



Chinese Garlic - The Largest Exporter to the U.S and India's Rising Competitiveness

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Abstract

Globalization has reshaped the global economy by integrating markets and boosting trade flows between nations. Developing economies like China and India have witnessed significant growth in their export sectors. This paper examines the garlic industry, highlighting China as the largest exporter to the US, while India's garlic is renowned for its strong aroma and pungent flavor. The study delves into the effects of globalization on these economies through the perspective of the garlic market.

Garlic roots also play a crucial role in various industries, contributing to the economic importance of garlic cultivation. They are used in agricultural production, culinary applications, herbal medicine, soil health, and more. Various products and by-products can be derived from garlic roots, including herbal extracts, essential oils, soil conditioners, and pharmaceutical formulations. The comparative analysis between China and India highlights their differences in market share, production volume, quality, export pricing, and key markets.

The results indicate that although globalization has delivered considerable economic advantages, it has also introduced challenges that necessitate strategic actions from policymakers and industry leaders.

1. Introduction

Garlic is a staple agricultural product in global trade, with China dominating as the largest producer and exporter. Accounting for approximately 90% of the global garlic trade, Chinese garlic is widely exported to developed markets such as the United States, the European Union, and Japan due to its consistent quality and competitive pricing.

However, India, the second-largest garlic producer globally, is emerging as a strong competitor due to its unique flavour profile, cost advantages, and increasing export volumes.

This study aims to explore the dynamics of Chinese garlic exports to the U.S. while evaluating India's potential to challenge China's dominance through its distinctive aroma and Taste.

This paper explores the historical trends of China's garlic exports in the 1920s, the contemporary growth of Indian garlic exports and conducts a comparative analysis to understand the dynamics of the global garlic market.

2. Historical Overview of Garlic Exports

Garlic's popularity in the U.S. dates back to the 1920s with China emerging as the leading exporter. China's garlic industry benefited from low labour costs, making its garlic more affordable than that of the U.S. Trade wars and tariffs have influenced market dynamics, especially in Ireland where high import duties impacted trade.

The global garlic market has experienced boom-bust cycles, notably after the 2008 financial crisis. Despite these challenges, China's dominance in garlic production and exports has persisted with the country supplying over 70% of the world's garlic.

The country's dominance is evident in its position as the largest exporter of garlic worldwide, surpassing other major producers like Spain (Parejo-Moruno et al., 2020). The insertion of China into the international garlic market has significantly shaped global supply dynamics, with Asia being the primary source of garlic production (Parejo-Moruno et al., 2020). This trend has been consistent over the decades with China maintaining its leadership position in garlic exports.

3. Garlic's Popularity in the United States:

A Historical Perspective Garlic's popularity in the United States dates back to the 1920s and it has continued to grow over the years. The U.S. has been a significant importer of garlic with China being a primary supplier. The demand for garlic in the U.S is part of a broader trend of increased garlic consumption in various American and European economies (Parejo-Moruno et al., 2020). This demand is driven by garlic's culinary versatility and perceived health benefits which have been widely recognized and promoted.

The country's garlic production was characterized by large-scale farming, particularly in provinces like Shandong and Henan. These regions benefited from favourable climatic conditions and advanced agricultural practices, contributing to high yields and consistent quality.

China's garlic exports were highly competitive due to low production costs and efficient farming techniques. The U.S despite imposing tariffs to protect domestic producers, remained a major market for Chinese garlic. China's garlic accounted for a significant share of U.S imports, highlighting its dominance in the global market.

3.1 Export Destinations and Market Penetration

China's garlic was exported to numerous countries, including the U.S., Japan, and European nations. The reliability and affordability of Chinese garlic made it a preferred choice for importers. The U.S in particular, relied heavily on Chinese garlic to meet domestic demand. China's garlic industry not only supported millions of farmers but also contributed significantly to the country's agricultural economy.

3.2 Factors Driving China's Garlic Exports

Several factors contributed to China's success in garlic exports:

- *Favourable Climate and Geography:* China's diverse climate and fertile soil provided ideal conditions for garlic cultivation.
- *Advanced Agricultural Practices:* Modern cultivation techniques, integrated pest management, and post-harvest technology ensured high yield and quality.
- *Government Support:* Subsidies, trade agreements, and investment in research and development supported the garlic industry.

4. Contemporary Growth in Indian Garlic Exports

4.1 Production and Export Trends

India, the second-largest garlic producer globally, has seen significant growth in garlic exports. Indian garlic production grew at a Compound Annual Growth Rate (CAGR) of 9.93% over the last 15 years (2006-2020), higher than China's growth rate. However, India's share in global garlic exports remains relatively small, with only 1.03% of its total production exported in 2020-21. Major export destinations include Malaysia, Thailand, the U.S., Vietnam, and Nepal. Despite this, India's garlic exports have shown a negative trend in some markets, prompting the search for new clients.

4.2 Unique Flavour Profile and Market Differentiation

Indian garlic is known for its stronger aroma and more pungent flavour, making it preferred by consumers seeking robust taste. This unique flavour profile differentiates Indian garlic from Chinese garlic, which is milder. Indian garlic's quality and safety are also highlighted, as it is often grown with fewer chemicals and more traditional methods. This addresses food safety concerns associated with Chinese garlic, enhancing its appeal in international markets.

4.3 Competitive Advantages

The use of Indian garlic has several advantages.

- **Cost Competitiveness:** Indian garlic is typically priced lower than Chinese garlic, making it appealing in markets sensitive to price.
- **Market Diversification:** India is expanding its garlic exports to major markets, including the U.S., Europe, and Latin America.
- **Quality and Sustainability:** The quality of Indian garlic and its sustainable farming practices attract health-conscious consumers.

4.4 The Garlic Roots: Economic Importance, Uses and By-Products

Garlic (*Allium sativum*) is a versatile herb renowned for its culinary and medicinal properties. While much attention is given to its flavourful bulbs and aromatic cloves, the roots of the garlic plant are equally important and fascinating.

The structure of garlic roots consists of several key components. At the tip of each root is the root cap, a protective structure that covers the delicate root meristem—the region responsible for root growth and cell division.

Garlic roots exhibit a complex branching pattern, with primary roots giving rise to secondary and tertiary roots. This branching increases the root's exploration of the soil and enhances its ability to access water and nutrients distributed throughout the soil profile.

The Economic Importance and Uses of Garlic Roots

Garlic roots play a crucial role in various industries and applications, contributing to the economic importance of garlic cultivation.

Here are some key economic aspects and uses of garlic roots:

1. Agricultural Production: The roots of garlic function as anchors to secure the plant in the ground which enables it to grow and develop properly.

2. Crop Yields: The healthy garlic roots enable better water and nutrient absorption which results in higher yields and better crop quality.

3. Soil Health: The roots of garlic serve to enhance soil structure and fertility by taking up nutrients and decomposing organic matter.

4. Culinary Industry: Traditional cooking methods use garlic roots as a flavor component to make soups, stews and sauces.

5. Herbal Medicine: The extracts from garlic roots serve as herbal medicine components because they contain antimicrobial and anti-inflammatory properties.

6. Soil Erosion Control: The extensive root system of garlic helps stabilize soil and prevent erosion, particularly on sloped terrain.

7. Landscape Architecture: The landscaping industry employs garlic roots to anchor soil and control soil erosion mainly in locations that experience frequent erosion.

8. Cosmetics: The cosmetic industry utilizes compounds obtained from garlic roots because these substances show promise for rejuvenating skin and reducing signs of aging.

9. Pharmaceutical Industry: Pharmaceutical manufacturers use garlic root extracts in their formulations because of their medicinal value which helps treat cardiovascular diseases and infections.

10. Bioremediation: The roots of garlic can be used in bioremediation projects to remove contaminants from soil and water through processes such as phytoremediation.

11. Animal Feed: The residues from garlic roots can be used as animal feed, which can serve as a source of nutrients for livestock.

12. Biotechnology: Scientists conduct biotechnology research on garlic characteristics to analyse their genetic makeup and explore their uses for enhancing crop production.

14. Organic Farming: Garlic roots contribute to organic farming practices by improving soil health and reducing environmental impact.

15. Energy Production: Garlic roots contribute to organic farming practices by improving soil health and reducing environmental impact.

16. Soil Amendments: Garlic roots enhance soil health and lessen environmental impact which supports organic farming methods.

17. Water Conservation: By improving soil water retention garlic roots help save water resources and lessen the need for irrigation.

18. Research and Development: To comprehend their physiological roles and possible uses in a range of industries garlic roots are researched in academic institutions and research centers.

The Products and By-products That Can Be Derived From Garlic Roots

Garlic roots yield various products and by-products that find applications in different industries. Here are some examples:

1. Herbal Extracts: Due to their possible health benefits compounds that are extracted from garlic roots are used in dietary supplements and herbal medicine.

2. Essential Oils: Because of their therapeutic qualities essential oils that are extracted from garlic roots are used in aromatherapy and natural medicine.

3. Soil Conditioners: In agriculture composted garlic roots can be applied as soil conditioners to enhance soil fertility and structure.

4. Animal Feed Additives: Garlic root residues can be added to animal feed to give animals a natural

source of nutrients.

5. Natural Pesticides: In organic farming compounds from garlic roots are utilized as natural pesticides.

6. Biodegradable Packaging: The use of garlic root fibers to make biodegradable packaging materials is still being investigated.

7. Cosmetics: Because of their possible skin-rejuvenating qualities extracts from garlic roots are used in skincare and cosmetic products.

8. Pharmaceutical Formulations: The medicinal qualities of garlic root extracts make them useful in pharmaceutical formulations especially for the treatment of infections and cardiovascular disorders.

9. Botanical Extracts: Numerous compounds that are extracted from garlic roots are utilized in pharmaceutical development and botanical research.

10. Herbal Teas: A variety of health benefits are thought to be associated with herbal teas made from dried garlic roots.

11. Nutraceuticals: Because garlic root extracts may have health benefits they are used in nutraceutical products.

12. Soil Amendments: To improve soil fertility and structure in agriculture composted garlic roots are used as soil amendments.

13. Organic Fertilizers: Plants can naturally obtain nutrients from the organic fertilizers made from the residues of garlic roots.

14. Herbal Salves: Garlic root extract-containing salves are applied topically for their ability to soothe and heal the skin.

15. Herbal Shampoos: Garlic root extracts are used in shampoos to prevent hair loss and support healthy scalps.

16. Herbal Lotions: Garlic root extracts are found in lotions that are used to nourish and moisturize skin.

17. Herbal Supplements: For a number of health advantages garlic root extracts are taken as herbal supplements in the form of capsules and tablets.

5. Literature Review

- **China's Dominance in Garlic Exports:** Over the past decade, China has maintained its position as the largest exporter of garlic globally. In 2024 alone, Chinese garlic exports reached 2.62 million tons, marking an eight-year high. High-value-added products such as dehydrated and black garlic have contributed significantly to growth with export values increasing by up to 20 times compared to fresh garlic¹²⁴.
- **India's Growing Export Potential:** India exported 56,823 metric tons of garlic in 2023–24, marking a 110% increase in quantity compared to the previous year. Indian garlic is recognized for its stronger aroma and pungent flavour, making it preferred for culinary uses where robust taste is essential³.
- **Trade Barriers and Market Dynamics:** The U.S. has imposed tariffs on Chinese garlic since the mid-1990s due to dumping allegations. These trade restrictions create opportunities for alternative suppliers like India to expand their presence in the U.S. market⁵.
- **Globalization** has been a catalyst for economic growth in many developing countries,

facilitating increased trade and investment flows (Stiglitz, 2002). China's rapid integration into the global economy has been particularly notable, with its exports growing exponentially over the past few decades (World Bank, 2002). India, too, has experienced significant growth in its export sector, although at a slower pace compared to China (UNCTAD, 2002).

- The garlic industry provides a compelling case study to examine the impact of globalization. China has emerged as the largest exporter of garlic to the US, leveraging its low labour costs and efficient production techniques (Gale et al., 2013). Meanwhile, India's garlic, known for its stronger aroma and more pungent flavour, has also gained market share, albeit to a lesser extent (Nugroho & Lakner, 2022). The competitive advantage of these countries in the garlic market can be attributed to factors such as favourable climatic conditions, agricultural expertise and government support (Lall, 2001).
- However, globalization has also brought challenges, including increased competition, volatile market prices, and environmental concerns (Ghose, 2000). The socio-economic implications of garlic exports are complex, with benefits such as increased income and employment opportunities, but also potential drawbacks like labour exploitation and environmental degradation (Lee, Addy & Vivarelli, 2006).

6. Research Gap

Although a lot of research has been done on China's hegemony in the world market for garlic few studies have compared the flavor profiles and consumer preferences of Chinese and Indian garlic qualitatively especially in developed markets like the United States. Furthermore not enough research has been done on India's strategic potential to take advantage of the expanding demand for a variety of garlic varieties in global markets.

7. Research Methodology

1. Data collection: Export volumes values and pricing trends for both countries will be analysed using secondary data from trade databases government reports and industry publications.
2. Comparative Analysis: Using statistical tools a thorough analysis of Chinese and Indian garlic will be carried out taking into account production practices export prices quality characteristics and market penetration.
3. Consumer Survey (Optional): In the United States surveys and focus groups will be held.
A. markets to gauge consumer preferences for garlic varieties strength of flavor and aroma.

8. Objectives

1. to examine the current state of Chinese garlic exports to the United States as well as their historical trends or marketplace.
2. to assess India's growing competitiveness against China in terms of quality attributes pricing advantages and export growth.
3. to determine what influences the demand for Indian garlic in global markets such as the United States. S. Europe Latin America and Europe.
4. to determine whether Indian garlics unique flavor and affordability can challenge China's hegemony.

9. Comparative Analysis: China vs India

<u>Aspect</u>	<u>China</u>	<u>India</u>
Market Share	~90% of global trade	Emerging player with rapid growth
Production Volume	Largest globally	Second-largest globally
Quality	Clean, uniform size; rigorous inspections	Strong aroma; distinct flavour profile
Export Pricing	Competitive but higher than India (\$1.35/kg)	Lower prices (\$1.26–\$1.80/kg)
Key Markets	U.S., Europe, Asia	U.S., Europe, Latin America
Recent Trends	Stable growth; focus on high-value products	Record-breaking export growth (2023–24)

Comparative Analysis: China vs. India

9.1 Market Share and Production Volume

Over 70 percent of the world's garlic is produced in China which continues to be the largest producer and exporter. Despite its fast growth India still has a smaller market share worldwide. India is producing more garlic though thanks to year-round cultivation made possible by favorable agroclimatic conditions.

9.2 Export Pricing and Competitiveness

To keep its competitive edge Chinese garlic is frequently more expensive than Indian garlic. Nonetheless in price-sensitive markets demand for Indian garlic is being driven by its quality and cost advantage. Customers from West Asia and Africa are drawn to Indian garlic flakes because they are less expensive than Chinese flakes.

9.3 Quality and Safety Concerns

The quality and safety of Indian garlic are improved by its traditional farming practices and use of fewer chemicals. This resolves issues with Chinese garlic which has been criticized for having quality problems and chemical bleaching. Markets looking for a robust taste also favor Indian garlic because of its stronger flavor profile.

10. Challenges and Opportunities in the Global Garlic Market

10.1 Challenges for Indian Garlic Exports

- Domestic Consumption: India's export surplus is constrained by high domestic demand.

- Post-Harvest Management: Poor post-harvest practices impact quality and result in losses.
- Export Restrictions: India's garlic exports may be impacted by tariffs and trade regulations.

10.2 Opportunities for Indian Garlic Exports

1. *Flavour Differentiation*: Indian garlic's stronger aroma provides a competitive edge in markets seeking unique culinary characteristics³.
2. *Cost Advantage*: Lower production costs enable Indian exporters to undercut Chinese prices¹³.
3. *Market Diversification*: Growing demand from non-traditional markets like Brazil offers opportunities for expansion⁴.
4. Food Safety Concerns with Chinese Garlic: Allegations of chemical bleaching in Chinese garlic could shift demand toward Indian alternatives.

11. Results and Discussion

1. Economic Impact:

- China: China's garlic exports have significantly contributed to its economic growth, with exports to the US being a major component. The industry has benefited from low labour costs and efficient production techniques, leading to increased market share and economic benefits

- India: India's garlic exports have also grown, although at a slower pace compared to China. The unique characteristics of Indian garlic, such as its stronger aroma and more pungent flavour, have helped it gain market share in niche markets

2. Competitive Advantages:

- China: China's competitive advantage in the garlic market is attributed to its low labour costs, efficient production techniques, and government support. The country has been able to leverage these factors to dominate the global garlic market

- India: India's competitive advantage lies in the unique qualities of its garlic, which appeal to consumers seeking stronger flavours. Additionally, India has benefited from favourable climatic conditions and agricultural expertise.

3. Socio-Economic Implications:

- China: The garlic industry has provided significant employment opportunities and increased income levels for local communities. However, challenges such as labour exploitation and environmental degradation have also been reported

- India: Similar to China, India's garlic industry has contributed to increased income and employment opportunities. However, the industry faces challenges such as market volatility and trade barriers (Lee, Addy & Vivarelli, Macro 2006).

4. Policy Recommendations:

- China: To sustain its garlic export industry, China should focus on improving labour conditions, enhancing environmental sustainability, and diversifying its export markets to reduce reliance on the US market.

- India: India should invest in agricultural research to improve garlic quality and yield, develop infrastructure to support garlic exports, and negotiate better trade agreements to reduce barriers to entry in international markets.

Conclusion

China's dominance in the global garlic trade is rooted in decades of consistent production practices, high-quality processing standards, and established market penetration¹². However, India's increasing export volumes, distinct flavor profile, cost advantages, and diversification into new markets position it as a viable competitor in key regions such as the U.S.³⁴. This study highlights India's potential to challenge China's dominance by leveraging its unique strengths while addressing gaps in quality control and market access. In the 1920s, China's dominance in the global garlic market was characterized by large-scale production, competitive pricing, and reliable supply. Despite trade barriers and tariffs, Chinese garlic remained a staple in key markets like the U.S. In contrast, Indian garlic is emerging as a strong competitor due to its unique flavor profile, cost competitiveness, and growing production volume. With increasing global demand and concerns over food safety, Indian garlic is well-positioned to challenge Chinese dominance and expand its market share in the coming years. Future research should focus on consumer preferences for flavor profiles and policy measures to enhance India's competitiveness in global markets.

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