Experimental study on far infrared-microwave combined drying of Lentinus edodes

Absrtact: In order to improve the quality of dried Lentinus edodes, the drying experiments of fresh Lentinus edodes were carried out in the far-infrared drying chamber at 60 C and microwave at 0.8 W/g. The results showed that the far-infrared drying and microwave drying equipment had three stages: accelerated drying, constant-speed drying and decelerated drying, but the accelerated drying stage of microwave drying was very short and soon entered the constant-speed drying stage.

Through the experiment of drying fresh Lentinus edodes by far-infrared drying followed by microwave drying, the results showed that the higher the moisture content, the higher the drying rate and the lower the energy consumption, but the quality of dried Lentinus edodes decreased, and the best quality was achieved when the moisture content was about 53%.

The higher the temperature of far-infrared oven is, the higher the drying rate is, the lower the energy consumption is, but the quality of dried mushroom is the best at about 66.81 C. The higher the microwave drying power is, the higher the drying rate is, but the less the energy consumption is increased. When the microwave drying power per unit mass of fresh mushroom is about 1.13 W/g, the quality of dried mushroom is the best.

Key words: far infrared; combined drying; microwave drying of Lentinus edodes;

Drying is one of the most important means of fresh mushroom processing and storage at present. The contradiction between economy and product quality control of traditional dried mushroom production is increasingly prominent. How to reduce costs and improve product quality is an urgent problem to be studied and solved in the research of dried mushroom.

Experts at home and abroad have done a lot of research on drying food by microwave and far-infrared methods, such as Liu Yunhong and others. The effects of different ultrasonic power and far-infrared radiation temperature on drying time, drying rate, diffusion coefficient, microstructure and energy consumption of pumpkin slices were studied. Chen Junchen and others applied three-factor quadratic universal rotary combination design to optimize the combined drying of hot air and vacuum for apricot and abalone mushrooms. Technical parameters;

Xu Yanyang and others explored the combined drying method of hot air and microwave to compare the drying process of agricultural materials; KUMAR optimized the combined drying process of okra hot air and microwave by using three-factor quadratic rotation regression test; MASKAN studied the drying characteristics of kiwifruit slices by hot air, microwave and hot air-microwave combined drying. There are still many studies on material combined drying, but there are few studies on microwave and far-infrared drying of Lentinus edodes, especially far-infrared and microwave combined drying of Lentinus edodes.

Far infrared has a certain penetration, good quality after drying, fast drying speed and energy saving. Microwave has very strong penetration and is suitable for agricultural products which are difficult to dehydrate or lose moisture in later drying stage. In this paper, the combined drying of Lentinus edodes by far-infrared radiation in the early drying stage and microwave in the later drying stage was studied, which will provide theoretical basis for optimizing the drying method and technology of Lentinus edodes.