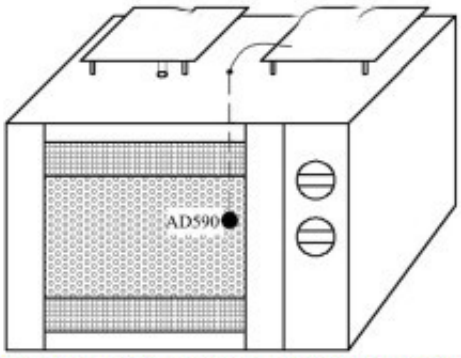
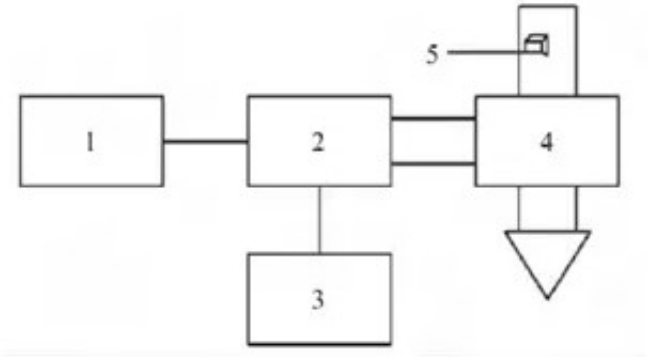
Optimization of microwave drying technology for balsam pear



Schematic diagram of microwave drying temperature control system

[Abstract] The water loss characteristics of Balsam Pear during microwave drying were studied by single factor experiments of microwave drying equipment, slice thickness and sample loading. The drying conditions of balsam pear were optimized by response surface analysis of three factors and three levels, and the regression model was established based on the water loss rate, electricity consumption and sensory score of balsam pear. .

The results showed that microwave power and sample loading had significant effects on water loss rate, sample loading had significant effects on electricity consumption, and microwave power had significant effects on sensory score of balsam pear. When microwave power is 480 W, slice thickness is 0.59 cm and sample loading is 62.86 g, the water loss rate is 3.08 g/min, the power consumption is 2.38 kW.h/kg, and the sensory score is 9.33.



Keyword: bitter melon microwave drying process optimization response surface analysis

Introduction

Momordica Charantia L. (Momordica charantia L.) is an annual climbing herb of Cucurbitaceae, which has high nutritional value and health care value. The balsam pear has strong seasonality and short shelf life. It is of great practical significance to make balsam pear dried slices to balance the demand of low and peak season and adjust the market. At present, the preparation of balsam pear is mainly traditional drying method and drying method. There is no research

report on Microwave Technology in this field. The drying of agricultural products by microwave drying technology is one of the development trends. The optimization of microwave drying technology mainly includes factors such as microwave power, chip thickness and sample size. In view of these factors, single factor experiments were carried out under the same conditions as other factors to investigate the effects of various factors on the drying of balsam pear and select the best drying conditions.

Response surface analysis of microwave drying process

According to the design principle of Box-Benhnken's central combination experiment and the results of single-factor experiment, three factors, microwave power, slice thickness and sample loading, which have significant effects on the drying of balsam pear were selected.

On the basis of the sub-experiment, response surface methodology (RSA) with three factors and three levels was used to analyze the response values of drying water loss rate, electricity consumption and sensory quality of balsam pear.