

Study on Microwave Processing Technology of Maize

Corn flake is a kind of low calorie, high dietary fiber instant food with grain nutrition. It is rich in thiamine, riboflavin, carotene and other vitamins and magnesium minerals. The content of essential amino acids in total protein is higher than that in rice and flour. China's maize production ranks third in the world, reaching 9.5 million tons in 1922. There are abundant resources for developing maize food.

[Microwave Drying Machinery](#) and Equipment Technology



Domestic [Corn Flake produc](#) mostly adopt steam cooking, hot air drying, pressing, baking and extrusion processes. The production is intermittent, with low output, high labor intensity and poor environmental protection and hygiene conditions. German company Bule R Magia designed corn chips production lines for some countries using steam cooking process.

Microwave technology has been applied to food processing since 1960s. It has been developed rapidly in recent ten years. It is widely used in frozen food softening, food drying, cooking and sterilization. However, the research on the cooking technology of cornflakes has not been reported yet. We have done a lot of experimental research on the microwave cooking technology of cornflakes, and at the same time, we have studied the traditional cooking technology of cornflakes. The change of cooling and drying equipment to high efficiency vibration multi-layer horizontal garden moving cooling and drying equipment makes the microwave processing of cornflakes realize continuous industrial production.

Characteristics of Microwave Processing

Fast speed and high thermal efficiency

Because microwave can penetrate into the interior of the material, the material with a depth of 30cm can be penetrated by 9M Hz microwave. The heat is not transferred from the surface to the interior, so the drying speed is fast. Generally, the heating and drying process can be completed in only 10-11% of the time of conventional method. At the same time, the heat of microwave heating comes from it. In the interior of the material, the heat loss is less in the surrounding air, and the thermal efficiency can be increased by 2-4 times than that of the conventional heating method.

Even heating, good product quality

Microwave medium heating heat source is dispersed in the heated material. It is heated from the inside of the material and has automatic balance. Even if the shape of the material is complex, heating and drying are uniform. Conventional heating is easy to produce endogenous phenomenon of external coke. Microwave

heating also has the characteristics of endogenous phenomena.

Bactericidal action thus prolongs the shelf life of the product.

Instantaneous control, easy to continuous production

Microwave heating has less thermal inertia, no heating process immediately after driving, stepless speed regulation of microwave power transmission, sensitive response and instantaneous control, which makes the production of cornflakes continuous.

Selective Heating Drying

It has been mentioned above that microwave heating and drying is closely related to the properties of materials. Microwave is easy to heat and dry medium with high dielectric constant. The dielectric constant of water is especially large. When $f = 3000\text{Hz}$, $t = 25\text{ C}$, the dielectric constant reaches 76.7. Water in materials can absorb microwave strongly. It absorbs more heat than materials, moisture is easy to evaporate, and materials. It absorbs fewer calories, does not easily cause overheating, small loss of nutrients, and good color. Generally, materials with hundreds to tens of water content can be effectively dried by microwave heating.

Conclusion

Microwave heating drying is selective and closely related to the properties of materials. It has a certain range of requirements for moisture content of heated materials. The moisture content of raw material corn ballast is about 14%, which can effectively utilize microwave energy.

2. Controlling the moisture and temperature of corn ballast after microwave cooking and drying to reach the required value for flake rolling is the key to obtain ideal flake shape in cornballast processing.

3. Microwave heating has the characteristics of high speed, high thermal efficiency and uniform heating. The shape of cornflakes processed by this technology is flat, the color and fragrance are attractive, the product quality is good, and the continuous production is realized. Successful research on microwave processing technology of cornflakes has provided scientific data for industrial production.

4 The microwave leakage of cornflakes should be strictly controlled in accordance with the national standards.