Optimization of preparation process of quick-frozen French fries

Potatoes are important agricultural products on the international market and are grown in most countries around the world. China's potato planting area, total output and consumption are among the highest in the world. In addition to fresh food, potatoes are also used as raw materials for food processing. The main processed products include potato starch and its series of products, potato chips, and quick-frozen (fried) French fries. In recent years, due to the rapid development of the western fast food industry, French fries are an indispensable food, and the demand is increasing.

Microwave drying machine

In the United States, the proportion of potatoes used to process French fries is 44%. In the past, due to the lack of potato varieties suitable for processing French fries, the French fries processing industry was backward. There are only a few domestically produced frozen fries production plants, and most of them are Sino-foreign joint ventures.

At present, the fast food industry uses French fries mainly relying on imports. In recent years, China has paid attention to the introduction and improvement of special potato varieties for processing French fries, and also carried out research on domestically produced equipment and processes for producing quick-frozen French fries. The China Academy of Agricultural Mechanization Sciences has developed the first national project. A localized production line has been put into production. French fries machine production line

However, in terms of potato deep processing technology, there is still a gap compared with the international level. In addition to the problems of the equipment itself, the color, shape and softness of potato fries are the main problems in the current research. Li Yuntao et al. discussed the process of color protection, pre-cooking, drying and pre-frying in the processing process of quick-frozen French fries, and obtained the process parameters of pre-treatment. After the raw materials were cut, protected and pre-cooked, 60 °C 5 min pre-drying, drying at 80-90 ° C for 20 min, frying at 170-175 ° C for 35 to 40 s, the product moisture content is 65% to 70%, and the oil content is 4.8% to 5.7%.

However, commercial French fries usually need to be frozen and the final frying process. Therefore, it is necessary to clarify the influence of the process parameters of the pretreatment process on the final product quality and further optimize the process parameters.

The preparation of French fries generally includes raw material selection, washing, peeling, slicing, blanching, cooling, drying, pre-frying, cryopreservation, frying and the like. Texture, color and oil content are the main quality parameters of French fries. The high-quality French fries have an attractive golden yellow, crispy outer layer while maintaining an internal wet state, and the oil content is low, and the amount of acrylamide produced is small. Factors affecting the quality of French fries In addition to the raw material varieties, process parameters such as blanching, drying, frying, and quick freezing in the preparation process are important factors.

After pre-drying at 70 ° C, the temperature was raised to 120 ° C for 11 min, then pre-fried at 182 ° C for 1 min, frozen at - 20 ° C, packaged and stored. Bung er and Mo ri eira and other raw materials for surface modification, such as NaCl solution impregnation, surface coating and other treatment, and then dried, pre-fried, so that the surface moisture of the raw potato chips is reduced to form a layer of starch paste The layer can reduce the oil content of the product and reduce the frying time. However, the process optimization research on the influence of process parameters on the quality of French fries is still rare.

In this paper, the potato variety “Netherlands 15” introduced from abroad was used as raw material to study the effects of pretreatment drying temperature, drying time and pre-frying time on the color, moisture content and oil content of the frozen French fries processing technology. The quality of high-quality French fries is the goal, and the preparation process of quick-frozen French fries is optimized by using the desired function path to improve the quality of quick-frozen French fries and provide a basis for actual production.