Study on Sorption Isotherms and Moisture Migration of Composite Foods

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ABSTRACT

Preserved foods containing more than one component are called as composite foods, among which moisture transfer phenomenon often occurs. In the condition of long-term preservation, moisture transfer easily occurs among each heterogeneous component, results in a tremendous impact on food quality, and affects food safety. Previous studies of the moisture in composite foods focused on discussions of overall water activity, and seldom involved equilibrium moisture content of heterogeneous components and moisture transfer among them. Therefore, this study selected composite foods containing two types of different components, sold in markets, as samples. Then established their sorption isotherms by static method, and analyzed their moisture migration so as to further observe the transfer of moisture between heterogeneous components and its effects on equilibrium moisture content after separately or commonly storing. Samples including almonds & dried fishes and cereals & raisins were stored in 8 relatively different humidity environments. Besides, researches in sensory evaluation on two types of composite food were carried out in the shelf life in order to understand effects of moisture transfer between heterogeneous components on consumers ’ sensory organs. Experimental results showed equilibrium moisture content of two types of composite foods, including almonds & dried fishes and cereal & raisins, increased with the rise in relative humidity of preserved environment. The reason was that food absorbed moisture in the environment gradually when food ’s water activity was relatively low. Results of measurement of equilibrium moisture content in almonds and dried fishes showed that when they were preserved together, dried fishes water activity rises due to interactions with almonds while effects on almonds, were not obvious due to structural denseness and rich in fat. But moisture content of dried fishes rose immediately, which will affect food quality and cause food spoilage. Results of measurement of equilibrium moisture content of cereal and raisin showed cereal as stable component, which is beneficial to food quality, since effects from cereal absorbing condition water were not shown on water activity. Raisin ’s sorption isotherms for common preserved had the trend to move towards left obviously when preserved with cereal. The effect of interactions between two heterogeneous components reduced the water activity of raisin. The above results showed moisture interaction occurred between heterogeneous components when composite foods were in preservation, and it indeed affected equilibrium moisture content and water activity of food.In terms of sensory evaluation, three control groups of almonds and dried fishes in dry condition, general condition and in the condition of just unpacked had no significant differences in scores. However, overall preference of control groups was well accepted. Sensory evaluation experiments for cereal and raisins showed foods stored in dry condition were the best loved by judges.

Keywords : composite food、equilibrium moisture content、moisture migration、sensory evaluation、moisture transfer

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