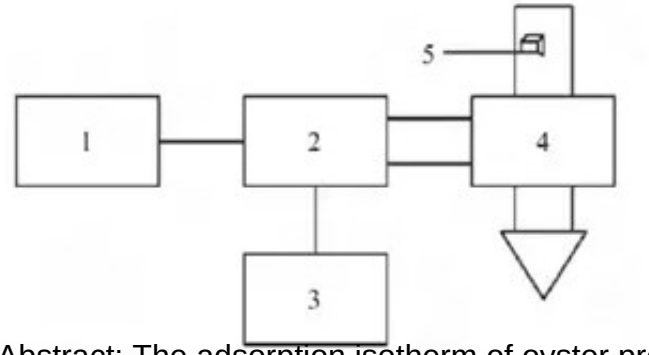
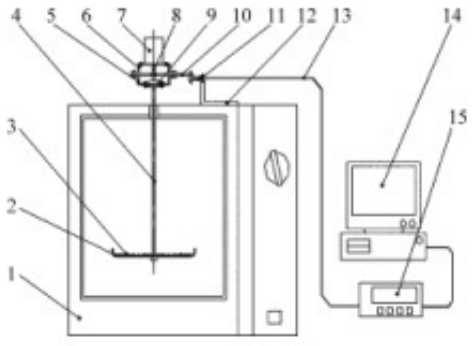
# Adsorption isotherms and glass transition temperatures of frozen and microwave dried oyster products




Abstract: The adsorption isotherm of oyster products dried by freeze-drying and microwave drying equipment at 25 °C was studied by static adjustment of environmental humidity method, and the glass transition temperature was measured by differential scanner. The results showed that the equilibrium moisture of dry oysters increased with the increase of water activity (aw), and the fitting of BET and GAB models to adsorption isotherms was very good. The effect of water as plasticizer on glass transition temperature It is obvious that the glass transition temperature decreases significantly with the increase of equilibrium water. When the dry moisture content of the oyster is 0.18 kg/kg dry basis, the products obtained by the two drying methods have a corresponding glass transition temperature of 0. Below °C.

Key words: oyster microwave drying; freeze drying; adsorption isotherm; glass transition temperature




In addition to considering the water activity (aw) of the food, it is necessary to consider the glass transition temperature (Tg) of the food in consideration of the storage stability and quality stability of the food. Aw reflects the degree of affinity of food and water, and its size has an important impact on the color, aroma, taste and stability of food.

The thermal state parameters represented by aw are usually applied to food materials with high moisture and medium moisture, in which the water can be freely diffused without restriction; while the dynamic properties are often used for foods with low and medium moisture content, at which time the water is amorphous. The plasticizer of the solids, the diffusion fluidity

of the reactants is more or less restricted, and the glass transition temperature T is closely related to the kinetic properties.

When the temperature is higher than Tg, the amorphous solid is in a "rubber" state, in which the mobility of the matrix and the reactant molecules is accelerated, resulting in acceleration of physical and chemical changes of the dry product, such as stickiness, collapse, agglomeration, flavor Loss, browning and oxidation. The role of T in food processing and storage has been recognized and valued by many researchers.

Oysters have high nutritional value, and fresh oysters are difficult to preserve. Therefore, oysters are usually stored after dehydration and dried. The dried oysters are economical and convenient because of low moisture content, transportation, storage and consumption.

Therefore, in this experiment, the adsorption isotherm of dried oyster products by microwave drying and freeze-drying method at 25 °C was studied by static adjustment of environmental humidity method, and fitted by BET and GAB models; The glass transition temperature is determined to provide a theoretical basis for determining the moisture content of the final product of the oyster during the drying process and the suitable storage temperature of the dried product.