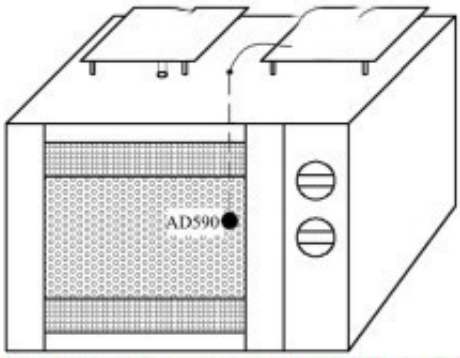
Effects of hot air, microwave and combined drying on the quality of garlic slices

ABSTRACT: In order to study the effects of hot air, microwave and combined drying on the quality of garlic slices, garlic slices were used as raw materials, and the drying rate, thiosulfite content, sensory score, color L value, rehydration ratio and comprehensive score were taken as indicators.

The effects of different hot air temperature and microwave power on the drying characteristics and quality of garlic slices were compared. The drying conditions of garlic slices were optimized by L (33) orthogonal experiment, taking hot air temperature, dry base moisture content at conversion point and microwave drying equipment as experimental factors.

The results showed that the comprehensive scores of garlic chips dried by hot air drying at 60 C and microwave drying at 550 W were 83.64 and 80.74 respectively. Hot air temperature and microwave power had a significant effect on the comprehensive score of garlic slices dried in combination (p



Schematic diagram of microwave drying temperature control system

The optimum drying conditions of garlic slices by hot air microwave combined with hot air were as follows: the dry base moisture content was 1.00 g/g from 65 to the conversion point in the early stage, and 0.18 g/g from 550 W microwave power in the later stage. Under these conditions, the drying rate of dehydrated garlic slices prepared by combined drying was the fastest, the content of thiosulfite was 1.7739 mmol/100 g, the comprehensive score was 92.21, and the sensory quality was better. Therefore, hot air microwave combined drying technology is a better method for garlic chips drying.

Key words: garlic microwave drying, hot air drying, microwave drying, combined drying, drying quality

Garlic is a perennial herb belonging to the genus Allium of Liliaceae, which is rich in nutrition. It has the functions of anti-bacterial, anti-inflammatory, improving immunity, preventing arteriosclerosis and cancer, and can alleviate and treat diseases such as hyperlipidemia, high

cholesterol and diabetes. 

The main active ingredients of garlic are eight thiosulfite esters. Allicin (diallyl thiosulfite) is the main thiosulfite, accounting for about 70% of the total thiosulfite of crushed garlic. However, garlic has short dormancy period, easy germination and decay, and can not bear storage. Dehydrated garlic can maintain the original color, aroma, taste and nutritional components, prolong storage period. 80% of garlic harvest in developed countries is used to produce dehydrated garlic.

Combined drying has the advantages of improving the quality of fruit and vegetable dried products, shortening drying time, energy saving, environmental protection, safety and efficiency, and overcomes the shortcomings of single drying. Wang Jing used hot air and vacuum microwave to dry garlic slices. In the early stage, vacuum microwave was used for 20 minutes, and in the later stage, hot air was used for 60 minutes. The quality of garlic slices was higher and the drying rate was increased. The drying time of garlic cloves by microwave hot air combined with Sharma G P is 80%-90% shorter than that by traditional hot air drying, and the color and flavor intensity of garlic cloves are obviously better than that by hot air drying.

However, there are few reports on the research of garlic drying by hot air microwave combined with microwave. Therefore, the effects of hot air, microwave and hot air microwave combined drying on the quality of garlic slices were studied in this experiment. The aim is to determine the drying process parameters of garlic slices and find a suitable combined drying method for garlic slices, to improve the quality of garlic slices and to provide theoretical data for fruit and vegetable drying. According to.