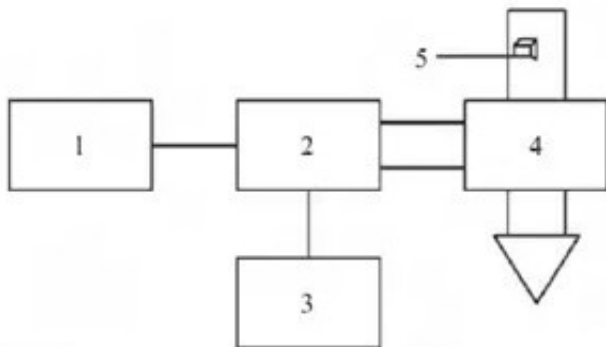


Establishment of Microwave Drying Model for Ginger Tablets and Analysis of Dehydration Mechanism

Abstract: The drying process of ginger slices under microwave power of 0.8, 1.2 and 1.6 W/g per unit mass was studied. The mathematical model of [microwave drying equipment](#) was fitted and analyzed. It was concluded that Wang-Singh model was the most suitable one to describe the precipitation process of microwave drying ginger slices.



The flow characteristics of water in ginger slices during drying were studied by NMR technology. It was found that free water quickly changed into irreducible water during drying, and the irreducible water was dominant during the whole drying process. At the last stage, the irreducible water was reduced to a certain extent and the combined water content was increased. The phenomenon of non-uniform water removal during microwave fluidized drying was not completely eliminated. The study provides a theoretical basis for controlling the precipitation process and optimizing the process of microwave drying ginger slices.

Key words: [microwave drying of ginger slices](#); model; nuclear magnetic resonance; free water; bound water



Microwave fluidized drying of ginger slices can improve the production efficiency and quality of the dried ginger slices by utilizing the advantages of strong microwave penetration and vibration fluidization to control the uniformity of heating. Discussing the law of precipitation in drying process is very important to control the process parameters and product quality. Many scholars at home and abroad have studied the precipitation process of drying fruits and vegetables.

Togrul studied the drying model of infrared drying apple slices and thought that Midilli formula had the best expression effect. Wang et al. studied the drying model of apple pomace by

microwave drying under two modes of pre-drying without superheated air. It was found that Page formula was most suitable for describing these two drying processes.

In the research of water binding state and fluidity characteristics, NMR technology has obvious advantages such as rapidity and accuracy. Li Bing et al. explored the water change of *Lentinus edodes* under hot air microwave fluidization. It was believed that there existed mutual transformation among free water, non-flowing water and combined water during drying.

Zhang Xukun and others also made relevant reports on hot air drying carrots. In order to discover the Precipitation Law of microwave fluidized drying of fruits and vegetables and establish the theoretical basis of process optimization, the kinetic model and water transfer mechanism of microwave fluidized drying of ginger slices were studied on the basis of previous studies.