



Available online at www.sciencedirect.com

ScienceDirect



REVIEW

Progress of potato staple food research and industry development in China



CrossMark

ZHANG Hong^{1,2,3}, XU Fen¹, WU Yu¹, HU Hong-hai^{1,3}, DAI Xiao-feng^{1,2,3}

¹ Institute of Food Science and Technology, Chinese Academy of Agricultural Sciences, Beijing 100193, P.R.China

² Academy of Food and Nutrition Health, Institute of Food Science and Technology, Chinese Academy of Agricultural Sciences, Hefei 238000, P.R.China

³ College of Staple Food Processing Technology, Institute of Food Science and Technology, Chinese Academy of Agricultural Sciences, Harbin 151900, P.R.China

Abstract

Potato is the largest non-cereal food crop worldwide and ranked as the world's fourth most important food crop after rice, wheat, and maize. Potato is a vital food-security crop and substitute for cereal crop considering its high yield and great nutritive value. Therefore, by replacing wheat, rice or maize in traditional staple foods partly by potato, the nutritional value of traditional foods and the utilization of potato are expected to be improved. China is the largest potato producer worldwide in terms of either volume or area. However, majority of potatoes are consumed as fresh vegetables for cuisine, and the industrial processing rate is much lower than the global average. Thus, research and development for nutritional potato staple food suitable for the dietary habits of Chinese residents are of great significance. However, we still confronted plenty of constraints in the development of potato staple food. In order to develop potato staple food suitable for Chinese residents' dietary habit like noodles, Mantou (steamed bread), rice and rice noodles, also to industrialize production of potato staple foods, some transformations need to be realized. Independent innovation is the only choice to realize the potato staple food processing and industrial development strategy on the technical level. Thus a lot of researches have been done to promote the development of potato staple food in China. Up to now, we already developed a series kinds of potato staple foods and some of these staple foods have already been widely promoted in Chinese markets.

Keywords: potato, staple food, research, industry, China

1. Introduction

Solanum tuberosum is an annual herb of *Solanaceae*, of which tuber is edible called potato, yam or sleigh bells, etc. It is the world's fourth most important food crop (Ezekiel *et al.* 2013; Zhang *et al.* 2016) with 381 million tons (Mt) produced annually, only wheat (729 Mt), rice (741 Mt) and maize (1 037 Mt) are produced in larger amounts for human consumption (FAO 2014). Originated from Peru and Chile in the Andes Mountains of South America as well as the alpine

Received 30 March, 2017 Accepted 25 May, 2017

ZHANG Hong, E-mail: zhang.h07@hotmail.com, zhanghong03@caas.cn; Correspondence DAI Xiao-feng, Tel/Fax: +86-10-62893899, E-mail: daixiaofeng@caas.cn

© 2017, CAAS. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)
doi: 10.1016/S2095-3119(17)61736-2

zone with an elevation of 3000–4000 m in Mexico, potato has been one of the primary food sources for Andean people long ago (Lutaladio and Castaldi 2009). Potato was introduced into China through the sea routes or the Silk Road (land) in the 17th century (Singh and Lovedeep 2009). Potato was the first cultivated crop in the southwestern mountainous area, Qinling Mountains of Shaanxi, Shanxi provinces and other regions in China. Potato, which grows extraordinarily well in the areas with high altitude and extremely cold climate, was spread rapidly in Inner Mongolia, Heilongjiang, Hebei, Shanxi, Gansu, Shaanxi, Yunnan, Guizhou regions and other districts of China. After being introduced into China from abroad, potato has made tremendous contributions to feed Chinese people generation after generation owing to its capability for surviving in barren soil. For many years, it was closely related to poverty and subsistence.

In the times with shortage of food, potato once served as the “lifesaving potato” and its contributions to the reproduction and prosperity of Chinese nation cannot be ignored. At the initial stage of the China’s reform and opening-up, potato once became the major food of Chinese residents and appeared on people’s dining tables as the “subsistence potato”. With the dawning of the 21st century, many impoverished and backward areas got rid of poverty and acquired wealth by impelling the potato industry, so potato also got the laureate of “wealth potato”. When China enters the new eras of all-round well-off society, potato, as a globally recognized total nutrient food, will become a “nutritious potato”, which can improve residents dietary structure.

As a matter of fact, potato has always been the second staple food for local residents in developed countries like European countries and USA. When China faces the urgent demand of improving residents’ dietary nutrition structure, apparent contradiction between supply and demand of the three staple food grains, namely, rice, wheat and corn, together with the excessive pressure of agricultural resources and environment, it is highly important to actively choose potato as a new major food source, open a new path to guarantee the national food security, unearth a new potential of agricultural development and explore a new channel for the development of modern staple food industry with Chinese characteristics (Liu *et al.* 2016). Therefore, conducting the researches on potato as a staple food and industrial development became an inevitable tendency for complying with the continuously growing nutritional and healthy demand of Chinese residents, to adapt to the trait of Chinese diet culture, to transform from conventional agriculture to modern agriculture and to achieve sustainable development in agricultural production. The emergence of potato staple food products will be the third revolution in food expenditure in Chinese history, and it is imperative to implement the development strategy of potato staple food

products and industry.

2. The significance of implementing the development strategy of potato staple food products and industry

At present, the potato is mainly consumed in the form of fresh tuber in China and the annual consumption is less than 40 kg per capita, which is approximately 1/3 of annual consumption per capita in developed countries like European countries and USA. Nevertheless, in China, processed products with potato as the principal raw material are less than 10% of the total output, and the forms of processed products are mainly of starch, modified starch, potato chips and fried chips, etc. The limited type of products and relatively low nutritional value vastly restricted the consumption of potato. The significance of the strategy by implementing the national potato staple food products and industrial development is mainly embodied in the four aspects as follows:

2.1. Beneficial to improve the dietary nutrition of Chinese residents

The 2014 report on Chinese Resident’s Chronic Disease and Nutrition (http://www.chinadaily.com.cn/m/chinahealth/2015-06/15/content_21008408_2.htm) showed that there are increasingly prominent healthy problems such as unreasonable dietary structure, overweight and obesity of Chinese residents in recent years. In 2012, overweight rate among adults was 30.1%, increased by 7.3 percentage points over 2002; obesity among the same age group was 11.9%, increased by 4.8 percentage points. In recent years, the prevalence of major chronic diseases has risen rapidly in China. In 2012, hypertension prevalence rate among people of 18 years old and above was 25.2%, and diabetes rate was 11.7%. Both rates increased significantly compared with 2002 (Wang *et al.* 2017). As a “hidden treasure”, potato may play an important role in human health over a lifetime of consumption. Villegas *et al.* (2007) found that the intake of tubers was associated with a lower risk of type 2 diabetes in the Shanghai Women’s Health Study, China. Anthocyanins, glycoalkaloids, and lectins from potatoes are antitumor agents (Camire *et al.* 2009). Previous study also showed that potato protein, resistant starch, and phosphorylated starch could help lower the level of cholesterol (Camire *et al.* 2009). These nutritional contributions make the potato become a vital food stuff in the diet of Chinese people.

With a high nutritional value, potato is not only abundant in carbohydrate and protein, but also contains various minerals, vitamins and dietary fiber (Chung *et al.* 2016). Particularly, it is rich in vitamin B and vitamin C which are not sufficient in cereals (Galdón *et al.* 2010; Singh *et al.*

Download English Version:

<https://daneshyari.com/en/article/8875807>

Download Persian Version:

<https://daneshyari.com/article/8875807>

[Daneshyari.com](https://daneshyari.com)