Optimization of microwave puffing instant fish skin processing conditions

Abstract: The swelling degree of fish skin was determined by initial moisture content, water balance time and microwave drying mechanical expansion time, and the optimum conditions of fish skin microwave expansion technology were determined by response surface method. On this basis, orthogonal experiment was used to optimize the processing parameters (hot water blanching time, ice water quenching time and concentration of potassium chloride solution), and scanning electron microscope was used to observe the microstructure of tuna skin products to determine the best brittleness technology of instant tuna skin. The results showed that the optimum conditions of fish skin puffing were initial moisture content 21.8%, water balance time 9.1 h, microwave power 700 W and microwave time 4 min. Under these conditions, the puffing degree was (1.24 +0.03). The optimum process of brittling was hot water blanching time 2 min, ice water quenching time 2 min and potassium chloride solution quality. At the concentration of 5.0 g/L, the breaking force of microwave puffed fish skin was (41.17+0.28) N and the degree of puffing was (1.25+0.02). The product was loose in texture and crisp in taste. Larger and smaller breakages increase. It can be concluded that a tuna skin product with good texture and taste can be prepared by microwave puffing and brittling.

In the process of fish processing, more than 30% of the fish skin, viscera and other leftovers will be produced, of which fish skin accounts for about 20% of the total leftovers. However, due to the lag of processing technology, a small part of these waste materials are used for the processing of low-cost feed fish meal, and most of them are discarded directly as waste, which not only causes a great waste of fishery resources, but also pollutes the environment. At present, there are many researches on the comprehensive processing and utilization of fish skin drying equipment in our country, mainly focusing on the extraction technology of fish skin protein and its properties. The physicochemical properties and structure of gelatin such as gelation strength, gelation temperature, melting temperature and spectroscopic characteristics were studied. The optimum technological process for enzymatic hydrolysis of fish skin collagen peptide was determined based on peptide yield, degree of hydrolysis and sensory evaluation. As a new type of food production technology, microblog drying machine technology has the characteristics of low cost, easy operation and high efficiency, and is widely used in the production of snack puffed food. At present, the technology of puffing food is frying, puffing, microwave drying, mechanical expansion and extrusion. Among them, the mechanical expansion of microwave drying is through the transmission of electromagnetic energy radiation, so that water molecules absorb microwave energy, generate rapid vibration to obtain kinetic energy, so as to achieve moisture gasification, with the expansion of animal materials. Microwave drying machine technology can maximize the preservation of food nutrients, and processing time is short, so that the expansion, drying, sterilization process at the same time. In recent years, microwave drying machine technology has attracted people's attention, and gradually in the instant puffed food production has been widely used.