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Chinese Potato (*Plectranthus rotundifolius*): An Emerging Functional Food Crop

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With the growing emphasis on nutritious diets and environmentally sustainable food systems, attention is increasingly shifting toward underutilized crops with high functional value. Among these, Chinese potato (*Plectranthus rotundifolius*) stands out as a nutrient-dense tuber with significant untapped potential. Native to Africa and traditionally consumed in parts of Asia, this crop remains largely overlooked despite its substantial health benefits. Unlike widely consumed tubers such as potato and yam, Chinese potato contains elevated levels of dietary fiber, vital minerals, and bioactive compounds such as polyphenols that play an important role in enhancing digestion, regulating blood glucose, and promoting cardiovascular health (Mukherjee et al., 2015). The tuber's low glycemic index makes it particularly beneficial for individuals suffering from diabetes and other metabolic disorders, as it helps maintain stable blood glucose levels. Furthermore, its prebiotic nature supports the growth of beneficial gut microorganisms, which are increasingly recognized as essential for immune function and overall well-being (Vimala & Nambisan, 2005). Beyond its nutritional significance, Chinese potato is highly adaptable in culinary and industrial applications, lending itself to the preparation of gluten-free flours, snacks, and functional food products. Its ability to thrive under marginal soil conditions and low-input farming systems further enhances its value as a sustainable crop capable of addressing food security and nutritional challenges in vulnerable regions (Kana et al., 2012). This article explores the nutritional, functional, and agricultural importance of Chinese potato and emphasizes its role in advancing health-focused diets and resilient food systems (Figure 1.)

Nutritional Composition of Chinese Potato

Per 100 g of fresh tuber, it provides approximately 83–94 kcal of energy, meeting about 4% of the recommended daily allowance (RDA), primarily derived from carbohydrates (19.0–23.3 g), which supply nearly 16% of daily carbohydrate needs. The protein content ranges from 0.84 to 1.7 g, contributing 2–3% of the RDA, while the fat content is very low (0.05–0.48 g), making it suitable for low-fat diets. Chinese potato also contains dietary fiber (0.30–0.50 g) and a substantial amount of starch (17.3–19.0 g), which together support digestive health and provide sustained energy release. In terms of micronutrients, Chinese potato is a good source of vitamin C (10–12 mg), contributing 11–13% of the RDA, which enhances immunity and antioxidant protection. It is particularly rich in essential minerals such as calcium (76.1–86.7 mg), fulfilling about 14% of daily requirements, and magnesium (56–62 mg), providing 14–19% of the RDA, both of which are important for bone health and metabolic functions. The tuber also supplies iron (1.43–1.69 mg), meeting 7–8% of the RDA,

along with potassium (109–110 mg), contributing 10–13%, which aids in maintaining electrolyte balance and cardiovascular health. Additionally, Chinese potato contains appreciable levels of phosphorus (91.5–102.8 mg), manganese (0.52–0.60 mg)—accounting for 24–31% of the RDA—as well as trace elements such as zinc (0.98–1.1 mg) and copper (0.08–0.09 mg). Collectively, this diverse nutrient composition highlights the potential of Chinese potato as a valuable dietary component for improving nutritional intake and supporting overall health.

Nutritional benefits

Chinese potato is a reservoir of essential nutrients that contribute significantly to human health. It is particularly rich in dietary fiber, which aids digestion, prevents constipation, and helps regulate lipid and glucose metabolism. The tuber provides important minerals such as potassium, magnesium, and iron, which support nerve and muscle function, regulate blood pressure, and facilitate oxygen transport in the body (Vimala & Nambisan, 2005).

In addition to its mineral content, Chinese potato contains notable levels of polyphenolic compounds that exhibit strong antioxidant activity. These antioxidants help neutralize free radicals, thereby reducing oxidative stress and lowering the risk of chronic diseases such as cardiovascular disorders, cancer, and inflammatory conditions (Mukherjee et al., 2015). Its low glycemic index ensures a slow and steady release of glucose into the bloodstream, making it suitable for sustained energy release and diabetes management. Moreover, the prebiotic fiber present in Chinese potato enhances gut microbial diversity, which is essential for nutrient absorption, immune modulation, and overall metabolic health.

Figure 1. A (flower of Chinese potato); B (chinese potato field); C (pot culture of chinese potato); D (chinese potato)

Culinary versatility

Chinese potato exhibits remarkable adaptability in culinary applications due to its mild flavor and starchy texture. It can be consumed in various forms, including boiled, roasted, mashed, or incorporated into soups, curries, and stews across traditional African and Asian cuisines. This versatility allows easy integration into daily diets without major changes in food habits. From a modern food processing perspective, Chinese potato is gaining importance as a raw material for gluten-free flours, making it suitable for individuals with celiac disease or gluten intolerance. Food industries are increasingly exploring its use in the development of value-added products such as chips, noodles, baked goods, and fermented foods. The combination of traditional culinary relevance and modern product innovation enhances its acceptability among diverse consumer groups and expands its market potential.

Sustainability and food security

Chinese potato is a resilient crop capable of growing in marginal soils and under diverse climatic conditions with minimal reliance on chemical fertilizers and pesticides. This makes it an environmentally sustainable option for small and marginal farmers (Kana et al., 2012). Its ability to produce reasonable yields under low-input conditions contributes significantly to household food security, particularly in rural and resource-poor regions. The tuber's high nutrient density makes it a valuable crop for combating malnutrition, especially in communities that depend heavily on limited staple foods. Promoting Chinese potato cultivation can also help diversify cropping systems, reduce dependency on major cereals like

rice and wheat, and enhance agricultural resilience against climate variability and crop failures.

Functional food applications

The presence of bioactive compounds such as dietary fiber and polyphenols makes Chinese potato an ideal candidate for functional food development. It can be used in the formulation of low-glycemic snacks, prebiotic beverages, fortified bakery products, and therapeutic foods aimed at improving metabolic health. Scientific studies suggest its potential role in preventing lifestyle-related diseases, including diabetes, cardiovascular disorders, and digestive ailments, aligning well with current functional food trends (Mukherjee et al., 2015). Advanced processing techniques such as extrusion, fermentation, and dehydration are being explored to enhance its nutritional value, shelf life, and consumer appeal. With increasing demand for natural and plant-based foods, Chinese potato offers promising opportunities for large-scale commercialization.

Challenges and opportunities

Despite its numerous advantages, Chinese potato remains underutilized due to limited consumer awareness and insufficient promotion. Inadequate processing infrastructure and lack of organized supply chains also hinder its large-scale adoption. Furthermore, there is a need for extensive research to better understand its bioactive components, optimize agronomic practices, and develop improved varieties suited to different agro-climatic zones.

However, these challenges present opportunities for future development. Collaborative efforts involving researchers, policymakers, farmers, and food industries can help improve cultivation practices, develop value-added products, and enhance market visibility. Strengthening extension services and consumer education can further promote its inclusion in mainstream diets.

Conclusion

Chinese potato (*Plectranthus rotundifolius*) represents a highly nutritious, versatile, and sustainable crop with immense potential as a functional food. Its rich nutritional profile, health-promoting properties, and adaptability to diverse environments make it a valuable asset in addressing global challenges related to nutrition, health, and food security. Strategic investments in research, processing technologies, and awareness creation can transform this neglected tuber into a mainstream dietary component, contributing to healthier populations and more resilient agricultural systems.

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