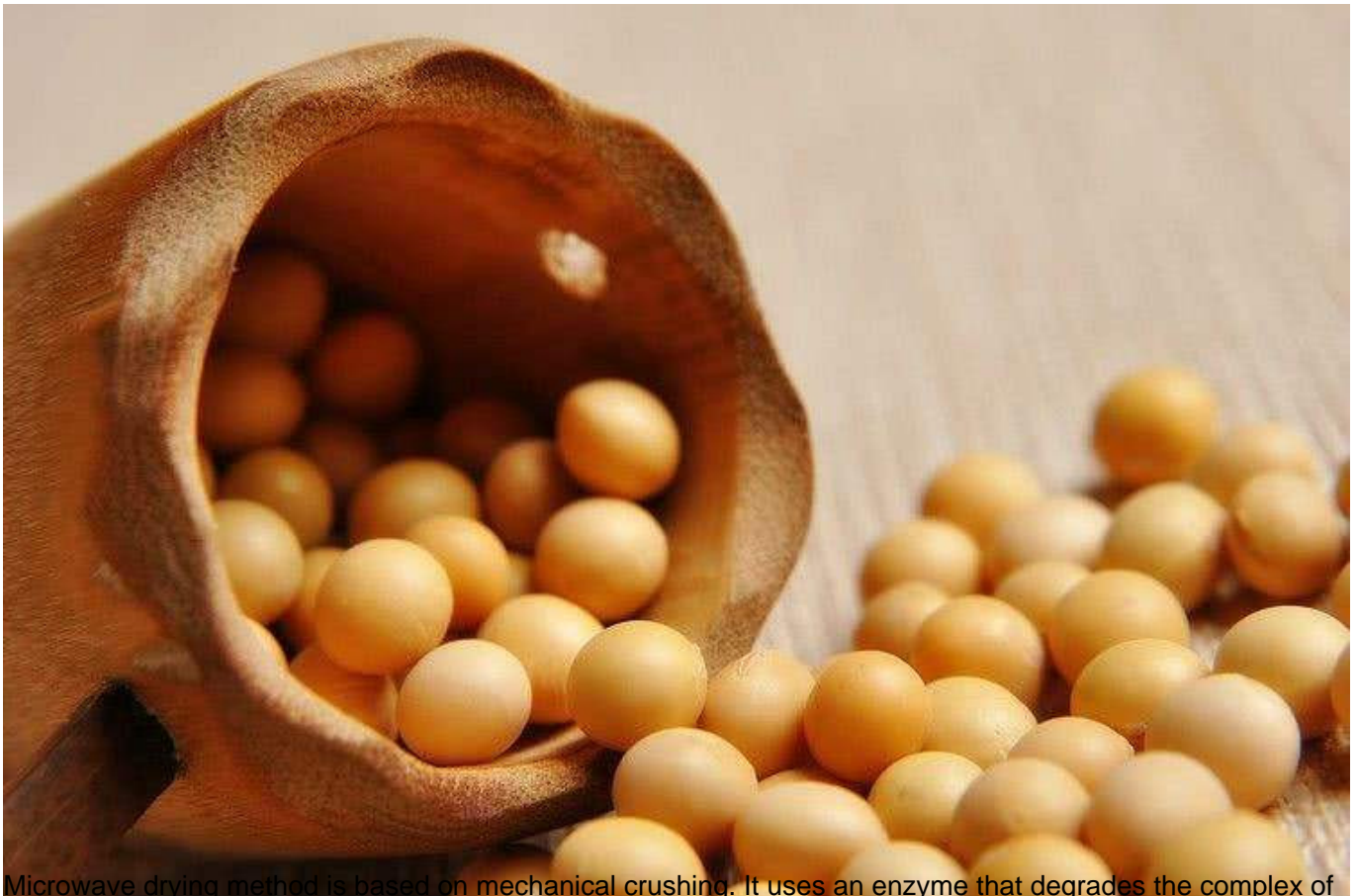
# Soybean oil extraction process

At present, three kinds of oil extraction processes are mainly used in the oil and fat industry: solvent leaching method, pressing method and extrusion puffing-leaching method.

For the traditional three oil-making processes, the pressing method is to physically squeeze out the oil, the process is simple, but the oil yield is low, the protein denaturation is serious during the oil extraction process, and it can only be used as a fertilizer, resulting in a large number of high-quality plants. Waste of protein.

Solvent leaching and extrusion puffing-leaching method have high oil yield, but labor intensity is large, and there is solvent residue problem. Solvent No. 6 and n-hexane which are main leaching solvents have certain toxicity, are flammable and explosive, and have poor production safety.

Basic principle of oil extraction by [microwave drying](#)



Microwave drying method is based on mechanical crushing. It uses an enzyme that degrades the complex of vegetable oil cells, lipoproteins, and lipopolysaccharide to act on the oil, so that the oil is easily released from the oil solids, and the protein and protein are utilized. Carbohydrates separate oil and non-oil components by the difference in affinity between oil and water and the difference in oil to water ratio [11]. In the water

enzymatic process, in addition to degrading oil cells and decomposing lipoproteins, lipopolysaccharides and other complexes, the enzyme can also destroy the lipoprotein membrane on the surface of the oil droplets, reduce the stability of the emulsion, and thereby increase the yield of free oil.

Basic process of microwave extraction and [extraction of soybean oil](#)

The basic process includes clearing and peeling, pulverizing and grinding, quenching and tempering extraction, separation and post-treatment. After the soybean is peeled, the soybean is ground into a slurry of a certain particle size, the solid-liquid ratio is adjusted, and an enzyme preparation of a certain type and concentration is added, and enzymatic hydrolysis is carried out under appropriate conditions. After completion of the enzymatic hydrolysis, the slurry was separated and extracted on a centrifuge to obtain a liquid phase oil, a hydrolyzate, an emulsion, and a solid phase wet slag.

Advantages of Microwave Drying for Extracting Soybean Oil

Microwave drying method for extracting vegetable oil has mild conditions, simple equipment, safe operation and no solvent residue; oil and protein can be separated from oil crops simultaneously, nutrients in oil can be effectively retained; odor components and nutrient inhibitor factors in oil can be removed Gas production factor, the extracted oil has light color, low phospholipid content, acid value and peroxide value, generally can be eaten without refining; protein isolated by microwave drying can be further processed and can be widely used in various food systems. The emulsified oil obtained by the separation can obtain high-quality oil without treatment after demulsification.

in conclusion

The microwave drying method is safe and green, and the recovered (hydrolyzed) protein powder has high utilization value. Although there are still some problems in the extraction of soybean oil by microwave drying, such as insufficient enzyme resources, high cost of use, and easy inactivation, with the continuous development of bioengineering and immobilized enzyme technology, it is believed that these problems will be solved.

Further research is needed in the future: some of the oils and fats in the microwave drying process are present in the emulsion, and the research on the emulsion breaking process of complex emulsion systems needs to be studied in depth; the optimal enzymatic hydrolysis parameters for high oil extraction rate and protein extraction rate must be Optimization, etc. The microwave drying method has low investment, low energy consumption and easy disposal of waste. It is a technology with broad development prospects and is one of the development directions of the oil industry in the future.