Origin and Production of Taro in the World

Subjects: Food Science & Technology

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Taro (*Colocasia esculenta* (L.) Schott) is a tropical root crop with a rich history, which belongs to the Araceae family and encompasses over 10,000 landraces. It is cultivated worldwide in tropical and subtropical regions, including Africa, China, New Guinea, various Pacific islands, all Caribbean islands, parts of Central and South America, as well as specific regions in the United States. Recognized as one of the oldest known crops, taro is believed to have been domesticated more than 10,000 years ago.

taro roots dietary fiber product development

1. Introduction

Roots and tubers are recognized as substantial contributors to global carbohydrate consumption and are second only to cereals. These crops are cultivated extensively in developing nations, such that millions of farmers rely on them for food security and economic prosperity [1]. These crops are vital to income generation, sustainable development, and household food security, particularly in low-income countries. Moreover, they find versatile applications in animal feed, starch extraction, and the production of fermented foods and beverages [2]. The most world-consumed tropical roots and tubers are taro (*Colocasia esculenta*), yam (*Dioscorea* spp.), potato (*Solanum tuberosum* L.), sweet potato (*Ipomoea batatas*), cassava (*Manihot esculenta*), and elephant foot yams (*Amorphophallus paeoniifolius*). Taro holds great promise as a food and has the potential to combat malnutrition, given its underutilization thus far [3]. The taro crop has enormous potential as an economical source of dietary energy, starch, fiber, potassium, vitamin C, protein, and other micronutrients [4].

The taro plant belongs to the Araceae, which are aroids grown principally for their edible corms, petioles, and leaves. The Araceae family has 110 genera and more than 2500 species, which include Colocasia, Xanthosoma, Amorphallus, Alocasia, and Cytosperma [2]. The polymorphic species Colocasia esculenta, often known as eddo or dasheen, is cultivated for its tasty corm and is exported internationally. *Colocasia esculenta* (L.) Schott var. esculenta and *Colocasia esculenta* (L.) Schott var. antiquorum (School) are the two widely available varieties [5].

There are potentially thousands of known taro cultivars that fall into two categories: (1) the “eddoe” type (*Colocasia esculenta* var. antiquorum syn. *Colocasia esculenta* var. globulifera) and (2) the “dasheen” type (*Colocasia esculenta* var. esculenta) [6]. These two main varieties present different corm types; the dasheen variety is long central with few side-corms (cormels), whereas the eddoes variety shows a well-developed cormel.

Taro plants exhibit adaptability to a wide range of soil conditions, spanning from well-drained dry soils to waterlogged soils in high-rainfall areas. Optimal taro growth occurs in warm and humid environments, which is characterized by mean temperatures that range from 25 to 30 °C and well-distributed rainfall [7]. However, supplemental irrigation is occasionally necessary to ensure a successful yield. Considering the sustainability and high nutritional value of taro roots, it is worth exploring their potential to thrive in warmer regions of the USA. In addition, taro stands out as a root crop with zero waste since every part of the plant, including the leaves, peel, and root, can be utilized [8]. Nevertheless, it is unfortunate that only a limited number of studies have investigated the industrial utilization of taro as a source of ingredients for processed food products. The divisible usages of taro and its health benefits are demonstrated in **Figure 1**.

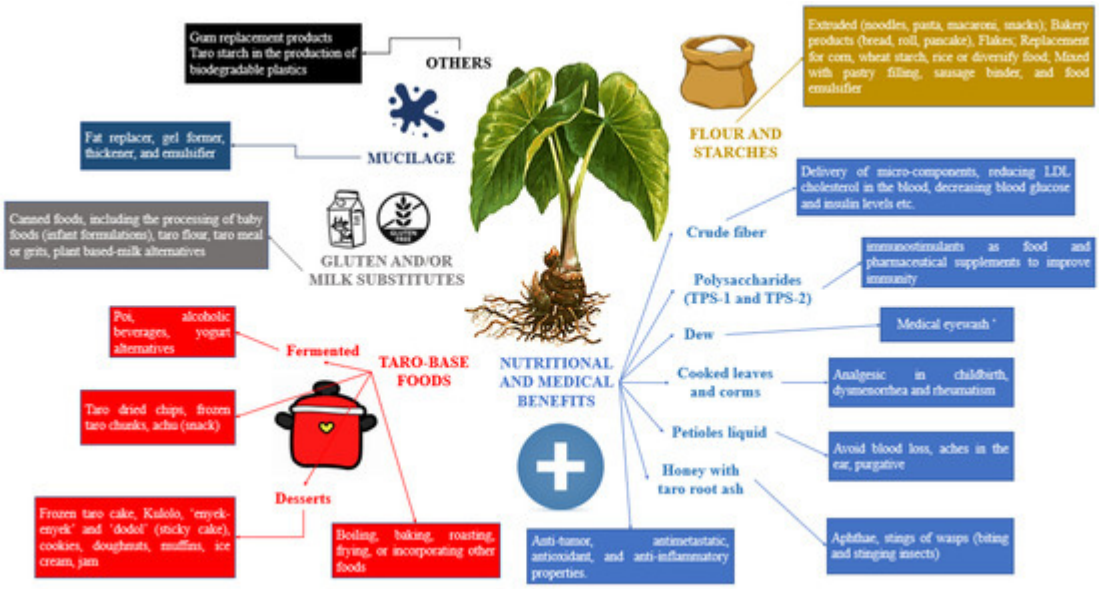

Figure 1. Clinical benefits and usages of taro in different food products.

2. Origin and Production in the World

Taro (*Colocasia esculenta* (L.) Schott) is a tropical root crop with a rich history, which belongs to the Araceae family and encompasses over 10,000 landraces. It is cultivated worldwide in tropical and subtropical regions, including Africa, China, New Guinea, various Pacific islands, all Caribbean islands, parts of Central and South America, as well as specific regions in the United States. Recognized as one of the oldest known crops, taro is believed to have been domesticated more than 10,000 years ago [9][10]. Archaeological evidence from the Solomon Islands suggests its utilization dates back nearly 28,000 years [11]. However, establishing a single center of origin for taro has proven challenging. Some theories propose South Central Asia, specifically India or Malaysia as the possible origin [12]. Matthews (1990) hypothesized an origin between Myanmar and Bangladesh in the Indo–Malayan region [13]. Nevertheless, with a comprehensive genetic analysis of cultivars or wild taro materials from these distributed regions, the precise origin of the crop remains to be determined [10].

Taro is a widely cultivated root crop in 50 countries worldwide. Nigeria is the largest producer of taro, followed by Cameroon, China, and Ghana, and collectively, they account for over half of the global taro production (**Figure 1**). In 2021, global taro production reached 12,396,248.5 tons, with Africa contributing 77.30% of that output. Asia contributed 18.60%, while Oceania and the Americas contributed 3.40% and 0.70%, respectively (**Figure 2**).

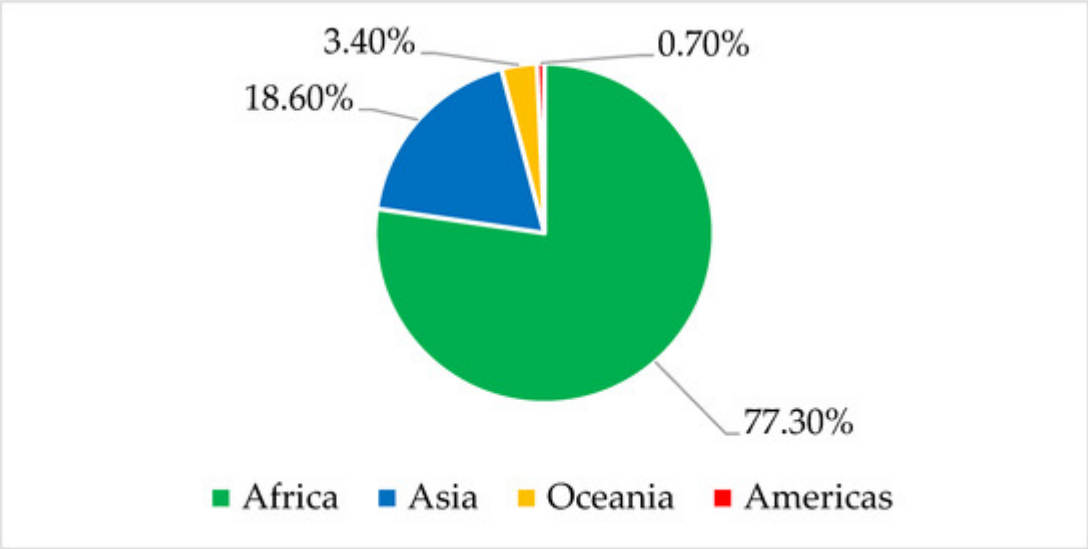

Figure 2. Production share of taro by region in 2021. Source: FAOSTAT 2023 [14].

Table 1 provides the annual taro production for various regions worldwide. In 2000, Africa was the top producer with 8,233,653.65 tons, followed by Asia with 1,930,699.73 tons. As of 2021, Africa continued to lead, producing 9,525,695.56 tons, despite a slight drop in 2010 (to 7,754,061.42 tons). The Americas had the lowest taro production from 2000 to 2021, although they experienced a substantial increase in 2015, when they produced 133,346.23 tons.

Table 1. World taro production in recent years by region.

Year	Area Harvested (Ha)				Total Yield (Tons)			
	Africa	Asia	Oceania	Americas	Africa	Asia	Oceania	Americas
2000	1,250,204	128,872	44,361	7622	8,233,653.65	1,930,699.73	318,752.90	78,815.08
2005	1,383,172	127,935	55,659	8915	9,849,310.49	1,914,001.54	413,899.85	82,994.87
2010	1,194,840	132,284	52,462	4883	7,754,061.42	2,079,541.37	402,544.38	55,662.43
2015	1,575,862	147,251	48,310	7836	8,632,488.23	2,366,643.69	416,184.77	133,346.23
2021	1,590,820	148,515	48,048	6320	9,525,695.56	2,395,189.79	410,496.50	64,866.65

Source: FAOSTAT 2023 [14].

Figure 3 clearly indicates that the major share of global taro production in 2021 was dominated by 10 countries and accounted for nearly 90%. Nigeria produced the most with 25.94%, while China and Cameroon made

comparable contributions of 15.11% and 14.59%, respectively. Conversely, Japan and the Central Africa Republic displayed a significantly lower contribution, each contributing a mere 1.09% to the overall global taro production.

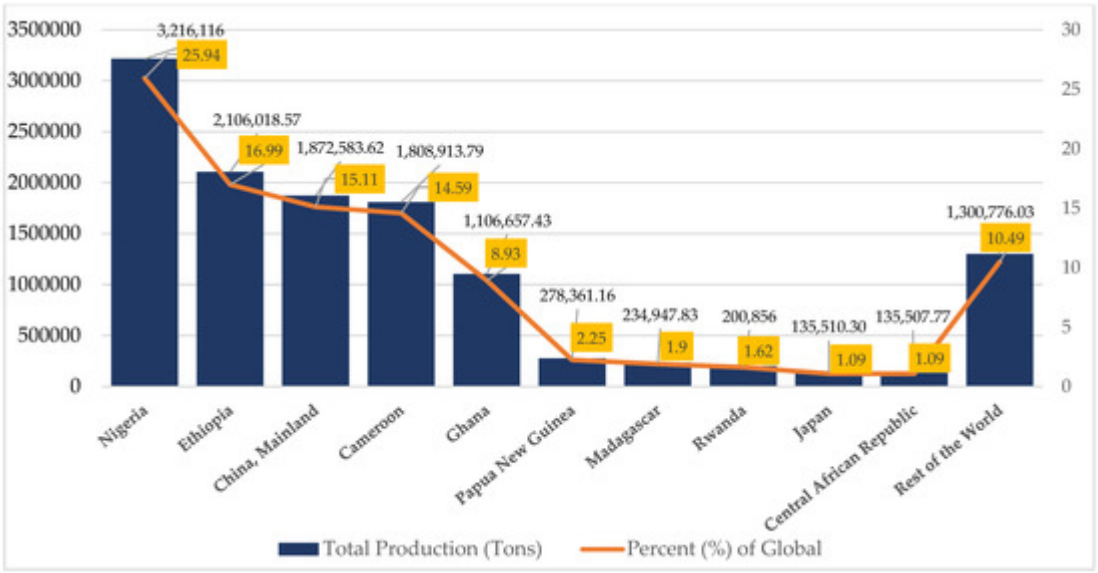

Figure 3. Top 10 taro producers in 2021. Source: FAOSTAT 2023 [14].

Taro cultivation is typically carried out on a small scale by impoverished rural African women with limited resources. Despite being the third most important root and tuber crop after cassava and yams, taro must be utilized for export and industrial purposes, considering its nutritional benefits for health in Africa. On a global scale, the United States is the largest importer of taro, importing 35.7% of the total production in 2021 [15]. However, North America and the Asia–Pacific region are the primary suppliers of taro roots worldwide. Taro is also commercially grown in Hawaii and various parts of the Pacific Basin, although cultivation is usually limited to small plots near households. Hawaii is the largest taro producer in the US, with an estimated 4.8 million pounds of taro produced in 2021 [16]. In ancient times, Hawaiian planters cultivated around 300 taro species, often distinguished by the colors of distinct leaf portions [17]. However, taro is also grown on small-scale farms in California.

Taro can be broadly categorized into two types: upland taro, which is commonly used as a potato substitute, and wetland taro, which is primarily utilized for making poi, a fermented taro dish. While the long corms, narrow stems, and leaves of the taro plant are edible, they require thorough cooking before consumption to ensure that they are safe to eat and to enhance their taste and texture.

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