

Design and Test of Microwave Vacuum Drying Device for Vegetables in CO₂ Cold Trap

ABSTRACT: A set of CO₂ cold trap [microwave drying equipment](#) was designed, and the geometrical structure of vacuum microwave drying chamber was studied based on Fluent. The analysis results of velocity and pressure diagrams of gas in drying chamber were discussed. Finally, it was concluded that the drying chamber model met the test requirements and the drying experiment of purple potato was carried out on the device with good results.

Key words: [Vegetable microwave drying](#); Geometric structure; Vacuum microwave drying; CO₂ cold trap



Our country has a large population, and the output and demand of fruits and vegetables are huge, but the loss caused by the transportation of fruits and vegetables has not been solved. Because of the advanced storage and drying technology, the loss rate after harvesting in developed countries is only 1.7%-5%.

Therefore, strengthening vegetable preservation is an important link in the implementation of vegetable basket project. Cold trap microwave vacuum drying technology is widely used in the drying and storage of fruits and vegetables. Industrialization management is further developed, and Research on low temperature vacuum drying is gradually increasing in China.

In this paper, the velocity and pressure field of gas in drying chamber were verified by the experiment of CO₂ cold trap microwave vacuum drying device and based on Fluent finite element software. The final verification results meet the working requirements of drying device.

In this paper, through the experiment of microwave vacuum drying device with CO₂ cold trap, the vacuum drying chamber is analyzed under different pressure. The streamline and pressure diagrams of the gas in the drying chamber are obtained from the experiment. The flow characteristics of the gas in the microwave vacuum drying chamber and the pressure change trend of the drying chamber wall are revealed. The simulation results are compared to verify the reliability of the simulation results.

To explore the influence of geometrical structure of CO₂ cold trap microwave vacuum drying chamber on drying effect, the drying chamber model designed in this paper can work normally under specific pressure and meet the test requirements. Through the drying experiment of purple potato, the ideal drying effect was obtained.

