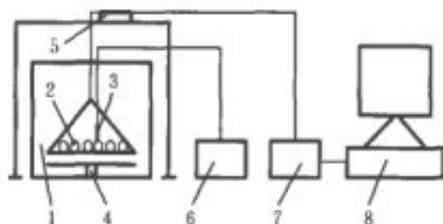


# Effects of different drying methods on the quality and energy consumption of okra Crisp Bars



Abstract: In order to determine the best drying method of recreational okra crisp strips, the effects of [microwave drying equipment](#), hot air drying, vacuum freeze drying, vacuum microwave drying, vacuum freeze combined with vacuum microwave drying and hot air combined with vacuum microwave drying on hardness, brittleness, color, shrinkage, drying time, energy consumption and total flavonoids, total phenols and polysaccharides of okra crisp strips were studied and compared. The effect of content.

Key words: [Okra microwave drying](#), drying method, quality, energy consumption rate



Okra, also known as carambola and Kidney-tonifying herb, belongs to the annual herb of okra family, originated in Africa, and is now widely cultivated in Asia, southern Europe and the Americas. The tender fruit of okra is rich in protein, free amino acid, VC, VA, VE, phosphorus, iron, potassium, calcium, zinc, manganese and other mineral elements, especially flavonoids, polyphenols and polysaccharides. Flavonoids and polyphenols have the biological activities of scavenging free radicals, delaying aging, cancer prevention and radiation resistance. Polysaccharides can promote the excretion of organic substances and reduce the accumulation of toxins in the body.

However, okra has a short shelf life and can only be stored for 2-3 days at room temperature. If it can not be sold or processed in time, it will lose more water and nutrients, and the fruit will become senile and wilting easily. Domestic research on okra mainly focuses on its appearance, nutrient content, planting conditions, and the research on its dried products is still rare.

At present, the dried products of okra on the market include okra powder condiment, health bag tea and fried okra crisp strips, etc. Condiments and health bag tea can not be used as ready-to-eat products, but the products processed by frying have high oil content, more loss of nutrients, and it is more difficult to solve the adverse effects of oil oxidation on product quality. In recent

years, fruit and vegetable crisp snack food has quietly entered the market, and is more and more popular with consumers. Some domestic enterprises are also aiming at the market and actively planning the processing projects of dried leisure food of fruits and vegetables.

At present, the main drying methods of non-fried fruits and vegetables are far infrared drying, hot air drying, vacuum freeze-drying, vacuum microwave drying and so on. Far-infrared drying has the advantages of fast heating speed, uniform heat absorption and high heat transfer efficiency. Hot air drying technology is the simplest operation, but it has low thermal efficiency and poor product quality.

Vacuum freeze-drying is suitable for drying of highly heat-sensitive and highly oxidizable materials. It can retain the color, aroma, taste and nutrient components of fresh materials without loss, but it has large equipment investment, high energy consumption and long drying time. Vacuum microwave drying has fast drying speed, good product quality and sufficient energy utilization, but it is prone to heating non-uniformity in the heating process, which leads to the quality of heat-sensitive materials. Compared with vacuum freezing and vacuum microwave, vacuum freezing combined with vacuum microwave is superior to single drying method in drying time, energy consumption, VC retention rate, color and texture.

Chen Guifen carried out hot air drying, hot air combined with vacuum microwave drying, vacuum microwave drying and vacuum freeze drying of shelled litchi. The results showed that the protein content and reducing sugar content of hot air combined with vacuum microwave drying were the highest. However, Li Lijuan found that the shrinkage and browning of lotus root crisp chips dried by hot air combined with vacuum microwave were higher than those dried by hot air alone, and their crispness, VC retention and polyphenol retention were also lower than those dried by vacuum microwave alone. Therefore, the best drying method should be selected according to the characteristics of actual materials.

In this study, the texture, nutrient content, drying time and energy consumption rate were selected to compare and analyze the effects of far infrared, hot air, vacuum freezing, vacuum microwave, vacuum microwave, vacuum freezing combined with vacuum microwave and hot air combined with vacuum microwave drying on okra, in order to screen the most suitable drying method of okra crisp strip and provide reference for its industrial production.