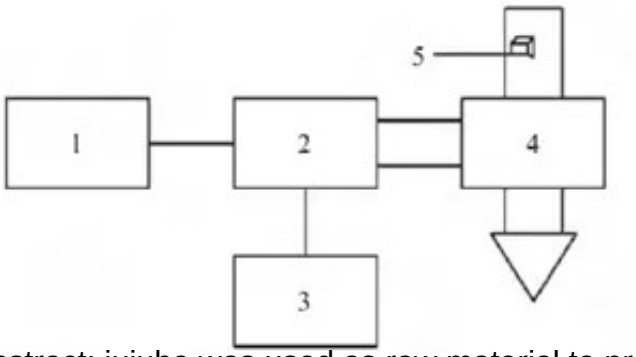
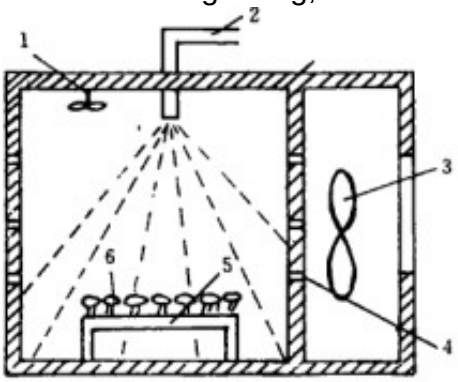
# Effect of drying methods on quality characteristics of black jujube powder




Abstract: jujube was used as raw material to prepare jujube powder by hot air, microwave, spray, variable temperature pressure expansion and vacuum freezing. The physical properties such as wetting subsidence, dispersity, solubility and bulk density were studied, and the comprehensive scoring of 5 kinds of black jujube powder was calculated by using the coefficient of variation coefficient method. 5 methods were used to study the physical properties of black jujube. The effect of microwave drying equipment on the quality characteristics of black jujube powder was studied in order to identify the best drying method of black jujube powder.

Key words: microwave drying of black jujube powder; coefficient of variation coefficient; comprehensive score; drying; quality characteristics

Black jujube, also known as soft jujube and Jun Qian Zi, is mainly divided into two categories: nuclear and nuclear free. Black jujube can improve human immunity, inhibit the growth and reproduction of cancer cells, promote the growth of white blood cells in vivo, reduce the content of serum cholesterol, and then improve serum albumin, protect human liver. It plays an important role in the prevention and treatment of osteoporosis and postpartum anemia. Black jujube fruit contains 45.7% total sugar, 3.00%-3.84% pectin, 1.83% protein, 41% starch and 0.98% tannin. The VC content of black jujube fruit is 97.9 mg/100 g, which is 14-32 times higher than that of pear, apple, apricot and peach.




Therefore, the nutritional value of black jujube is very rich, and it can be used as an ideal raw material for various health products and food research and development. In China, black jujube pulp has been used to reduce fever and promote endocrine in traditional medicine. It has

obvious effect on tonifying kidney and nourishing stomach. It is called "nutrition warehouse".

The drying technology of fruit and vegetable powder mainly consists of hot air, vacuum freezing, variable temperature pressure differential expansion, microwave and spray drying. Hot air drying is easy to operate and has low production cost, but its operation temperature is high, drying time is long and the product is prone to browning phenomenon. Vacuum freeze drying is a drying method operated under low temperature environment, which has the function of keeping the original bioactive substances of fruits and vegetables, but the operation time is long, the cost and energy consumption are high.

Extrusion drying technology with variable temperature and pressure difference is a new, environmentally friendly and energy-saving drying method for non-fried and expanded fruits and vegetables. Its drying efficiency is high, and most of the color, flavor and nutrition of fruits and vegetables are retained to a large extent. Microwave drying with three-dimensional heating method can quickly evaporate the moisture of fruits and vegetables and reduce the operation time, but it has a high drying efficiency. It will cause partial overheating of fruits and vegetables, resulting in a large degree of browning. Spray drying technology has short drying time and fast speed, and is widely used in drying fruits and vegetables. At present, there are few reports about drying products of black dates. Qiao Xiao congruent uses enzyme assisted spray drying to prepare black jujube powder, and optimizes the technology. The yield is 26.89%. Liu Chunhui and so on have studied the vacuum freeze drying technology for the preparation of black jujube stem.

However, there is no report on the evaluation of the quality characteristics of black jujube powder prepared by different drying methods using coefficient of variation weight method.