

North Asia Soy Food Report

2022



Table of Contents

Introduction	01
China	02
Food Soybean Production and Trade	04
Production of Soybeans	04
Soybean Trade Methods	06
Logistics and Transportation of Food Soybeans	08
China's Food Soybean Supply Chain	09
Tofu Production and Consumption	12
Tofu Food Production Enterprises	12
New Trends in China's Tofu Foods	16
Plant-Based Meat	16
Plant-Based Yogurt	19
Labeling Requirements and Precautions for Soybean Foods	20
Legal Provisions and Requirements	20
Extension of Practical Issues	24
Customs Clearance for Soybean Imports	26
Japan	30
Soy Food Market	32
Soybeans and Food Culture	32
Soybean Supply Chain	34
Growth in Container Shipping	36
Japanese Import Volume Trends	37
Transgenic Labeling	38
Industry Views on Labeling Changes	42
Supply Chain Commingling Test	46
Sustainability in Japan	48
Consumer Awareness	48
Sustainable U.S. Soy Logo Use	51
Sustainability Trends	55
Soybean Consumption Trends	58
Major Soybean Products	60
New Soy Food Trends	62
Tofu Standards and Revisions	63
Natto Standards	64
Advantages of U.S. Soybeans	66
Korea	68
Soy Food Market	70
Trade	72
Imports of Food Soybeans	72

Consumption	76
Soy Food Trends	77
Policy	78
Tariffs	78
Genetic Modification Tolerance	80
Sustainability in Korea	82
Consumer Sustainability Trends	82
Corporate Sustainability Trends	84
Taiwan	86
Soy Supply and Demand	88
Industry Overview	90
Procurement Process	92
Shipping and Storage Process	94
Soy Food Market Development	96
State of the Industry	98
Innovation	100
Future Development	101
Plant-Based Meat	106
Market Introduction	106
Taiwan's Vegetarian Evolution	110
Technological Developments	111
Future Development of Plant-Based Meat	113
Regulations	116
Inspection and Registration	117
Border Control and Import Duty	119
Traceability and Tracking	120
Product Labeling	122
Sustainable U.S. Soy Logo Use	124
North America	128
Food-Grade Soybean Production	130
United States Production	130
Canadian Production	133
Soy Food Market	134
Dominance of Soy Milk	134
Growth of Meat Alternatives	135
Labeling	138
The Bioengineered Disclosure Act	138
Non-GMO Project	139
Industry Standards	140
Tofu	140
Soy Milk	143

Introduction

Welcome to the U.S. Soybean Export Council's inaugural North Asia Soy Food Report. This comprehensive report combines the varied current market factors-- from sustainability and consumption to policy and labeling--necessary to provide a holistic understanding of soy markets across China, Japan, Korea and Taiwan.

North Asia, along with the rest of the world, is experiencing increasing consumer demand for plant-based proteins in traditional soy foods and as an ingredient in many new meat-alternative foods.

U.S. Soy is well positioned to meet the growing demand of international consumers and buyers seeking sustainable, reliable solutions to their soy food needs.

The North Asia Soy Food Report was produced by U.S. Soybean Export Council staff and leading market experts to meet the need for up-to-date market information required by U.S. Soy exporters, farmers, end users, industry and the soy foods industry of Asia. I'm confident you will find it to be a highly informative and insightful tool in understanding the valuable North Asia soy food market.



Jim Sutter
Chief Executive Officer
U.S. Soybean Export Council



China

SOY FOOD REPORT



Food Soybean Production and Trade

PRODUCTION OF SOYBEANS

The production of plants classified as genetically modified organisms (GMOs) in China requires an agricultural safety certificate. According to the approved list issued by China's Ministry of Agriculture and Rural Affairs, up to now, the only genetically modified crops allowed to grow in China are cotton and papaya. Genetically modified soybeans currently are not among the crops allowed to be grown in China.

At the same time, to meet domestic demand, the country allows some imports of GMO soybeans and corn.

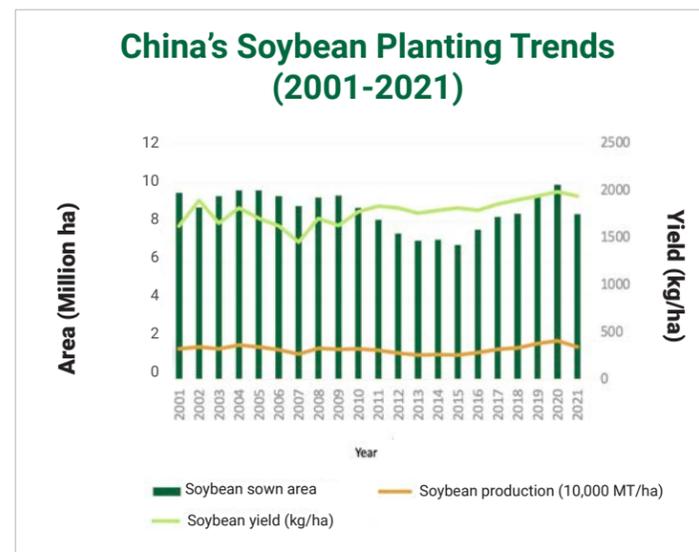
That is, China does not allow the cultivation of genetically modified soybeans, but it allows the import and consumption of some transgenic soybeans. In December 2021, the Ministry of Agriculture and Rural Affairs added 10 new GMO soybean varieties to the Approved List of Agricultural GMO Safety Certificate (Import).

Imported GMO soybeans approved with safety certificates are used as raw materials for processing. About 20% of the GMO soybeans imported into China become soybean oil and 80% become soybean meal, the main part of animal feed. Soybeans produced in China are non-GMO soybeans.

SOYBEAN PRODUCTION

According to the national grain production data released by the National Bureau of Statistics of China, the soybean planting area in 2021 was about 8.4 million hectares (20.8 million acres), a decrease

of about 14.8% from the previous year. The total output, 16.4 million metric tons (602.5 million bushels), decreased by 16.4% compared with the previous year. The yield per unit area was 1.95 MT per ha (28.7 bushels per acre), a decrease of 1.8% compared to the previous year.



Source: U.S. Department of Agriculture (USDA) Foreign Agricultural Service (FAS)



In the past two decades, China's annual soybean production has basically remained at a relatively stable level as shown in China's Soybean Planting Trends, mainly due to the increase in unit production. From 2001 to 2021, China's soybean planting area decreased from 9.48 million ha (23.4 million acres) to 8.4 million ha (20.8 million acres), a drop of about 11.4%. Soybean yield increased from 1.6 MT per ha (23.9 bushels per acre) to 1.9 MT per ha (28.5 bushels per acre), an increase of about 19.4%.

SOYBEAN PLANTING LEVEL IN CHINA

Technology plays a key role in soybean breeding, cultivation, farming, processing, quality, safety and disease prevention and control. Soybean planting areas in China include the spring area in the north that produces one crop per year; the summer areas in the Huanghai-Huaihai Basin and the Yangtze River Basin; the spring, summer and autumn area in the southeast; and the four-season area in South China. Different regions have different high-efficiency cultivation techniques for improved varieties of research and development (R&D) applications. In 2019, the new soybean variety bred by the Heilongjiang Academy of Agricultural Sciences yielded 6.7 MT per ha (98.6 bushels per acre), setting a new record for Chinese soybeans.

This is of great significance for increasing Chinese soybean production and revitalizing the soybean industry.

With the development of science and technology, the yield per unit of land has continuously increased. Compared with crops such as corn and rice, soybean cultivation in China is expensive, laborious and time-consuming, and the benefits are very small.

According to an expert from the School of Food Science and Nutritional Engineering, China Agricultural University, "The yield per acre of non-GMO soybeans in China is only half that of others, but the pesticides used and the time spent are much more than others. Another major reason why farmers are reluctant to grow soybeans is that soybeans are far less profitable than alternative crops such as corn."

In January 2022, the Ministry of Agriculture and Rural Affairs of China issued the 14th Five-Year Plan for the Development of the National Planting Industry. The plan proposed that by 2025, China will strive to expand the soybean planting area to about 10.7 million ha (26.4 million acres), and the output will increase from 16.4 million MT in 2021 to 23 million MT, promoting the self-sufficiency rate of soybeans.

Sources:

- Regulation on Administration of Agricultural Genetically Modified Organisms (GMOs) Safety
- Approved List of Agricultural GMO Safety Certificate (Production and Application)
- Wang Yu, Li Ganqiong, Yu Wen, et al., Present Situation and Prospects of Soybean Production in China [J], Hubei Agricultural Science
- The Ministry of Agriculture and Rural Affairs issued the 14th Five-Year Plan for the Development of National Planting Industry

SOYBEAN TRADE METHODS

SPOT TRADE

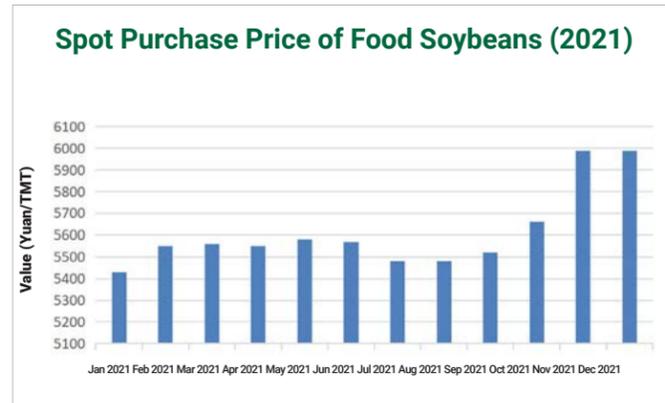
Spot trade refers to a trade method in which buyers and sellers take immediate or short-term delivery of physical commodities according to the agreed payment and delivery methods. This is the basis for normal operation and development of the soybean market in China.

Due to the small scale and high-degree dispersion of enterprises in China's soybean food processing industry, the current food soybean trade is still dominated by traditional spot trade. However, due to the fluctuations in soybean prices and supply, this traditional trading method shows obvious disadvantages. Soybean planting and supply follow a seasonal pattern. Generally speaking, during harvest season, farmers will focus on selling soybeans, and processing companies will focus on purchasing soybeans. This causes soybean prices to slide and a wait-and-see mood in the market. On one hand, the price drop will damage farmers' income. On the other hand, it will also cause capital cost and storage pressure to soybean purchasing enterprises.

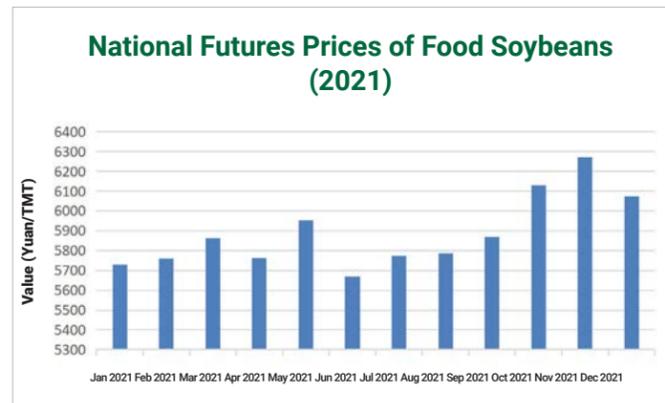
In order to avoid the risk of spot trade, more and more enterprises that either hold or need to use a large amount of food soybeans have gradually begun to use the hedging business in the futures market to avoid operational risks. The point price trade commonly used in soybean spot trade is also based on futures price and contango/backwardation.

FUTURES TRADE

Soybeans are a mature futures trading variety. The soybean futures trading of the Chicago Board of Trade (CBOT) is the most well-known. The CBOT soybean futures price has become a global soybean trade indicator. Dalian Commodity Exchange in China has also launched soybean futures. In March 2002, due to the promulgation and implementation of the national



Source: Industry reporting



Source: Industry reporting



GMO management regulations, imported soybeans could not participate in the futures delivery for the time being. The contracts are divided into soybean No. 1 futures contracts for edible-quality non-GMO soybeans and soybean No. 2 futures contracts for oil-pressing quality genetically modified and non-GMO soybeans.

Non-GMO soybeans have relatively independent price trends compared to GMO soybeans, but with a strong price correlation. With the effective use of the price discovery and risk mitigation functions of soybean futures, the linkage between soybean futures and the soybean spot market has also been strengthened and used by many entities in soybean industry as an important basis for judging price trends.

Should the soybean food production industry learn from the soybean crushing industry and more rationally use modern financial futures trading methods, such as hedging, call options, etc., soybean trade would have a better opportunity to avoid the risk of price fluctuations faced by spot transactions.

CONTRACT FARMING TRADE

In recent years, the trade of contract farming in China's soybean industry is gradually developing.

This form of trade allows both the supply and demand sides to sign forward contracts and lock in prices before soybeans go on the market or even get planted. Enterprises do not have to worry about insufficient soybean supply, while farmers can be assured they will not be unable to sell soybeans due to falling market prices after harvest.

There are many modes of contract farming. The more successful one is enterprise plus farmer. Relying on agricultural reclamation enterprises and using farms as an intermediary, order contracts are signed with farmers. These contracts have a high performance rate of over 95%. In April 2017, after reaching an agreement and signing a contract with a well known domestic food company, Daxinganling Agricultural Reclamation Group, a high-protein soybean base of 12,267 ha (30,312 acres) was built that year, and 23,000 MT (845,000 bushels) of high-protein soybeans were produced, delivering protein content above the accepted industry average of 36%.

The price per metric ton is \$47 higher than that of ordinary soybeans, and the income per hectare has increased by more than \$115.38. 93 Branch of Beidahuang Agricultural Reclamation Group Co., Ltd., is an important production base for special raw materials for soybean food. By actively going out to connect with large enterprises and adapting to individual enterprise needs for raw materials, it establishes the special food soybean base. It also makes planting plan based on sales, even before the season.

Sources:
 - The Development Level of Domestic Soybean Industry Needs to be Improved
 - Dong Yanbo, Skills Showed in the Supply Side of Agricultural Soybeans
 - Public data of the Ministry of Agriculture and Rural Affairs of the People's Republic of China

National well-known leading tofu products enterprises such as Yuwang, Zuming and Dali Group continue to establish production bases for soybean food raw materials in 93 Branch. Contract farming not only solves the problem of farmers' difficulty in selling soybeans, but also increases their income and greatly raise their willingness to plant.

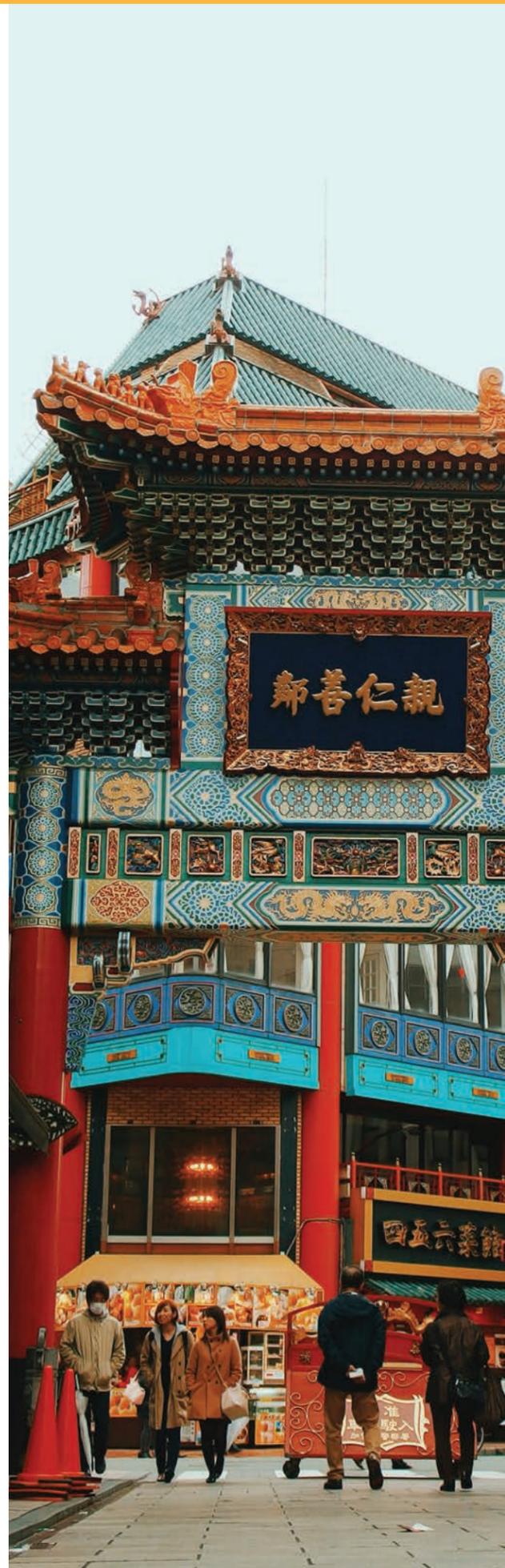
Contract farming is the basis of and important to agricultural industrialization. But in the process of implementation, the order contract is not detailed, the procedure is not perfect, the operation is not standardized, the legal awareness of both parties to the contract is not strong, and the performance rate is unstable. In the future, relying on the hedging, price guidance and other functions of soybean futures trading, contract farming will be better developed. This can not only control the pace of soybean sales and reduce market risks, but also ensure the supply of raw materials for enterprises, making China's soybean market system more complete.

LOGISTICS AND TRANSPORTATION OF FOOD SOYBEANS

TRANSPORTATION OF IMPORTED FOOD SOYBEANS

At present, in China's soybean imports, shipping is the core link of circulation. Cost, insurance and freight (CFI) is the most common method. The seller is responsible for chartering and booking. CIF is followed by free on board (FOB). According to incomplete statistics, the proportion of FOB used in China's soybean imports is less than 30%.

Normally, non-GMO soybeans are imported from the exporting country's port to the Chinese port by dry bulk carrier. After soybeans arrive at Chinese ports, they go directly to the warehouses and workshops of large-scale importing enterprises at the ports for storage or direct processing. Otherwise, they are screened and packaged and then transported by road, waterway, railway or multiple modes of transportation to processing enterprises. The packaging specifications are mostly 50-kg (110-pound) bags.



TRANSPORTATION OF DOMESTIC FOOD SOYBEANS

A combination of road and railway transports most food soybeans throughout China. Due to the shortage of railway capacity, most enterprises still choose road transportation. Primarily 30-metric ton (33-short-ton), heavy-duty trucks are used in road transportation, and most of the goods are packed in 50-kg (110-pound) bags. In terms of price, taking the transportation from the northeast to Jiangsu as an example, the average railway freight in 2021 was about \$35.38 per MT, and the average price of road transportation was about \$69.23 per MT. Due to the epidemic and oil prices, the price of road transportation in 2021 was nearly \$30.77 higher than 2020.

Farmers, dealers, agricultural product wholesale markets, soybean processing enterprises and distributors use the soybean transportation network in the main production areas. Normally farmers transport the soybeans to the wholesale market, and dealers purchase soybeans with their own transport trucks. Soybeans are delivered to the soybean processing enterprises in their own province, to the collection points set up by the soybean processing enterprises of southern provinces, or to processing plants in sales areas.

Soybean processing enterprises establish collection points in the production area and entrust third-party logistics companies to transport soybeans to processing facilities. Compared with other entities, the logistics managed by processing enterprises is more organized, economical and efficient. The mode of transport is a combination of road and rail.

In the future, soybean producers will further improve transportation capacity by improving the network, infrastructure, etc. They will establish soybean logistics parks, warehousing markets, circulation, processing and distribution centers with more advanced talents, technologies, equipment and management levels, so as to better meet the logistics needs of soybeans.



CHINA'S FOOD SOYBEAN SUPPLY CHAIN

MAIN INTERNATIONAL PRODUCTION AREAS

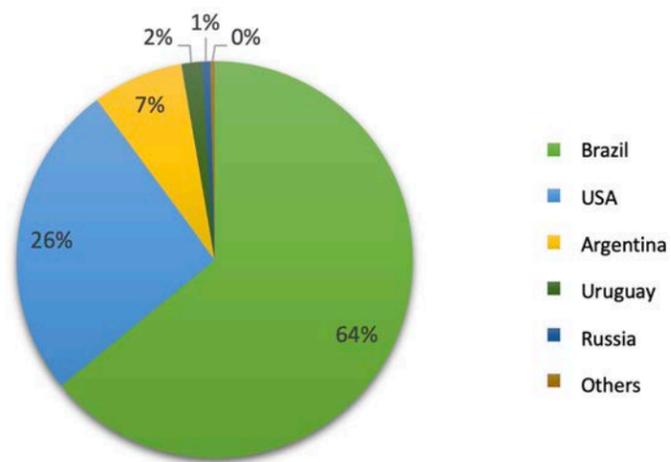
According to customs statistics, in 2020, China's soybean imports reached 100.3 million MT (3.7 billion bushels), an increase of 13.3% over the previous year. The value was about \$42.2 billion, an increase of 12.5%. The average import price was about \$420.62 per MT, which dropped by 0.7%.

During the year, soybean imports from Brazil were 64.3 (2.4 billion bushels) million MT, an increase of 11.4%, accounting for 64.1% of China's total. Imports from the United States were 25.9 million MT (952 million bushels), an increase of 52.8%, accounting for 25.8%. Imports from Argentina, Uruguay and Russia were 7.46 million, 1.66 million and 693,000 MT (274 million, 61 million and 25.5 million bushels) respectively, a decrease of 15.2%, 19.8% and 5.4%.

In 2020, China's soybean imports from Brazil, the United States and Argentina accounted for a total of 97.3%, which means that China's imports of non-GMO soybeans accounted for about 3% of the total imports. The main sources of China's imports of non-GMO soybeans are Russia, Ukraine, Canada, Tanzania, Ethiopia, Benin and other countries.

Sources:
 - Meng Qiang and Chen Lining, Analysis of the Importance of Shipping Rights in China's Soybean Imports
 - Xiaoxu Xiao, Analysis of Present Situation of Soybean Logistics Network in Heilongjiang Province
 - Yang Shuguo, Research on China's Soybean Industry Economics from the Perspective of Industrial Chain

Distribution of China's Soybean Imports by Country (2020)



Source: USDA FAS

MAIN DOMESTIC PRODUCTION AREAS

Except for Qinghai Province, soybeans are sown all over China, but the main soybean production areas are relatively concentrated. In terms of production pattern, the northeast, Huanghai-Huaihai and south production areas grow the most soybeans in China.

Since 2009, soybean planting in the northeast production area has been decreasing, the Huanghai-Huaihai production area has decreased slightly, and the southern production area has increased slightly. The relative situation of the three production areas has not changed. In 2012, the soybean planting area of the three main production areas accounted for 50%, 30% and 15% of the country's total soybean planting area, respectively. The soybean output of the three main production areas accounted for 50%, 26% and 15% of the country's total soybean output.

The provinces with the largest sown area in China are Heilongjiang, Jilin, Liaoning, Inner Mongolia, Anhui, Henan and Shandong. Provinces with relatively larger sown areas are Sichuan, Jiangsu, Shaanxi, Hubei, Shaanxi, Hebei, Guizhou, Jiangxi, Hunan, Guangdong and Guangxi. In 2021, the national soybean planting area was 8.4 million hectares (20.8 million acres), with a total output of 16.4 million MT (602.5 million bushels).



MAIN SOYBEAN SALES AREAS IN CHINA

From the perspective of processing pattern, Chinese soybean food processing is basically distributed according to regional population and consumption habits. Biochemical processing is mainly distributed in coastal areas and large cities.

Because the main soybean production areas in China are concentrated in the north and the sales areas are mainly concentrated in the developed areas in the south, the circulation of soybeans has long been a pattern of north-to-south. Small and medium-sized soybean food processing enterprises in various regions give priority to soybeans produced in their own regions, while large-scale enterprises basically have purchasing departments or production bases in northern production areas due to using large amount of soybeans.

The Bean Products Committee of China (BCPA) selected the top 50 soybean products companies in the country based on the 2020 business operation data reported by large-scale enterprises in the national soybean product industry. The total amount of beans invested by the top 50 companies was 1.8 million MT (66.1 million bushels), an increase of 4% over 2019 and sales were about \$4.47 billion, an increase of 9.2% over 2019. Geographically, most of the top 50 companies are located in Hunan, Jiangsu, Shanghai, Zhejiang and Anhui.

Sources:

- Contains GMO and non-GMO soybeans
- China's Soybean Imports Exceed 100 Million MT for the First Time in 2020
- Yang Shuguo, He Xiurong, China's Soybean Industry Status and Viewpoints on it
- Wang Yu, Li Ganqiong, Yu Wen, et al., Present Situation and Prospects of Soybean Production in China
- In-depth Thinking on the Pattern of China's Soybean Industry: Worthy of Careful Reading by Futures and Spot Experts

Tofu Production and Consumption

TOFU FOOD PRODUCTION ENTERPRISES

China is the birthplace of tofu products and the world's largest consumer of them. Soybeans, a traditional Chinese food, have been deeply loved by Chinese people. With the improvement of living standard and the acceleration of pace of life, modern people pay more attention to the nutrition and health of food, and the nutritional ingredients in soybeans meet their demands. The proportion of tofu foods consumption in people's dietary consumption structure is increasing.

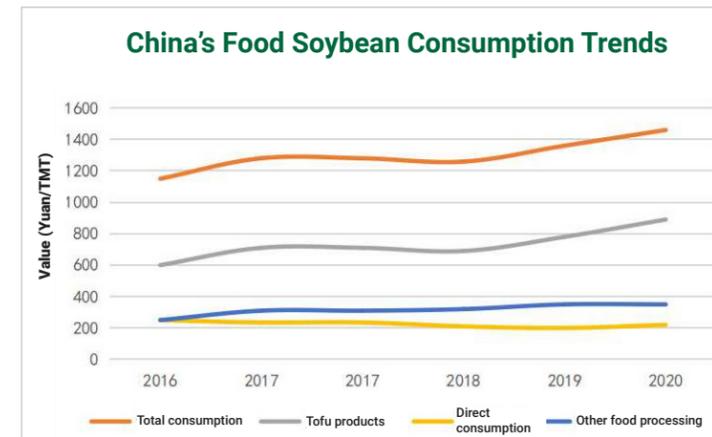
Non-fermented and fermented tofu products are common in China. Non-fermented tofu products mainly include traditional tofu, soy milk, dried tofu and yuba, as well as soybean protein, that is, new tofu products. New products include soybean protein and its puffed food, soybean meat, etc. Fermented tofu products mainly include soy sauce, soybean paste, sufu, tempeh, etc. Besides the new tofu products of soybean protein, the above are well-known traditional foods in China, important to every household.

In 2020, China's soybean output was 19.6 million metric MT (720 million bushels), an increase of 8.3% over the previous year. According to statistics from the General Administration of Customs of the People's Republic of China (GACC): China imported 1.2 million MT (44.1 million bushels) of non-GMO soybeans, including 690,000 MT (25.4 million bushels) from Russia, 65,000 MT (2.4 million bushels) from Ukraine, 24,000 MT (882,000 bushels) from Ethiopia, 68,000 MT (2.5 million bushels) from Kazakhstan, 245,000 MT (9 million bushels) from Canada and 15,000 MT (551,000 bushels) from Benin. China also exported 70,000 MT (2.6 million bushels) of soybeans in 2020.

According to the survey data of tofu products enterprises nationwide by the BPCA, the soybean consumption in China's food industry in 2020 was about 14.6 million MT (536 million bushels), an increase of about 7.4% compared with 2019, showing an upward trend.

Compared with 2019, the consumption processed soybeans in 2020 increased by 11%, to 8.9 million MT (327 million bushels), accounting for about 61% of the total soybean consumption in China's food industry.

The consumption of soybean used for other food processing in 2020 is basically the same as 2019, about 3.5 million MT (129 million bushels), accounting for about 24% of the total. Direct soybean consumption in 2020, including homemade soy milk, etc., increased by about 10% compared with 2019, to about 2.2 million MT (81 million bushels), accounting for about 15% of the total amount of soybean in the food industry, also in an upward trend. In the last five years, the soybean consumption in China's tofu food industry as a whole showed an upward trend, while the soybean consumption in tofu products also showed an obvious upward trend.



Source: Annual reports of the BPCA

Although China's tofu product manufacturing industry has existed for thousands of years and has a large volume, quite a number of enterprises in the market are small and micro-enterprises with about 10 employees. These businesses are difficult to develop into large-scale enterprises in a large batch in a short period of time.

In 2016, the number of manufacturing enterprises with production licenses in China's tofu products industry was approximately 5,000. That number is expected to reach 10,000 by 2020. With the further optimization of the industrial structure, the ratio of large-scale enterprises to small and micro-sized enterprises will change from the original 3:7 to a more reasonable 7:3 in the future.

Sources:

- Unless otherwise specified, the soybeans mentioned herein refer to non-GMO soybeans
- Bean Products Committee of China (BCPA), Analysis of New Product Development, Food Safety and Use of Related Standards in China's Tofu Products Industry in 2020
- Interview with Wu Yuefang, BCPA vice president and secretary general
- Sina Finance: The BPCA chairman proposed that the consumption of soybeans for food will reach 15 million MT in 2020
- List of top 50 enterprises in 2021

This indicates that the conventional tofu products in the market will be mainly supplied by large-scale enterprises, and the specialty and customized small products will be jointly supplied by small and micro-sized enterprises and large-scale enterprises.

LARGE-SCALE ENTERPRISES IN THE TOFU PRODUCTS INDUSTRY

According to the announcement of the Top 50 Brand Enterprises in China's Tofu Products Industry in 2021 issued by the BPCA, the current large-scale tofu food product enterprises are mainly concentrated in the Yangtze River Delta region where the population is relatively dense and the economy is relatively developed. Others are located in the central region with a developed agriculture industry, such as Anhui and Hunan, as well as the Sichuan and Chongqing areas. The development level of tofu products production is unbalanced and gradually decreases from southeast China to northwest China.

Among the top 50 enterprises, 23 provide fresh tofu products, an increase of two over the previous year. Eight companies engage in soy milk and soy milk powder, a decrease of one over the previous year. The 14 enterprises mainly offering tofu snacks remain unchanged from the previous year.



Six other tofu product businesses focus on fermentation, puffing, yuba, protein, etc., also unchanged from the previous year.

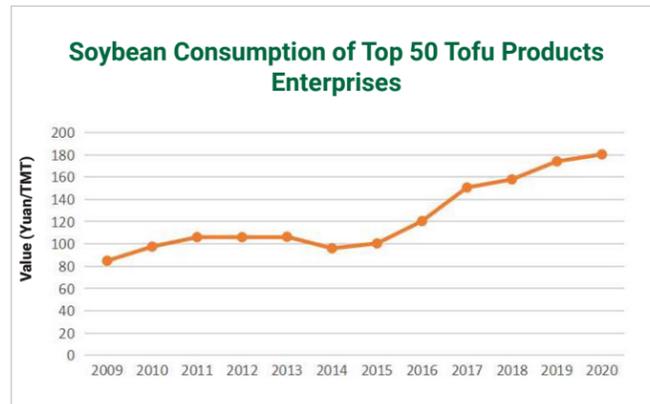
According to the nationwide statistics of the BPCA on large-scale tofu products enterprises in 2020, the sales volume and soybean consumption of the top 50 large-scale enterprises in the tofu products industry in 2020 increased compared to 2019. The soybean consumption was 1.8 million MT (66.1 million bushels), an increase of 4%. Sales reached \$4.5 billion, an increase of 9.2%. The tax paid in 2020 increased by 20.5% compared with 2019, 17.6% compared with 2018 in 2019, and 11.2% compared with 2017 in 2018. After-tax profit in 2020 increased by 9% compared with 2019, 24.5% compared with 2018 in 2019 and 9.5% compared with 2017 in 2018.

INTRODUCTION OF KEY SECTORS OF TOFU PRODUCTS INDUSTRIES

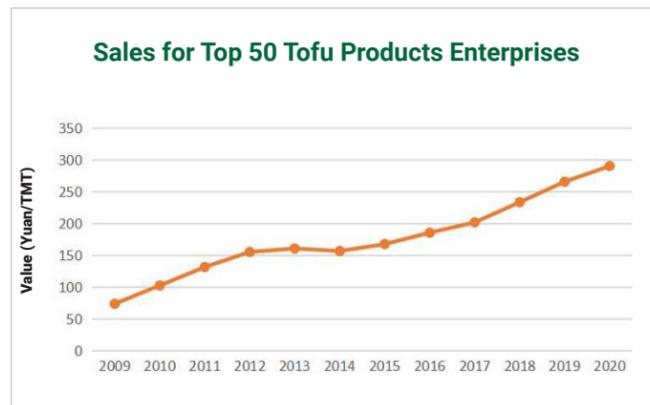
From the perspective of market size, the consumption of fresh tofu products, \$9.9 billion, plant protein drinks, \$5.9 billion, and snacks, \$3 billion, in 2020 is relatively large.

Fresh tofu products have strong market growth potential due to characteristics of meeting the needs of healthy diets. From 2013 to 2020, the amount of soybeans used by top 50 large-scale enterprises for fresh tofu products increased from 310,500 MT (11.4 million bushels) to 575,500 MT (21.1 million bushels), with a compound annual growth rate of 9.2%.

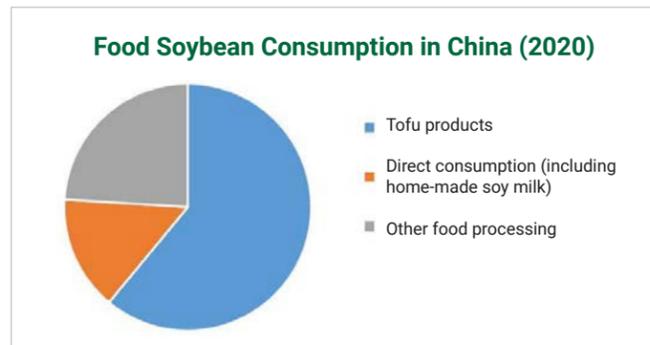
Soy protein drinks provide benefits, including low cholesterol, low saturated fat, plant protein and more, which are in line with the trend of healthy consumption; therefore, the plant protein drink industry has achieved rapid development. From 2014 to 2020, the soybean consumption of 50 large-scale enterprises for plant protein drinks increased from 300,700 MT (11 million bushels) to 476,000 MT (17.5 million bushels), with an annual compound growth rate of 8%.



Source: Annual reports of the BPCA



Source: Annual reports of the BPCA



Source: Industry reporting



Source: BPCA



Snacks are vegetarian food. For example, dried tofu and other tofu foods can be made into small packaged instant foods with unique flavor and suitable for leisure and tourism, thus expanding tofu products from traditional dishes to leisure and convenient foods. According to the data, from 2014 to 2020, the soybean consumption of the top 50 enterprises for snacks increased from 239,800 MT (8.8 million bushels) to 376,200 MT (13.8 million bushels), with an annual compound growth rate of 7.8%.

Among fermented tofu foods, soy sauce is an indispensable condiment for Chinese families. According to the data of the China Condiment Industrial Association (CCIA), among the top 100 condiment enterprises in China from 2016 to 2019, the sales revenue of the soybean sauce businesses showed an upward trend year-by-year. In 2019, the sales revenue reached \$4.3 billion, up 13.2% from 2018, accounting for 27% of the total sales revenue of the condiment industry. Foshan Haitian flavoring and Food Co.Ltd. (Haitian) has a market share of about 17%, and the top three brands have a combined market share of 27% in China's soy sauce market. Haitian prospectus shows that it purchased \$66.2 million of soybeans in the first half of 2013, and the spot price of domestic soybeans in 2013 was \$106.50 per MT.

INDUSTRY PROSPECTS

From the perspective of human health, the trend is to increase the proportion of soybean protein and other plant proteins in daily diets. Plant-based food consumption likely will become a more common choice in human diet structure.

Additionally, China's tofu products have a development history of more than 2,000 years, which contain the concept of Chinese culture. All these factors are bound to promote the development and optimization of tofu products industry.

In the 2020 annual report of the tofu products industry, the BPCA put forward the future development goal: the consumption of soybeans for food could increase by more than 1 million MT (36.7 million bushels) in the future. By the end of 2025, the consumption of soybeans used in the catering industry as an auxiliary or cooking material may reach 6 million MT (220.4 million bushels). The consumption of soybeans for snacks is projected to be 3.5 million MT (128.6 million bushels). The consumption of soybeans used in soy milk categories, including flavored soy drinks, could be 800,000 MT (29.4 million bushels), based on one cup of flavored soy drinks and one cup of milk per person per day. The annual consumption of soy drinks per person in China is expected to reach 30 kg (66 pounds) and the consumption of soybeans will reach 5 million MT (183.7 million bushels). Direct consumption, including home made soy milk, of soybeans should be 2 million MT (73.5 million bushels), slightly less than now. Soybean consumption for soybean protein and food industry ingredients may reach about 4 million MT (147 million bushels). The average output value of soybeans per 10,000 MT (367,400 bushels) should be \$250 million, an increase from \$160 million today, and the total output value of the industry should reach \$300 billion.

Sources:
 - National Good Bean! 2021 Top 50 Tofu Products Enterprises in China
 - Exchange rate for U.S. dollars to renminbi in the report is 6.5
 - Sealand Securities, Consumption Upgrade and Catering Development Promote the Growth of the Soy Sauce Industry - In-depth Report of the Condiment Industry
 - BCPA, 2020 China Soy Food Industry Status and Trends
 - USDA database



New Trends in China's Tofu Foods

China is the source of tofu food culture, with the longest history of soybean consumption. China's tofu foods are healthy, safe and nutritious, featuring numerous varieties and comprehensive nutrition, suitable for all ages. Traditional Chinese tofu products can be divided into two categories: non-fermented and fermented.

Non-fermented tofu products include home-cooked dishes, such as boiled beans and fried beans, made directly from soybeans, as well as stir-fry and soup made with soybeans and supplemented by other ingredients. Traditional tofu products also include hydrated products like tofu, semi-dehydrated products like dried tofu and beancurd sheets, fried products like oily bean curd and fried bean balls, marinated products such as marinated dried bean curd and spiced dried bean curd, dried products such as yuba and more.

Fermented tofu products include tempeh, soybean paste for sweet noodle sauce or soy sauce, sufu and others. These traditional tofu foods or products passed down from generation to generation are deeply loved by the Chinese public. With changing times and the advancement of science and technology, in addition to traditional edible soybean oil, more and more deep-processed tofu products are constantly emerging in the market. Examples include flavored soy drink and soy drinks powders; derivative products made of soybean protein, such as soybean protein powder; various solid drinks with soybean protein; and ready-to-eat snacks with soy protein as the main ingredient.

PLANT-BASED MEAT

The consumption of meat products in various countries has increased rapidly due to the continuous improvement of living standards. It is estimated that by 2030, the supply gap of China's meat products will reach 38 million MT, which will seriously threaten the country's grain reserves and food security.

To deal with such problems, related research on plant-based meat has attracted extensive attention in recent years. Plant-based meat refers to food with a similar flavor, texture and morphology of meat products, processed with soybean, pea and other plants as raw materials combined with vegetable oil and flavor substances. As a result, the plant-based meat product series, a new application field of soybeans, began to take root and sprout.

Regarding consumers' acceptance of plant-based meat, foreign scholars and institutions have carried out some surveys and studies. According to the investigation by Bryant and other scholars, consumers in the three most populous countries in the world, namely the United States, China and India, have very high acceptance of vegetable meat products, even more than 90% in China and India.

Other scholars conducted an email survey and found that if the price is the same, about 21% of the respondents will choose plant-based meat burgers instead of beef burgers. In consideration of the size of the global burger market, the development of plant-based meat is economically feasible. At present, there are few academic studies on Chinese consumers' acceptance of plant-based meat products.



The summary information of investigation and research in several major industries is shown in the table of Plant-Based Meat Companies and Products in Chinese Market. Chinese consumers have a high degree of acceptance of plant-based meat, showing a strong desire to buy and eat these products. Despite a large gap between the Chinese and global plant-based meat market, players are very optimistic about its prospects and believe the Chinese market has great potential for development.

However, the localization of plant-based meat in the Chinese market still faces many challenges, mainly due to taste and price. Many people tried the plant-based meat products of multiple restaurant chains and brands immediately after they were launched.

The majority of consumers reflected that the taste of plant-based minced beef is indeed different from that of real beef, and the former lacks meat texture and chewiness. Therefore, in order to promote plant-based meat in the Chinese market, production technology and technical transformation must improve. In terms of price, taking Starbucks as an example, four plant-based meat products are in the plant-based diet category on its delivery menu page, with prices ranging from \$5.40 to \$7.50.

The price of Starbucks' plant-based meals is the highest among all categories, about 20% higher than that of similar animal meat products. The same is true of IKEA, where the retail price of plant-based protein meatballs is \$6.10, 21% higher than the retail price of classic meatballs, \$5.10. Price affects the threshold of consumption, and large-scale production can make the price of products more friendly. Nestle announced the completion and commissioning of its first Asia plant-based production line in Tianjin, China. The production line has been under construction since May 2020, with a total investment of about \$112.9 million, and the design capacity of the production line is 8,000 MT per year. And Starfield expected that by the end of 2021, the first self-built, large-scale production and research base will be completed and put into production.

Sources:

- Xin Liangjie, Li Penghui, Fan Yuzhi, Change of Food Consumption with Population Age Structure in China, Transactions of the Chinese Society of Agricultural Engineering, 2018, 34(14): 296-302
- Slade, P., If You Build It, Will They Eat It? Consumer Preferences for Plant-based and Cultured Meat Burgers, Appetite, 2018(125): 428-437
- Analysis of the Market Status and Development Prospects of China's Artificial Meat Industry in 2020, February 17, 2021, Foresight Industry Research Institute



The base will include nine items in three categories, covering more than 300 detailed plans for plant-based meat products. The expansion of production capacity can reduce the price of plant-based meat products, smooth the of upstream and downstream supply chains and ensure food safety.

Considering the trends around environmental protection, healthy diet and the purchasing power of the new generation of consumers, the demand for soybean-based meat is expected to increase significantly in the future, which will help promote the transformation of production methods. Expanding the production of plant-based meat may reduce greenhouse gas emissions compared to animal husbandry, and environmental protection is a key concern of Chinese government in recent years. From the perspective of ensuring people's livelihood, plant-based meat can be used as a supplement to further stabilize the meat supply market. Finally, plant-based meat can balance consumers' diet and enrich their choices.

Plant-based diets may improve the health of the human body. The development of plant-based meat industry can coordinate balanced development between humans, society and nature.

Plant-Based Meat Companies and Products in the Chinese Market

Enterprise Nature	Enterprise Name	Types of Plant-Based Meat Products
Foreign-invested enterprises	Beyond Meat	Plant-based meat patties, chicken nuggets, etc.
	Impossible Foods	Plant-based meat patties, chicken nuggets, etc.
	Nestle	Plant-based meat patties, chicken nuggets, etc., braised pork ball in brown sauce
	Unilever	Plant-based meat patties, chicken nuggets, etc.
Domestic enterprises	Jinzi Ham	Plant-based beef patties, sausages
	Hangzhou Be&Cheery	Spicy plant-based beef, small sausages
	Shenzhen Starfield	Plant-based meat patties, chicken breast
	Shenzhen Qishan Foods	Veggie sausages
	Jiangsu Hong Chang Foods	Black pepper plant-based pork chops
	Ningbo Sulian Foods	Western style hamburger steak

Plant-Based Meats Sales Channels in China

Sales channel	Online	E-commerce platforms such as Tmall, JD.com, Suning and Meituan
	Offline (Supermarkets)	Supermarket stores such as RT-Mart, Auchan, Hema Xiansheng, etc.
	Offline (Catering)	KFC, Pizza Hut, McDonald's, Starbucks, Dicos and other chain fast food restaurants

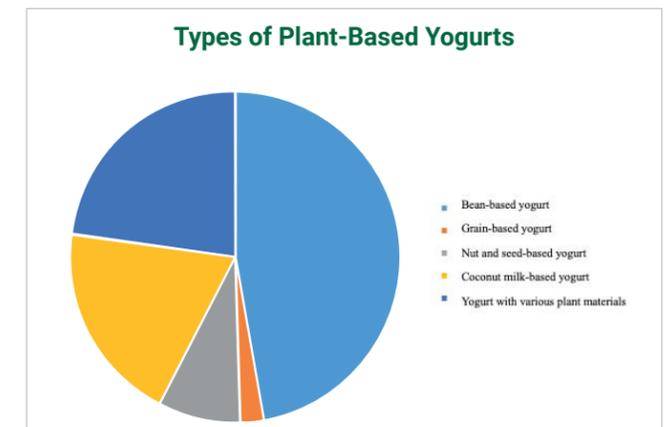
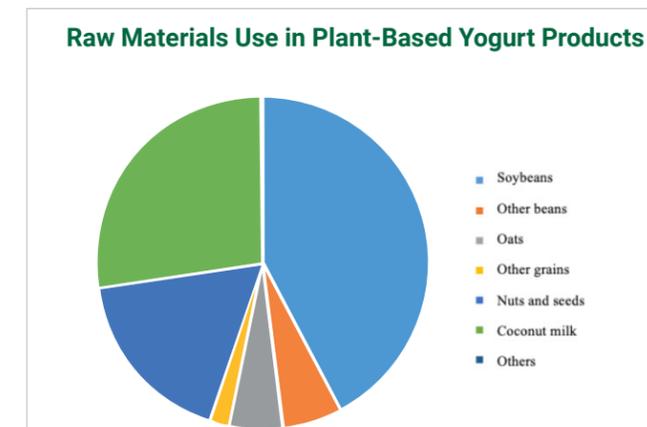
PLANT-BASED YOGURT

In addition to plant-based meat, a new kind of plant-based food, plant-based yogurt mainly made from soybeans, is also popular in the world in recent years. Plant-based yogurt can be made from beans, nuts, grains or other plants, such as soybeans, peas, almond, cashews, oats or coconut milk. Plant-based yogurts derived from soy, peas and legume blends have complementary advantages of low saturated fatty acids, no cholesterol and trans fatty acids, compared with traditional animal yogurt. Plant-based yogurt products have been widely recognized by consumers in foreign markets including Europe and the United States. The relevant data of the plant-based yogurt market shared by Euromonitor International reflects that the global plant-based yogurt market in 2018 was \$974 million, while the Chinese plant-based yogurt market was just getting started. Beijing Institute of Nutritional Resources collected and investigated 1,709 foreign plant-based yogurt products, and made statistics on the raw materials used, as shown in the first chart below.

And according to the product formula, the number of products using different plants was counted, as shown in the second chart.

It can be seen that soybean-based yogurt accounts for the majority. As an important food crop, soybeans have the highest protein content of plant-based options. The protein content of soybean is about 40%, which is higher than other food crops, like peas. Soybeans in foods like yogurt can provide part of the protein required by the human body. Double-protein yogurt contains milk and soybean protein. Companies producing double-protein yogurt claim it delivers a variety of nutritional benefits.

Currently, the Chinese plant-based yogurt market has just arisen, and the variety of products needs to be enriched. With the improvement of the production process, plant-based yogurt, as a new food that conforms to the development outline of inheriting the fine dietary tradition of mainly plant-based foods and supplemented by animal-based foods has huge development space and broad market prospect.



Source: Zheng Chenxi, Xu Bin, Zhai Penggui, Nutrient Content Distribution of Foreign Plant-Based Yoghurt, Food and Nutrition in China, 2022, 28(1): 38-43

Sources:
 - Li Aochen, Main Nutritional Components and Values of Soybean, Modern Agricultural Science and Technology, 2020(23): 213-214
 - Xu Wei, Zhang Dongjie, Li Hongliang, etc., Research Progress on the Development of Yogurt, Academic Periodical of Farm Products Processing, 2019(12): 87-89
 - Shirby, V.K., Mishara, H.N., Fermented Milks and Milk Products as Functional Foods: A Review, Food Science and Nutrition, 2003, 53(5): 482-496
 - General Office of the State Council of the People's Republic of China, Outline of China's Food and Nutrition Development, Beijing: People's Publishing House, 2014
 - Craig, W.J and Brothers, C.J., Nutritional Content and Health Profile of Non-Dairy Plant-Based Yogurt Alternatives, Nutrients, November 2021



Labeling Requirements and Precautions for Soybean Foods

The import, breeding and planting of genetically modified soybeans not only fall within the scope of crop-related laws, but also involve the legal relations of GMO and food safety. Therefore, many laws and regulations apply to genetically modified soybeans. This report discusses the relevant provisions of labeling management. Currently, GMO labeling management is mainly divided into four categories worldwide: voluntary labeling, quantitative comprehensive mandatory labeling, quantitative partial mandatory labeling and qualitative mandatory labeling based on catalog. China now adopts the latter. The following will further discuss the management of soybean labeling in China.

LEGAL PROVISIONS AND REQUIREMENTS

PRODUCTION AND PROCESSING OF NON-GENETICALLY MODIFIED SOYBEAN FOOD

Permit Handling

According to the Food Safety Law, the state implements a licensing system for food production and operation. To engage in food production, sales and catering services, a license must be obtained. However, those who sell edible agricultural products and only sell prepackaged food do not need to obtain this license. Those who sell only prepackaged food report to the supervision and administration department of food safety of the local government at or above the county level for the record.

Safety of Food Production

According to the Food Safety Law, food production and operation shall meet food safety standards. The production of food-related products must comply with laws, regulations and national food safety standards. The food safety management system shall be established and improved, including the following areas: establish and implement health management system for employees; establish food safety self-inspection system; establish food ex-factory inspection record system. Food traders have to store food in accordance with the requirements of ensuring food safety, regularly inspect the food in stock and promptly clean up the food that has deteriorated or exceeded the quality guarantee period.

Sources:

- Biosecurity Law of the People's Republic of China- Food Safety Law of the People's Republic of China
- Customs Law of the People's Republic of China
- Law of the People's Republic of China on the Entry and Exit Animal and Plant Quarantine
- Law of the People's Republic of China on Import and Export Commodity Inspection
- Food Safety Law of the People's Republic of China, Article 33



Management of Food Labeling

According to Administrative Provisions on Food Labeling, labeling needs to be attached to food or its packaging, except for food that may not be labeled according to laws and administrative regulations. The contents of food labels shall be true, accurate, easy to understand, scientific and legal. A food label states the place of production of the food, including the manufacturer name, address and contact information. Additionally, the place of production should be detailed to a prefecture-level city.

PRODUCTION AND PROCESSING OF TRANSGENIC SOYBEAN FOOD

Identify Agricultural Transgenic Organisms and Prohibit Changing Their Uses

According to the 2021 Work Plan on Agricultural GMOs Supervision issued by the General Office of the Ministry of Agriculture and Rural Affairs: "Ensure that all imported agricultural GMOs are used for raw material processing, and it is strictly prohibited to change their uses." Therefore, in processing, production enterprises need to check whether the agricultural products are GMOs, whether there is an agricultural GMO safety certificate, and ensure that all imported agricultural GMOs are used for raw material processing.

Obtain Permission and Report

Any unit or person engaged in the production and processing of agricultural GMOs must obtain approval from the competent agricultural administrative department of the state council or province, an autonomous region and a municipality directly under the central government. It shall obtain the License for Processing Agricultural GMOs issued by the competent agricultural administrative department at the provincial level where the processing is located. To be compliant, the producer or processor has to organize production and processing in accordance with the approved varieties, scope, safety management requirements and corresponding technical standards, as well as regularly provide production, processing, safety management and product flow reports. At present, the relevant illegal acts in the industry mainly focus on the processing of genetically modified food without obtaining the agricultural GMOs processing license. According to the general office of the Ministry of Agriculture and Rural Areas, on February 9, 2021, Qiufeng Corn Production and Marketing Cooperative in Changtu County, Liaoning Province, was ordered to stop production and processing due to the illegal production and processing of genetically modified corn seeds. Administrative penalties included fines and confiscation of illegal genetically modified corn seeds.

Sources:

- Regulation on Administration of Safety of Agricultural GMOs, Article 21 and Article 22

Safety Evaluation, Declaration and Approval

Those engaged in the research, test, production, processing, operation, import and export of agricultural GMOs within China that need safety evaluation in accordance with the regulations on the safety administration of agricultural GMOs shall abide by those administrative measures. Entities that engage in the research of safety levels III and IV for agricultural GMOs and the experiment and import of agricultural GMOs at all safety levels, as well as entities and individuals engaging in the production and processing of agricultural GMOs within China must, report or apply to the Office for the Safety Management of Agricultural GMOs at different stages as required.

According to the Ministry of Agriculture and Rural Areas, on February 9, 2021, when Nanjing Agricultural University applied for the production and application safety certificate to the GMOs safety management office, the genetically modified cotton Nannong 284 and Nannong 388 contained unapproved genes. The Ministry of Agriculture and Rural Areas rejected the application for production and application safety certificate according to law, and suspended the acceptance of the unit's application for production and application safety certificate for agricultural GMOs in 2021.

Labeling Management of Genetically Modified Soybeans

Policies and regulations on agricultural GMOs and food safety have different requirements for genetically modified soybeans and products. Soybean seed, soybeans, soybean powder, soybean oil and soybean meal are listed in the catalogue of the first batch of agricultural GMOs subject to labeling management by the Ministry of Agriculture. Specific requirements include the following details.

Annotation Method

Genetically modified animals and plants, microbial products, seeds, breeding livestock and poultry, aquatic seedlings, pesticides, veterinary drugs and fertilizers, as well as additives containing genetically modified animals and plants, microorganisms or their product components, shall be directly marked with "genetically modified." Direct processed products of genetically modified agricultural products are marked as "genetically modified; processed products," "genetically modified; finished products" or "processed raw materials are genetically modified." Products processed with GMOs or containing agricultural GMOs where the final sales products no longer contain or cannot detect genetically modified components, are

marked either "this product is genetically modified, processed, but this product no longer contains genetically modified ingredients" or labeled "genetically modified ingredients in the processing raw materials of this product; however, this product no longer contains genetically modified ingredients."

As for the design and printing of GMO logos, when it is difficult to label the original packaging or label, the agricultural GMOs with special sales scope requirements and the language requirements of the logo are all clearly stipulated in the Regulation on Administration of Identity of Agricultural GMOs.



Marking Requirements

The mark of agricultural GMOs shall be eye-catching and designed and printed simultaneously with the product packaging and label. If it is difficult to mark on the original packaging and labels, the method of adding GMOs on the basis of the original packaging and labels can be adopted, but the additional labels should be firm and lasting.



Other Annotation Methods

When it is difficult to identify agricultural GMOs with packaging or labels, the following methods can be used. Agricultural GMOs in fast food and retail industries that are difficult to identify on each sales product can be identified on the product display stand or on the price tag. When selling agricultural GMOs without packaging and labels, they also can be identified by setting up identification cards. When agricultural GMOs packed in transport containers are sold directly without packaging, the sales site can mark the containers or set up labels for identification. When it is difficult to mark agricultural GMOs without packaging and labels with identification cards, the seller should make a statement in an appropriate manner. If the imported agricultural GMOs without packaging and labels are difficult to be marked with identification cards, they shall be indicated on the inspection application form.

Specific Requirements

According to the food safety law and other regulations, food produced in China with non-GMO soybeans as raw materials includes labeling requirements and regulatory provisions for tofu products. If it is non-GMO food, there are no special requirements. If it is genetically modified food, it mainly implements the labeling standard requirements of prepackaged food.



Sources:
- Measures for the Administration of the Safety Evaluation of Agricultural GMOs, Article 15
- Regulation on Administration of Identity of Agricultural GMOs, Article 6

Sources:
- Regulation on Administration of Identity of Agricultural GMOs, Article 7 and Article 8
- National Food Safety Standard – General Rules for Labeling Prepackaged Food (gb7718-2011), implemented by the Ministry of Health in 2012

EXTENSION OF PRACTICAL ISSUES INTERPRETING LABEL REQUIREMENTS

Should edible vegetable oils produced from genetically modified plants be labeled?

Yes, according to the announcement on strengthening the labeling management of edible vegetable oil issued by the State Administration of Market Supervision, the Ministry of Agriculture and Rural Areas and the National Health Commission. Genetically modified edible vegetable oil shall be prominently marked on labels and instructions in accordance with regulations. If China has not approved the import of genetically modified crops for processing raw materials and has not approved the commercial cultivation in China, and there is no such genetically modified crops and processed products on the market, the labels and instructions of edible vegetable oil shall not be marked “non-genetically modified.”

Should other prepackaged foods produced with edible vegetable oil produced from genetically modified plants be marked?

The responses of local regulatory authorities are different. For details, businesses are directed to ask the local regulatory authorities. According to the view of Sichuan Market Supervision and Administration Bureau, whether to mark or not requires the enterprise to refer to the relevant provisions of the Administrative Measures for the Marking of Agricultural GMOs and in combination with the product composition analysis and test results. According to the view of Anhui Drug Administration, the food processed with genetically modified soybean oil is not an agricultural GMO, is not in the label management directory and does not need to be marked forcibly.



LABELING THRESHOLDS

Genetically modified food labeling thresholds should be defined by the Chinese government as the minimum limit that triggers its interpretation of eco-environmental safety or human health and safety concerns. In the world, there are many classifications of genetically modified food labeling systems. A mandatory labeling system is currently used by more than 60 countries or regions, including the European Union, Australia, New Zealand, China, Japan and Brazil. The voluntary labeling system of genetically modified food is mainly adopted in a few countries or regions such as the United States, Canada and Hong Kong, China.

According to China’s food safety law, provisions on the administration of food labeling, regulations on the safety administration of agricultural GMOs, measures for the administration of agricultural GMOs labeling, measures for the administration of safety review of new food raw materials and other relevant laws and regulations, China implements a compulsory labeling system for genetically modified foods. Relatively strict identification standards are adopted for genetically modified biological products, including animals, plants, microorganisms and their products. GMOs use genetic engineering technology to change the genome composition for agricultural production or agricultural product processing, without distinguishing the number or proportion of changed genomes. Positive identification takes the qualitative as the standard. As long as the food contains genetically modified components in the catalogue, it must be identified, and the threshold is not set considering the reality that accidental mixing may occur.



Customs Clearance for Soybean Imports

Soybean import involves multiple legal fields and regulatory authorities. The laws and regulations in these fields have been revised many times in recent years, such as the new Tariff Adjustment Plan implemented in 2022 that adjusts the commodity classification of soybeans. The new adjustment deletes subheading 1201.9010, but adds non-GMO soybean subheading 1201.9011 and other soybean subheading 1201.9019. That is, from the perspective of customs supervision, imported soybeans have been essentially divided into GMO and non-GMO, and different supervision and regulatory measures are applied. The following is a brief introduction to the import process of non-transgenic soybeans.

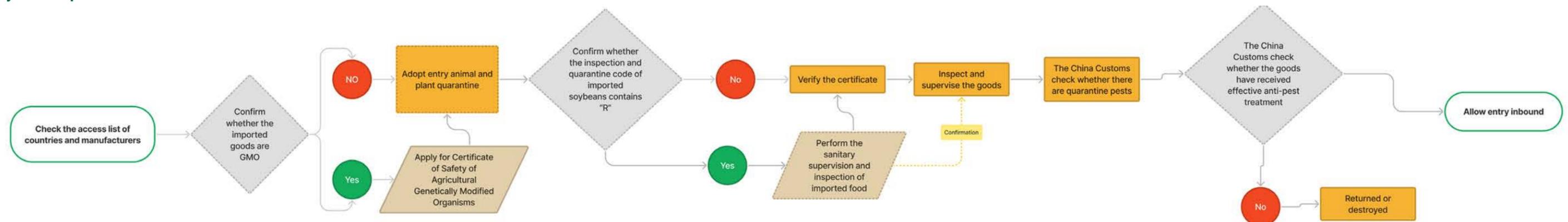
MAIN PROCEDURES FOR NON-TRANSGENIC SOYBEANS IMPORTS

Soybean belongs to Chapter 12 of the Customs Import and Export Tariffs. There are five subheadings under tariff item 12.01: 1201.1000 seeds, 1201.9011 non-GMO yellow soybeans, 1201.9010 other yellow soybeans, 1201.9020 black soybeans and 1201.9030 green soybeans. Using yellow soybeans as an example, the Most Favoured Nation (MFN) import tariff is 3%, the general tariff is 180%, and the value-added tax is 9%. The import process follows.

Check the Access List of Countries and Manufacturers

Offshore production, processing and storage enterprises need to check the relevant regulations of the access countries and manufacturers for grain imported. China customs implements the registration system for offshore enterprises and requires them to meet the mandatory standards of relevant laws and regulations.

Soybean Import Process in China



Confirm Identity of Imported Commodity

China adopts strict standards for identification of GMO products. Any animals, plants, microorganisms or their products which modify genome composition with genetic engineering technology and are used in agricultural production or agricultural product processing are GMOs. Provided the agricultural products contain GMO components, importers or exporters shall apply for Certificate of Safety of Agricultural Genetically Modified Organisms and relevant approval documents to handle the relevant procedures.

Sanitary Supervision and Inspection

If required by the inspection and quarantine code, the importer shall perform the sanitary supervision and inspection formalities of imported food. The detailed procedures follow.

- Recordation of the importer.
- Recordation of the overseas exporters or exporter's agents.

Quarantine Approval

Before signing the trade contract, soybean importers apply for the Entering Animal and Plant Quarantine License. The documents needed for inspection application are: the Certificate of Plant Quarantine issued by the competent authority of the grain exporting country or region; the Certificate of Origin; trade documents, such as a trade contract, bill of lading, packing list and invoice, etc.; bilateral agreements; protocols; memos and other documents stipulated by general customs.

Soybeans exported to China shall be inspected and quarantined in the regulatory places designated, and produced and processed in the designated plants.

Sources:
 - Measures for the Supervision and Administration of the Inspection and Quarantine of Imported and Exported Grain, Article 6
 - Food Safety Law of the People's Republic of China, Article 96
 - Regulation on Administration of Safety of Agricultural GMOs, Article 33
 - Measures for the Supervision and Administration of the Inspection and Quarantine of Imported and Exported Grain, Article 10

Apply for Inspection and Quarantine

The importer or its agent of food import must, in accordance with the provisions, submit the following documents to the inspection and quarantine agency at the place of customs clearance: contract, invoice, packing list, bill of lading and other necessary documents, relevant approval documents, the official required quarantine or hygiene certificate of the exporting country or region, bilateral agreements, protocols and other provisions, label proofs and translation copies of imported food. If importing prepackaged food for the first time, the permit certificate issued by the public health administrative department of the state council should be included. If importing non-national-safety-standard food for the first time, the importer should provide other required certificates or supporting documents for importing food.

- Application examined and accepted by inspection and quarantine agency.
- Inspection and quarantine agency billing and charging.
- Issuing customs clearance form.
- Documents transferred to the inspection implementation department.
- Inspection and sampling. The importer or its agent shall contact the relevant offices of the inspection implementation department to execute the inspection requirements and conduct sampling as needed within 20 days after customs clearance.
- Implementation of inspection and recordation of labels. The inspection and quarantine agency has to implement inspection in accordance with laws, regulations and standards, including sensory inspection, laboratory inspection, label inspection, etc.
- Evaluation of inspection results and issuing certificate. If the imported food is qualified by inspection and quarantine, the inspection and quarantine agency shall issue the qualified Certificate of Inspection and Quarantine to approve for sale and use. If the imported food is unqualified, the inspection and quarantine agency shall issue the certificate of unqualified. If the unqualified matters involve safety, health and environmental protection items, the inspection and quarantine agency will order the parties to destroy and supervise, or issue a notice of return process, which should be handled by the importers. In the case of return processing, the party concerned shall provide the supporting materials to prove the goods have been returned outbound thereafter, including the Customs Declaration of Return, Writing-off Form of Export Tax Refund, etc. In the case of destruction, the party concerned shall conduct harmless treatment of the goods and provide relevant materials under the supervision of the entry and exit inspection and quarantine agency, and shall not dispose of the goods without the consent of the inspection and quarantine agency. In the case of technical treatment, the Certificate of Conformity shall be provided after re-inspection.
- The record system of food import and sales.

Verification of Certificate

- Check the Entering Animal and Plant Quarantine License for imported soybeans.
- Check whether importing soybeans come from a registered enterprise.
- Check the authenticity and validity of the quarantine certificate.



Goods Inspection and Supervision

Goods qualified by the inspection and quarantine would be approved to enter. The process of loading, unloading, transportation, storage and processing should be under the supervision of China Customs, in accordance with the relevant requirements for plant quarantine of China. Without processing, the goods are not allowed to access the market directly and are strictly prohibited to be used as seeds.

Handling Non-Conformity

If China customs finds pests in quarantine, entry inbound would be allowed after effective anti-pest treatment. The goods shall be returned or destroyed if there is no effective treatment.

Quarantine Transference

In respect to the import of animals and plants, their products or other quarantine objects that need to be transferred away from a customs surveillance zone for quarantine inspection, customs shall, after verification, release the same on the strength of the Quarantine Transference Notice issued by the port animal and plant quarantine office.

Post-Import Risk Monitoring and Early Warning

The General Administration of Customs implements a monitoring system for potential epidemic situations from imported and exported grain. It carries out the monitoring and investigation of quarantine organisms, such as weeds, in the areas around grain entry ports, warehouses, processing enterprises, grain exchange and loading along the transportation line, etc.

Corresponding Responsibilities of Soybean Processors

Submit a Designate Application

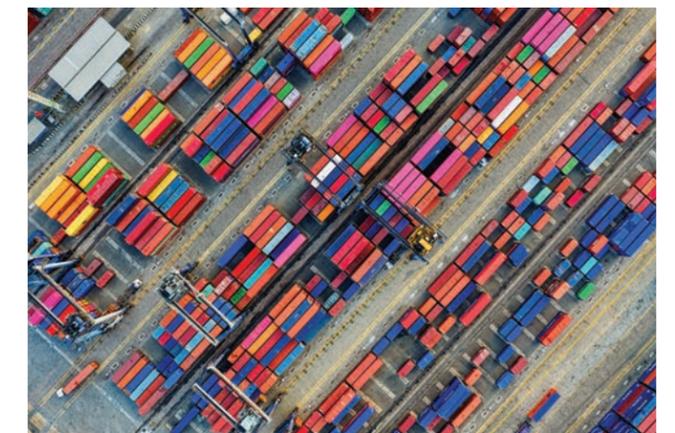
Enterprises planning to store and process imported grain may submit a designate application to local customs if they meet the corresponding requirements.

Accept Quarantine Supervision

China Customs requires enterprises, consignees and their agents to report to local customs immediately when they find major epidemic situations or public health problems. Customs shall handle and report the case in accordance with the provisions.

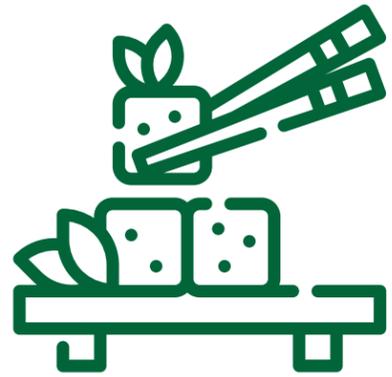
Keep Safety Control Records

The consignee and consignor of import and export grain and the production, processing, storage and transportation enterprises must establish corresponding production and operation files, and do a good job in quality trace and safety control.



Sources:

- Regulations for the Implementation of the Law of the People's Republic of China on the Entry and Exit Animal and Plant Quarantine, Article 20
- Law of the People's Republic of China on the Entry and Exit Animal and Plant Quarantine, Article 15
- Measures for the Supervision and Administration of the Inspection and Quarantine of Imported and Exported Grain, Article 33, Article 39 and Article 40



Japan

SOY FOOD REPORT



Soy Food Market

Japan's gross domestic product (GDP) is the third largest in the world after the United States and China. Despite a declining birthrate and an aging, declining population, the country is still an economic powerhouse with a population of nearly 126 million.

Although the Tokyo 2020 Olympic and Paralympic Games were held on a limited basis in 2021, the country is eagerly aiming to regain its footing by attracting tourism and other activities with an eye to hosting the Osaka Expo in 2025.

In terms of food culture, many Japanese traditional foods are made from soybeans, and they have been attracting attention from around the world in recent years because of their nutritional benefits.



SOYBEANS AND FOOD CULTURE

Soybeans are an essential ingredient in traditional Japanese foods such as soy sauce, miso, tofu and natto. The relationship between Japanese people and soybeans has long been a deep-rooted part of the country's culture.

Recently, many products are making use of the functional properties of soybeans. Soy products that are conscious of health and the environment are attracting attention, just as in Western countries.



Source: Ministry of Agriculture, Forestry and Fisheries aff



Source: Japan Tofu Association Japan Natto Cooperative Society Federation



Source: Sagamiya Food



Source: Otsuka Foods

In the area of food soybeans, the Japanese soy industry has established good relationships with U.S. exporters through proactive contracting and premium payments. Although there are many small players among the processors, they can become long-term partners by building a track record and trust.



Population

126.16 million people
(11th in the world)
Projected for 2019



GDP

\$5.38 trillion
(3rd in the world)

POPULATION AND ECONOMIC POWER

Although the birthrate is declining and the population is aging, Japan's population within developed countries is the second largest after the United States.

Japan claims the third largest GDP after the United States and China.

SELF-SUPPLY RATE OF FOODSTUFFS

Japan's self-sufficiency in grains other than rice is low, and the majority of wheat and soybeans are imported.

The country imports 94% of soybeans. Of this, U.S. soybeans account for 70% of the total, with food beans maintaining a high share of 55%.



Rice
97%



Wheat
15%



Soybean
6%

Estimate for 2020

Self-sufficiency ratio = Domestic production / Domestic consumption x 100 (weight basis)

Sources:

- Statistics of the World 2021, Japan Ministry of Internal Affairs and Communications
- Food Self-Sufficiency Rate in 2020, Japan Ministry of Agriculture, Forestry and Fisheries
- International Monetary Fund

Soybean Supply Chain

GROWTH IN CONTAINER SHIPPING

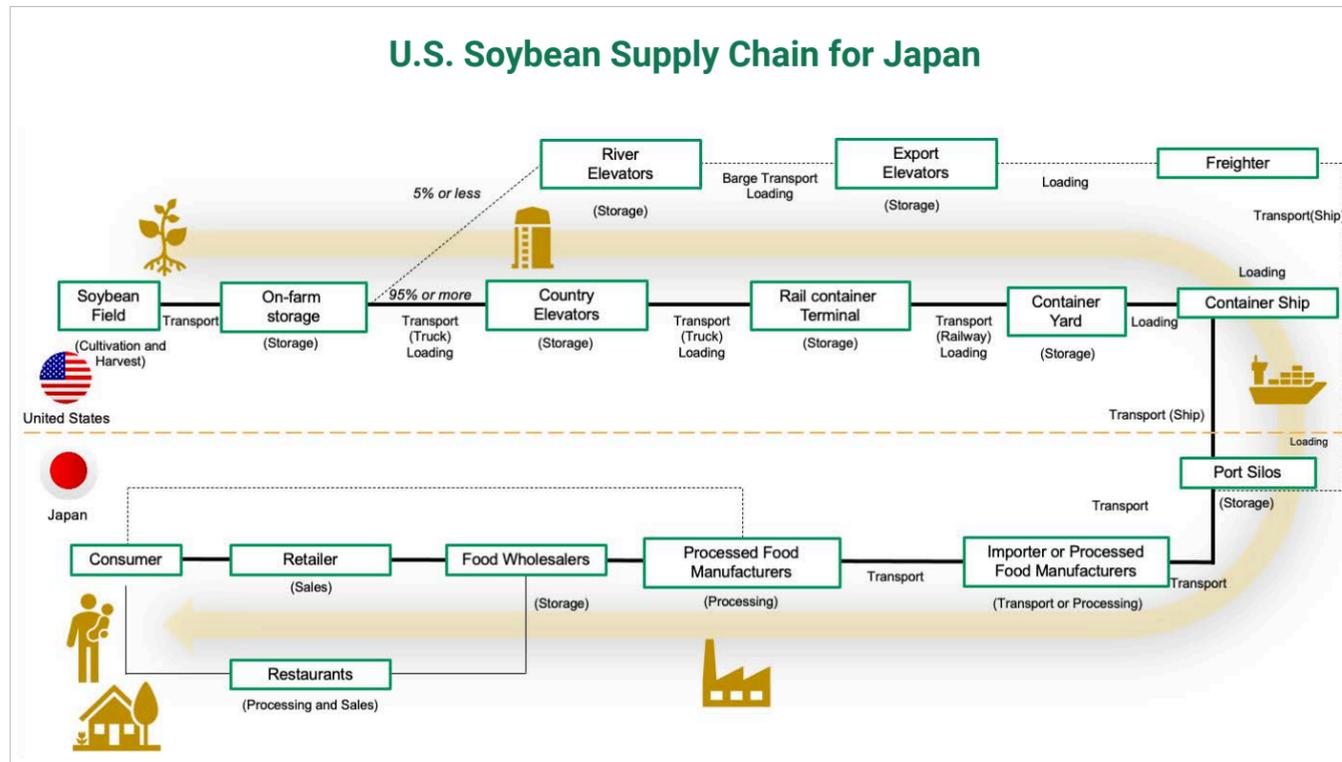
Most food soybeans imported from the United States, which accounts for nearly 95% of Japan's total food soybean imports, are shipped by container, according to USSEC data.

Due to changes in the industry, such as the promotion of traceability and the miniaturization of transport sizes, as well as changes in importers' conditions and transportation costs, food-grade soybeans traditionally produced in Indiana, Ohio, and Michigan and blended (IOM soybeans) have changed to a single variety called Variety Soybeans. Since about 1960, IOM soybeans had been imported in bulk on ships. By 2020, almost 100% of those soybeans were transported by containers.

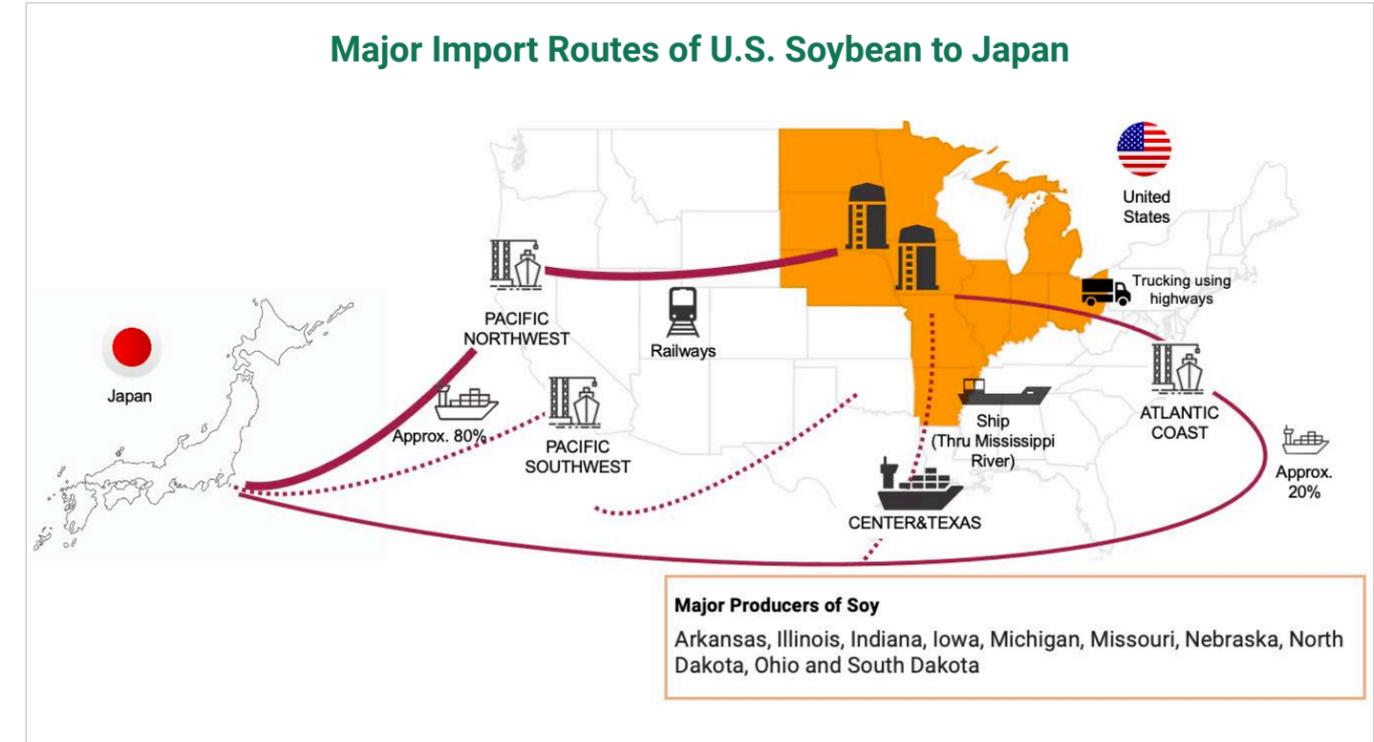
After arriving in Japan, they are distributed to food manufacturers through importers or directly, and then delivered to final consumers through retailers and restaurants.



About 80% of U.S. soybeans for Japan are transported from the Pacific Northwest (PNW) and 20% from the Atlantic Coast and container ships from other locations. Soybeans from the Atlantic Coast are shipped from the Norfolk port in New Jersey, the Savannah port in Georgia and ports in North Carolina.



Source: Created by Sellwell Co., Ltd. based on USEEC materials and interviews with industry officials



Source: Created by Sellwell Co., Ltd. based on USEEC materials and interviews with industry officials

In importing U.S. soybeans to Japan, there are seven main roles for Japanese import companies.

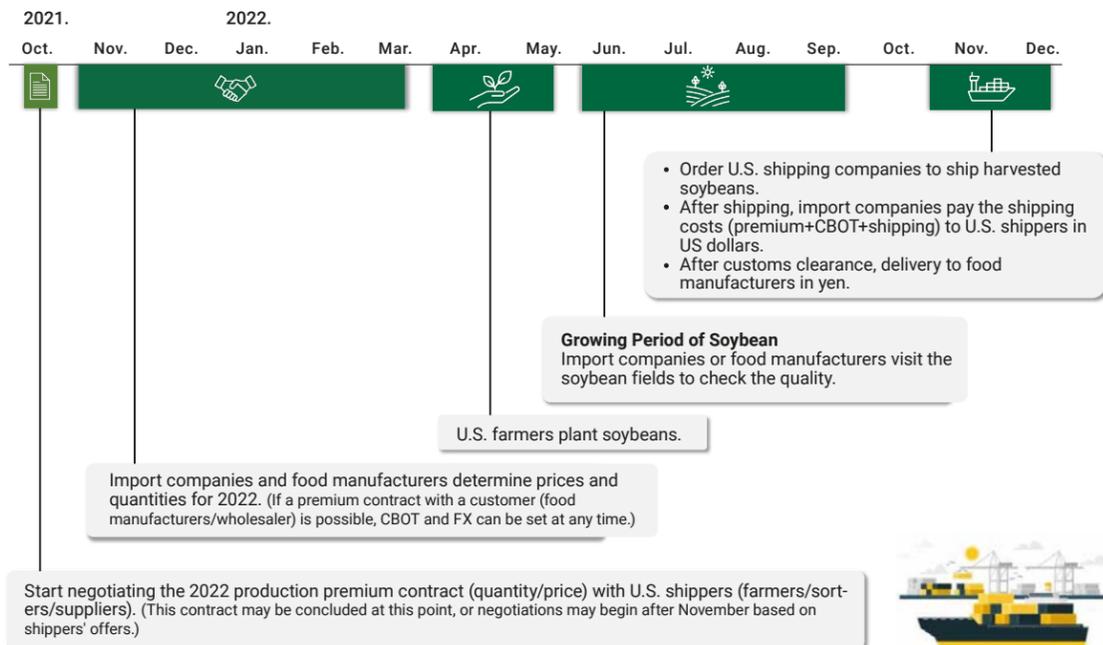
Roles of Japanese Trading Companies in Importing U.S. Soybeans

Items	Details
① Conclusion of contracts	Concluding premium contracts for pre-sowing contracts with farmers/suppliers.
② Setting of freight rates	Concluding premium contracts (quantity/price) with U.S. shippers (farmers, sorters, suppliers).
③ Price setting	Setting the CBOT price with the shippers.
④ Setting of exchange rates	Setting exchange rates with banks and enabling remittances overseas.
⑤ Confirmation of customs clearance costs	Confirming the customs clearance costs with the Japanese forwarders (freight brokers).
⑥ Setting of delivery and storage fees	Setting shipping and storage fees from container yards to food manufacturers.
⑦ Determination of CBOT price and exchange rate with food manufactures	Determining CBOT prices and exchange rates based on food manufacturers' requirements. (In most cases, only premiums (C&F) are performed because contracts are required before sowing.)

Source: Created by Sellwell Co., Ltd. based on USEEC materials and interviews with industry officials

PRODUCTION AND IMPORT PROCESSES

Flow of U.S. Soybeans Imports (Annual)



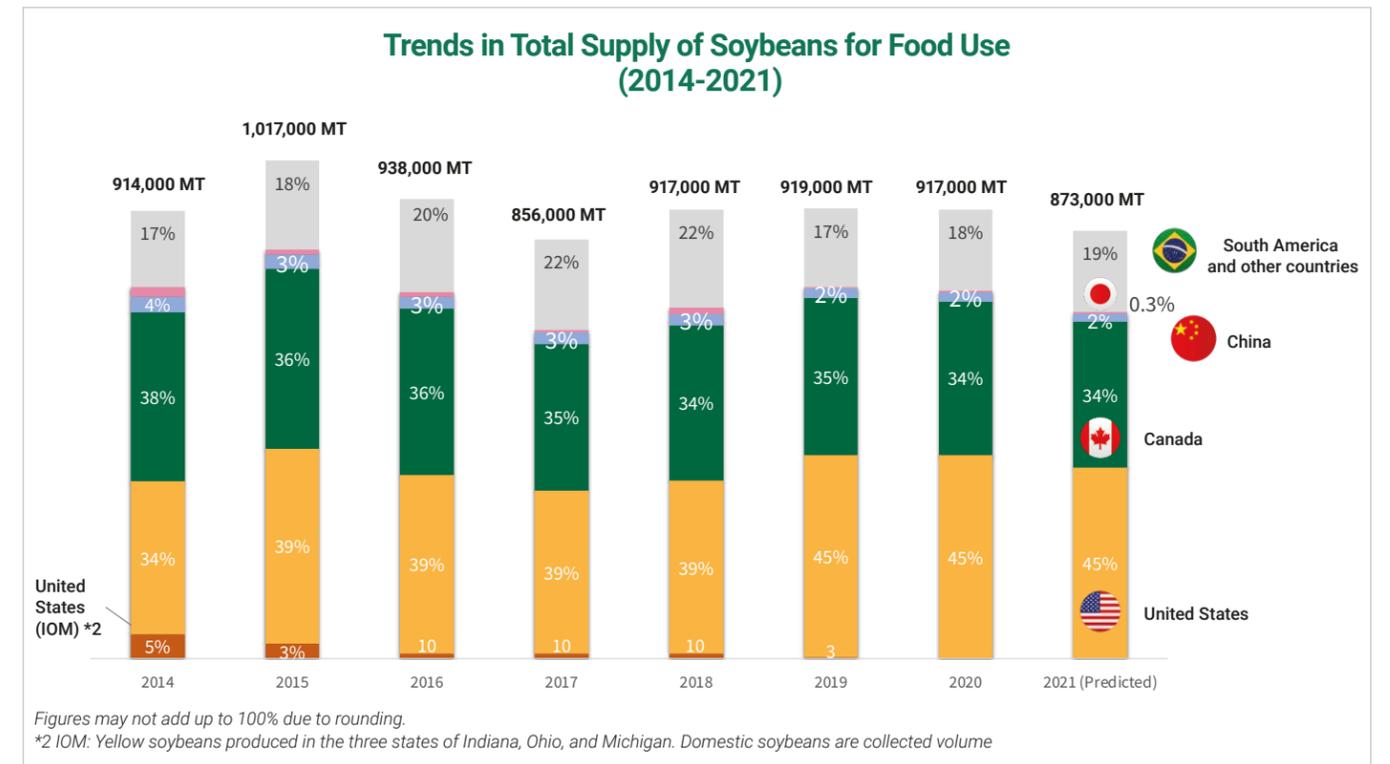
Source: Created by Sellwell Co., Ltd. based on USEEC materials and interviews with industry officials

JAPANESE IMPORT VOLUME TRENDS

U.S. soybeans have a 45% share of Japan's total food soybean supply, which totaled 917,000 metric tons (33.7 million bushels) including domestic products, in 2020. Of these, approximately 752,000 MT (27.6 million bushels) are imported, 55% of which are from the United States, according to USSEC data.

Canadian soybeans, which have the second largest market share after U.S. soybeans, are on a downward trend. U.S. soybeans are on an upward trend due to shrinking soy supply in Canada.

As for U.S. soybeans, in the early 1960s, IOM soybeans were imported because of their high protein content and bulk production. However, as new varieties were developed and food-grade soybeans production started in northern North America, single varieties increased and began to replace IOM soybeans.



Source: Daily Soybean Oil Report, Trends in Soybean Imports for Food Use (2014-2021)





Transgenic Labeling

In Japan, eight agricultural products and 33 processed foods that went through a review of safety standards by the Ministry of Health, Labor and Welfare are obligated to be labeled genetically modified organisms (GMOs). A new revision to the labeling system will be implemented in 2023 due to the changing circumstances since it was introduced in 2001.

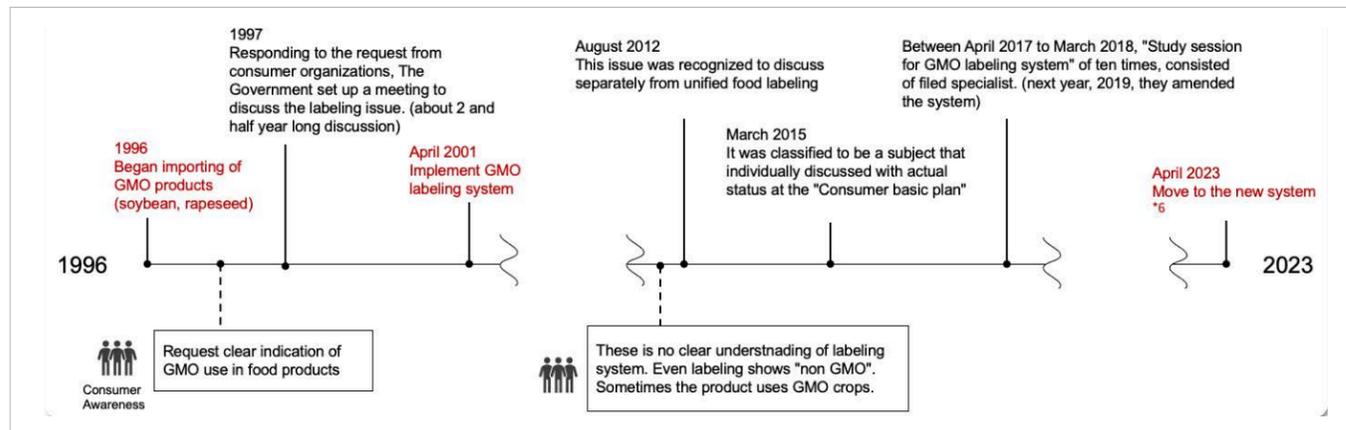


Crops and Processed Foods Subject to Label Requirements

Agricultural products (8 crops)	Soybean	Corn	Potato	Alfalfa	Beet	Papaya	Sausage	Cotton seed
Processed foods (33 food groups)	Tofu, Freeze-dried Tofu, fried Tofu, natto, miso, soymilk, boiled soybean, okara, yuba, soy flour, etc.	Corn snacks, constituents, popcorn, canned corn, etc.	Potato snacks, etc.	Products using the above as the main ingredient				

Major raw material: among the raw material, the weight ratio is top 3 and more than 5%

Labeling System Development



- Sources:
- Japan Consumer Affairs Agency, Labeling Obligations for GMO Foods
 - History of Plant Biotechnology, Japan Council of Agriculture, Forestry and Fisheries Technology
 - Japan Consumer Affairs Agency, Report of the Study Group on Genetically Modified Labeling System
 - Kinki Agri High Tech, Labeling System for Genetically Modified Foods
 - Japan Consumer Affairs Agency, Summary of Consumer Opinion Survey on Genetically Modified Foods
 - Japan Consumer Affairs Agency, GMO Labeling System

Major reasons for changing labeling system follow.

1. Change of production and logistics.
2. Improvement of analysis techniques.
3. Change of consumer awareness.

The existing labeling system could be misread by consumers. In addition, GMO distribution is increasing.

① Changes in production & distribution condition

Possibility of the increase of GMO distribution in Japan where we have low self-sufficiency.

Lately, GMO crop farming surface has been expanded to approx. 200 million hectares worldwide which is almost 4 times larger than 2001. (Among this, about half is soybean.)

② Improvement of analysis

Highly manufactured processed foods may be able to detect DNA of GMO which had been determined no need of labeling.

More precise analysis techniques are more commonly accessible commonly such as DNA purification kit and real-time.

③ Changes in consumer awareness

Most of the consumers do not know much about the labeling of GMO while they are concerns about GMO-containing food products. (if there is less than 5% contamination, it is recognized as "unintended contamination" and labeled as "non GMO" which causes the confusion.)

Concern

- 40% of consumers are concerned about GMO foods.
- 83% of consumers keep avoiding GMO foods (※the people responded "concerning" or "not concerning" regarding GMO).
- 24% of consumers are willing to purchase foods products using non-GMO raw material "even pricy."

Lack of Awareness

- 71% of consumers don't know that no labeling required for the food product cannot be detected DNA.
- 51% of consumers don't know about the labeling of "unable to separate."
- 73% of consumers don't know that it is acceptable that less than 5% unintended contamination.

- Sources:
- Biotech information dissemination meeting, Each Country's Farming Condition in 2019
 - Japan Consumer Affairs Agency, Report of the Meeting for GMO Labeling System
 - Japan Consumer Affairs Agency, Summary of the Survey on Consumer Awareness on GMO-Containing Foods

LABELING SYSTEM REVISIONS

Only the voluntary labeling system will be revised, not the mandatory labeling system.

Under the current system, a "Non-GMO" label can be used if the unintentional commingling is within 5% with proper identity preserved (IP) handling. Under the new system, only products verified as free of commingling will be allowed to use that label.



Labeling Conditions

		Current System	New System (April 2023~)
Identity Preserved Handling 📄	Implemented ○	GMO crops are used as ingredients in processed food. GMO crops must be labeled. <Example> Soybean(GMO) etc. Mandatory	
		Unintentional commingling exceeds 5%. Labeling must indicate that GMO and non-GMO crops are not segregated. <Example> Soybean(Not segregated from GMO products) etc. Mandatory	
	Change part	Unintentional commingling is 5% or less. Non-GMO label can be used. 1. It is permissible to state that the crops are handled with proper identity preservation. 2. The name of the ingredients only. <Example> Soybean(Identity Preserved) Soybean etc. Optional	
		No unintentional commingling. *An "official inspection method" to ensure that GMO crops are not commingled. (See Consumer affairs Agency website) <Example> Soybean (Non-GMO) Soybean (Non-GMO identified) etc. It is permissible to state it as Non-GMO. <Example> Soybean(Non-GMO)etc. Optional	
Not implemented ✕	GMO crops and Non-GMO crops are not segregated. Labeling must indicate that GMO and non-GMO crops are not segregated. <Example> Soybean (Not segregated from GMO products) etc. Mandatory		

Source: - Japan Consumer Affairs Agency, New GMO Labeling System

Labeling System Changes

	Items	Current System	New System (April 2023)
Only the voluntary labeling system revised	Unintentional commingling is 5% or less.	Non-GMO label can be used. <Example> Soybean (Non-GMO) Soybean (Non-GMO identified) etc.	1. It is permissible to state that the crops are handled with proper identity preservation. 2. Only the name of the ingredients can be labeled. <Examples> Soybean (Identity Preserved) Soybean (with IP), Soybean etc.
	No unintentional commingling* *An "official inspection method" to ensure that GMO crops are not commingled. (See Consumer affairs Agency website)		It is permissible to state it as Non-GMO. <Examples> Soybean (Non-GMO) Soybean (Not GMO) etc.

Source: - Japan Consumer Affairs Agency, New GMO Labeling System

Under the new system, if the unintentional commingling is within 5% with proper IP, there are two options as follows.

1. State that the crops are handled with proper IP.
2. No indication.



Example Labeling Under Current System

Ingredient: Whole Soy (Canada or U.S.) (Non-GMO)

名称	充填きぬごし豆腐	
原材料名	丸大豆(カナダまたはアメリカ)(遺伝子組み換えでない)、食塩 / 凝固剤(塩化マグネシウム(にかり)、グリセリン脂肪酸エステル、レシチン、炭酸マグネシウム)	
内容量	150g×3個	賞味期限 天面右下に記載
保存方法	要冷蔵(3℃~10℃)	
販売者	[Redacted]	
製造者	[Redacted]	
栄養成分表示 1個(150g)当り	注)表示してある原産国の大豆を適宜切り替え、混合して使用しています。	
熱量	97kcal	●賞味期限は未開封での期限です。
たんぱく質	8.1g	●開封後は、賞味期限にかかわらずお早めにお召し上がりください。
脂質	6.0g	●本製品についてお気づきの点は、
炭水化物	2.9g	

Cited from: WEDGE Infinity

Example Labeling Under New System

① State that the crops are handled with proper identity preservation
Ingredients: Natto (Soybeans (U.S.) (IP)

名称	納豆
原材料名	納豆(大豆(アメリカ)(分別生産流通管理済み)、納豆菌) 昆布たれ(砂糖混合ふどう糖果糖液糖、しょうゆ(小麦・大豆を含む)、昆布、砂糖、かつおエキス、蛋白加水分解物(鶏肉を含む)、昆布エキス、醸造酢、鰹節 / 調味料(アミノ酸等)、増粘多糖類) たれ(しょうゆ(小麦・大豆を含む)、砂糖、蛋白加水分解物、砂糖混合ふどう糖果糖液糖、食塩、しょうゆ加工品(小麦・大豆を含む)、昆布エキス、かつお節エキス(さばを

② No indication

Ingredients: Soybean, Coagulant (Magnesiumchloride, Nigari)

INDUSTRY VIEWS ON LABELING CHANGES

Interview results for each association were divided into three major opinions: support no-labeling, support the labeling of IP handling and guideline not set.

USSEC Japan has been communicating with various industry partners to create an industry guideline for labeling standards for packages and IP handling documentations in coordination with the Japan Consumer Affairs Agency and the Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan.

Fundamentally No Labeling

Japan Tofu Association & Zentouren



Suggesting Labeling

Japan Natto Cooperative Society Federation



Japan Federation of Miso Manufacturers Cooperatives



Guideline Not Set

Japan Soymilk Association



Source:
- Interview of each organization
- The images are also from the official website of the respective organizations

JAPAN TOFU ASSOCIATION AND ZENTOUREN

The tofu industry determined to indicate only “Soybean (Raw Material Origin)” on labels. Other information is not displayed on the unified raw material label unless there is 0% possibility of detection of GMO soybeans, a fundamental rule.

- Example: Soybean (Made in the U.S.)

If a business retailer requests some kind of labeling, it is suggested to indicate, “This product is using proper IP handling material (soybean)” outside of unified labeling. This applies to Japanese-made soybean products.

It is clear that no GMO soybeans are produced in Japan. However, some manufacturers may not put any labeling due to the possibility of commingling with GMO soybeans when they use both domestic and imported soybeans in the same production lines.

JAPAN NATTO COOPERATIVE SOCIETY FEDERATION

When IP handling was conducted and unintentional commingling is less than 5%, the label can indicate, “This product is handled using IP.”

- Example: Soybean (IP-handled material), Soybean (Completed with IP-handling)

If the production is processed under IP-handling and verified for no commingling, it can be labeled, “No GMO” or “Non-GMO.”

- Example: Soybean (No GMO), Soybean (Non-GMO)

JAPAN SOYMILK ASSOCIATION

No guideline has been published as an industry. According to the association, they determined not to create a guideline for the soy milk category due to multiple applications of soy milk for makers.

If makers ask questions about labeling guidelines, the association will answer as follows.

“If you would like to create labeling, follow the guideline from Consumer Affairs Agency with scientific evidence in order not to confuse the consumers.”

Sources:
- Interviews of Zentouren and Japan Natto Cooperative Society Federation



JAPAN FEDERATION OF MISO MANUFACTURERS COOPERATIVES

The industry guideline was published around 2019. A notice was sent to each prefectural association, but it was not published online. If materials were IP-handled and unintentional commingling is less than 5%, the label can indicate the product is IP-handled.

- Example: Soybean (IP-handled product), Soybean (Completed with IP-handling)

This information can also be included outside of the unified labeling. In this case, the label must clarify that this is about soybeans. If the product is handled under IP-handling and no GMO commingling is confirmed, the label can display “No GMO” or “Non-GMO.”

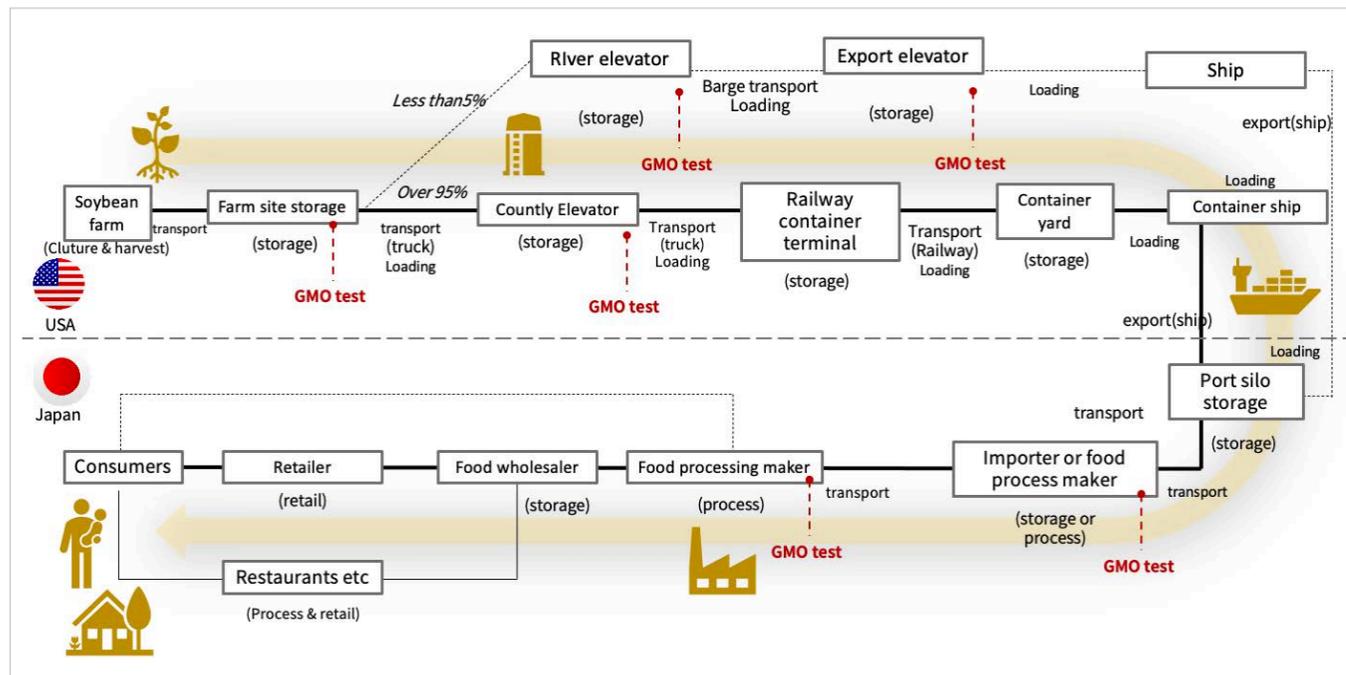
- Example: Soybean (No GMO), Soybean (Non-GMO)



SUPPLY CHAIN COMMINGLING TEST

In order to be certified for no unintentional commingling, step-by-step test certification is required. At each step, a test certificate will be submitted to the terminal users such as food processors and retailers.

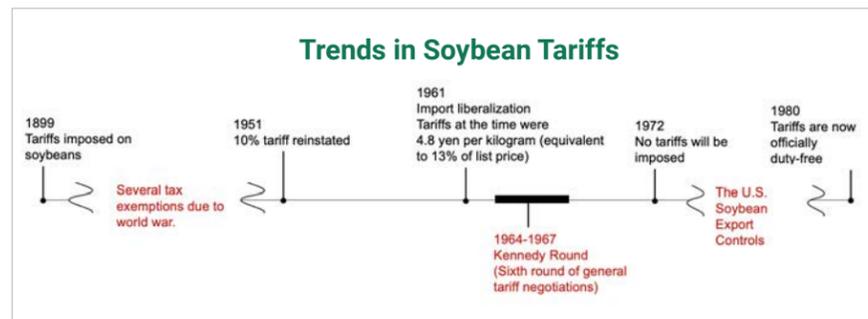
Identity Preserved Handling of Soybean Supply Chain



Source: Created by Sellwell Co., Ltd. based on USEEC materials and interviews with industry officials.

CUSTOMS DUTY

Soybeans were officially declared duty-free in 1980, and tariffs have not applied since then. However, tariffs do apply to some processed products, such as soy milk.



Source: Ministry of Agriculture, Forestry and Fisheries, Soybean Knowledge, prepared by Sellwell Co. Ltd. based on company websites and inquiries to Tokyo Customs.

Policy of Identity-Preserved Handling in Supply Chain

Management Item	Management entity	Confirmation entity	Checkpoint	Document
①	Collectors such as grain elevators that are in a position to manage farmers.	Freight forwarder.	① Sowing Seeds. ② Harvesting. ③ Agricultural tools and equipment. ④ Vehicles, etc., for shipping or pickup transportation. ⑤ Storage and loading/unloading facilities.	Seed name (number), quantity shipped, date of shipment, collection (name of seed [number] of agricultural product brought in, a farmer who purchased it, quantity, date), storage (name of product, bin number unless dedicated, quantity, date), receipt and delivery (name of product, bin number unless dedicated, quantity, date), confirmation of cleaning implementation if not used exclusively for non-GMO.
②	Port elevator.	Consolidator or importer, etc.	① Trucks, wagons and barges for cargo collection and transportation. ② Storage and loading/unloading facilities.	Collection (name of seed [number] of agricultural product brought in, a farmer who purchased it, quantity, date), storage (name of product, bin number except in the case of exclusive use), receipt and delivery (name of product, bin number except in the case of exclusive use, quantity, date), and confirmation of cleaning implementation.
③	Managers or contractors of export elevators and port silos.	Importer.	① Storage and loading facilities for ships, loading of cargo holds, etc. ② From the ship to the coastal ship. ③ Transshipment to a barge.	Receiving, warehousing, import/export (product name, quantity, vessel name, hatch number, date, port of loading/unloading), cleaning implementation confirmation.
④	Warehousing and sorting companies, etc.	Shippers (wholesalers, manufacturers and importers, etc.).	① Silo bins, bucket elevators, weighers, conveyors, etc. ② Sorting operations.	Receiving, shipping, and cleaning confirmation.
⑤	Importer.	Wholesaler.	① Loading and unloading silos. ② Transportation in the case of bulk transport. ③ Sorting operations.	Purchase of raw materials, storage of raw materials, warehousing at each storage location, sales of products, bagging operations (name, quantity, packing style, date), and confirmation of cleaning operations.
⑥	Manufacturer. (Mainly corn).	Manufacturer.	① Raw material delivery. ② Sorting facility. ③ Grits and Starch production line. ④ Storage and shipping of grits and starches.	Raw material purchase, raw material receipt and payment, manufacturing, storage location, product entry/exit, delivery, cleaning implementation confirmation.
⑦	Food manufacturer.	Food manufacturer.	① Raw material delivery. ② Separation and storage of raw materials. ③ Production line.	Raw material purchase (supplier, quantity, production,) storage, shipping, cleaning implementation confirmation.

A certificate to the effect that verification has been performed at each stage of distribution shall be issued to the counterparty of the transaction, and the person who has received the certificate shall retain it for at least two years.

Source: Japan Consumer Affairs Agency, Inspection Methods for Safety Reviewed Genetically Modified Foods, revised on March 18, 2019

Example of Exceptional Processed Products

※ As an exception, tariffs are applied to some soy-based processed products.

Example 1: Soymilk (for direct drinking / no sugar content)
Basic 16% / WTO Agreement 6.8%

Example 2: Soybean oil (crude oil/acid value 0.6+)
Basic 17 yen/kg / WTO Agreement 10.9 yen/kg / Japan-US Trade Agreement 3.63 yen/kg / EPA 3.63 yen/kg



品名	①豆乳	②大豆油
原産地	米国及び欧州	
備考	上記の欄に關し、下記の「関税率表適用上の所屬区分及び統計品目番号」、「関税率」、「内国消費税の適用区分及び税率」及び「他法令」欄記載のとおり回答します。	
関税率表適用上の所屬区分及び統計品目番号	通信欄をご覧ください。	
内国消費税の適用区分及び税率	消費税 6.24%	地方消費税 2.2/7.8 (消費税率を課税標準としての割合)
通関税	上記商品について、以下の通り検閲されます。	
	①直接飲用するもので砂糖が含まれていないものであれば、2202.99-200 が検閲されます。	
	関税：基本16%、WTO協定9.6%、日米貿易協定FREE、EPA(EU)FREE	
	直接飲用するもので砂糖が含まれているものであれば、2202.99-100 が検閲されます。	
	関税：基本22.4%、WTO協定13.4%、日米貿易協定FREE、EPA(EU)FREE	
	②粗油であり、酸価が0.6を越えるものであれば、1507.10-100 が検閲されます。	
	関税：基本17円/kg、WTO協定10.9円/kg、日米貿易協定3.63円/kg、EPA(EU)3.63円/kg	
	粗油であり、酸価が0.6以下のものであれば、1507.10-200 が検閲されます。	
	関税：基本20.7円/kg、WTO協定13.2円/kg、日米貿易協定4.4円/kg、EPA(EU)4.4円/kg	
	精製でないもの(精製したもの等)であれば、1507.90-000 が検閲されます。	
	関税：基本20.7円/kg、WTO協定13.2円/kg、EPA(EU)4.4円/kg	
参考(他法令)	食品衛生法	

Response on tariff duties on soymilk and soybean oil (Tokyo Customs)

Value of Sustainability in Japan

CONSUMER AWARENESS

The awareness of sustainability in Japan is increasing every year.

Sustainability as eco-action was introduced into Japanese consumer consciousness some years ago. It is assumed that environmental value, which accounts for the burden on the environment, will improve with conventional price value and benefits.



Source: Google Trends

The Japanese people's interest in sustainability is rising dramatically, as the chart shows. Consumers are considered more sensitive about environmental impact than before. An industrial leader of general merchandise stores (GMS), Aeon Co., Ltd., started introducing Aquaculture Stewardship Council (ASC) certification for cultured fish that passes environmentally and socially friendly cultivation practices.



The extension of sustainability in business is remarkable.

One company, Toyota Motor Corporation, which accounts for ¥30 trillion per year, announced the promotion of sustainability development goals (SDGs) in the settlement of accounts in March 2020. Company president Akio Toyoda expressed that corporate activities and SDGs are inseparable. Similar attitudes have been expressed not only in business enterprise, but also in politics.

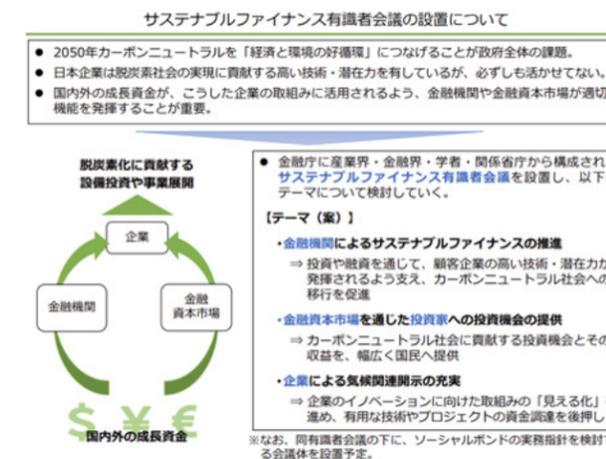
Sustainable Finance, the framework that financially evaluates the sustainability actions and progress by enterprises, has been led by Japan's Financial Services Agency since late 2020. This links sustainability actions directly to the evaluation of corporate value.



The president of Toyota Motor Corporation, Akio Toyoda, announced SDGs in the settlement of accounts in March 2020.



Instruction towards SDGs ambassador of Junior Chamber International Japan in 2019 by the then Foreign Minister Kono.



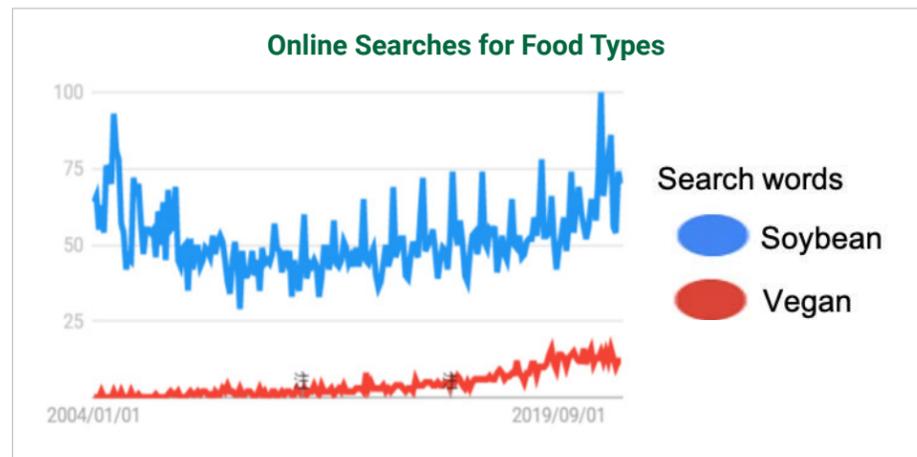
A conference about sustainable finance was held in December 2020 about how internal and international funds are bound up with appropriate enterprise investments.

Sources:
 - Aeon Co., LTD
 - Japan Ministry of Foreign Affairs
 - Japan Financial Services Agency
 - SDGs ACTION!

Along with the aforementioned growing awareness of sustainability, sustainable food is also receiving increased attention.

In the midst of this trend, soybean products, traditional Japanese foods, are being reevaluated. Soybeans are becoming a core component of sustainable food in the market, both in Japan and globally. As the chart shows, interest is gradually increasing in plant-based diets, such as vegetarian and vegan.

Japan's Ministry of the Environment held a meeting for opinion exchange on sustainable and healthy diets in August 2021. Major food manufacturers and others participated. For example, Japanese industry is promoting and using advertising for soy yogurt that proposes a healthier, environmentally conscious lifestyle. House Foods is selling tofu with localized flavors in the United States, where there are many vegetarians and vegans and environmental awareness continues to grow.



Source: Google Trends



SUSTAINABLE U.S. SOY LOGO USE

Natto, a traditional Japanese soybean food, is also attracting attention for its raw material. In addition to the existing value-added appeals such as "domestic" and "organic," "Sustainable U.S. Soy" is also coming into use.

Product Category	Natto
Manufacturer	Marukin Food Co., Ltd.
Product Name	Genki Natto Kyushu Honjikomi, Genki Natto with Kelp Sauce, etc.
Sales Outlets	Yume Town Fukuyama (Hiroshima Pref.), Freshta Muronoki Store (Yamaguchi Pref.), etc.



(front)

(front)



Yume Town Fukuyama



Products distributed to many local supermarkets in the Kyushu and Chugoku regions.



Fresta Muronoki Store



Genki Natto with Kombu Sauce (Back)

The explanation and website for Sustainable U.S. Soy is displayed on the side of product packaging.

商品情報	
商品名	元氣納豆 九州本仕込み
内容量	(納豆40g、たれ4.7g) × 3
賞味期間	13日間
JANコード	4902905 000153
販売期間	通年
アレルギー	小麦・大豆
商品特長	九州の甘口のしょうゆをベースに、九州の場好にあった甘口の「あまかたれ」付。納豆の苦手な方にも食べやすい納豆です。 「サステナブルな製法」で作られた大豆を使用し、トッピング容器でプラスチックにも量がわり、環境にやさしいです。
原材料名	納豆(大豆(アメリカ)(遺伝子組み換えでない)、納豆菌) たらししょうゆ(小麦・大豆を含む)、砂糖、食塩、発酵調味料、蛋白加水分解物(大豆を含む)、酵母エキス / 調味料(アミノ酸等)、酸味料

Sources:
 - House Foods Group, Inc.
 - Japan's Ministry of the Environment
 - Sapporo Holdings Ltd.



2021年 8月30日
環境省

(参考) 「つなげよう、支えよう森羅川海」プロジェクト

生活者目線で「地域循環共生圏」を広げる運動としてつなげよう、支えよう森羅川海プロジェクトを進めています。

＜プロジェクトの目標＞
 森羅川海を資源に活用し、その恵みを生み出し、豊かな食生活を実現し、自然環境を元気に保ち、地域循環共生圏を創出する。

二人一人、一社一社が、森羅川海を元気に支える社会をつくりたい。
 私たちの暮らしは森羅川海を元気に支えているだけで、日々の暮らし(消費行動や休日の過ごし方など)を支えることにより、私たちが森羅川海を支えることができます。一人一人がそれを意識して暮らす、いば人と自然、地方と都市が共生する社会への実現を促します。

フードロス削減
 食品ロス削減を推進し、食料の無駄を減らすことで、環境負荷を軽減し、食料の安定供給を実現します。

オーガニック×SDGs
 自然との循環×SDGs

SDGsを実現するための暮らしのヒント
 パターン × ライフスタイル
 ランダッシュ × インバージョン

暮らしを支えるSDGsチャレンジ
 アプリ/サイト/YouTube

サステナブルで健康な食生活の提案

SDGsやパリ協定などの流れを受けて食の持続可能性(サステナビリティ)に対する関心が高まっています。一人一人が今日から取り組めるアクションとして、サステナブルで健康な食生活の選択を促します！

食の循環地産・地産地消で美味しさや季節感を味わいましょう！
 ・地産地消の食材を使うことで、産地への経済効果や環境負荷の軽減が期待できます。
 ・旬の食材を使った料理は、栄養価が高く、美味しくいただけます。

少肉化やインタンパク質などの少肉加工食品を取り入れてみましょう！
 ・肉類の消費量を減らすことで、環境負荷の軽減が期待できます。
 ・肉類の消費量を減らすことで、環境負荷の軽減が期待できます。

有機(オーガニック)食品を取り入れてみましょう！
 ・有機食品は、化学合成の農薬や肥料を使用せず、自然の力で育てられています。
 ・有機食品は、環境に優しく、健康にも良いとされています。

それぞれのスタイルで生活の中に環境配慮を取り入れましょう！
 ・買い物袋を再利用したり、マイボトルを持参したり、エコバッグを使うなど、日々の生活の中で環境配慮を取り入れることができます。

食品ロスを減らすよう心がけましょう！
 ・食品ロスを減らすことで、環境負荷の軽減が期待できます。
 ・食品ロスを減らすことで、環境負荷の軽減が期待できます。

食を通してカーボンニュートラルやサーキュラーエコノミーの実現、生物多様性の保全等に貢献する取組も広がっています！一人一人がこうした取組に関心を持ち、実践しましょう！
 (例) 食品ロス削減運動、オーガニック食品の購入、環境に優しい消費行動の実践など

食生活を通じてサステナブルライフスタイルへの移行を進め、地域循環共生圏(地域SDGs)を創出

植物性素材を活かした商品で新たなライフスタイルを提案

昨今、地球温暖化などの環境に対する意識や健康意識が高まり、ライフスタイルにおいて植物性素材が注目されています。ポッカサッポロは、これまでレモンなどの植物性素材をさまざまな形で提供してきましたが、新たに大豆に着目。2015年に豆乳ヨーグルト事業に参入し、2018年に新ブランド「SOYBIO豆乳ヨーグルト」を発売しました。さらに2019年には群馬工場内に豆乳ヨーグルトの製造ラインを新設し、大容量タイプ「SOYBIO豆乳ヨーグルト400g」を新発売しました。豆乳ヨーグルトの市場は近年伸長しており、今後も成長が見込まれます。

また、2018年にはアーモンドミルク「アーモンド・ブリーズ」の販売を開始。牛乳・豆乳に続く第三のミルクとして提案しています。今後も植物性素材を原料とした商品拡大に取り組み、健康のみならず、環境課題の解決に繋がっていきます。



Product Category	Natto
Manufacturer	Hoya Natto Co., Ltd
Product Name	Kiwa Dashi Natto
Sales Outlets	Farmdo Azamino Marche (Kanagawa Prefecture), etc.

Natto made with U.S. soybeans displaying the Sustainable U.S. Soy logo can be found in high-end supermarkets alongside organic soybeans.



Tastemade introduced video content created by the U.S. Embassy Tokyo on its official website.



The U.S. Soy Sustainability Assurance Protocol (SSAP) is recognized by the Tokyo 2020 Olympic and Paralympic Games Organizing Committee as compliant with the sustainable sourcing code for agricultural products.



Sources:
- Twitter
- YouTube / Tastemade Japan
- Hoya Natto

Product Category	Natto
Manufacturer	Kosugi Foods Corporation
Product Name	Tsuyudaku Natto etc.

The 2019 U.S. Soy Sustainability Ambassador award winner adopted the Sustainable U.S. Soy mark for multiple products.



Product Category	Soybean Protein
Manufacturer	Miki Corporation
Product Name	Miki Protein 95 Supreme

On the official blog, Miki Corporation announced that Miki Protein 95 has received the Sustainable U.S. Soy certification mark.



Product Category	Miso
Manufacturer	Fujijin Co., Ltd.
Product Name	Yoake Awase Miso (White)

Product packaging mentions the use of Sustainable U.S. Soy.



Sources:
- Kosugi Foods Corporation
- Miki Corporation
- Fujijin Co, Ltd.
- OK Food Industry Co., Ltd.

Product Category	Fried Tofu
Manufacturer	OK Food Industry Co., Ltd.
Product Name	Ajitsukeage

On its official website, the company mentions that it uses Sustainable U.S. Soy as one of its SDG initiatives.



また2020年にはアメリカ大豆輸出協会 (USSEC) から、当社グループにおける持続可能な調達と、米国サステナビリティ標準システムに対する理解について表彰されました。

Product Category	Tofu
Manufacturer	Miyoshi Food Industry Co., Ltd.
Product Name	Nigari Soft, Nigari Momen

The products are marketed as “safe and reliable tofu made from contract-cultivated soybeans.”



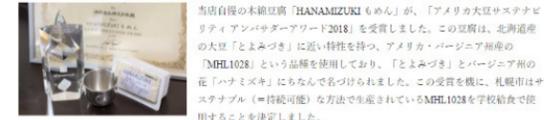
Product Category	Tofu
Manufacturer	Itami Foods Co., Ltd.
Product Name	Tezukuri Soft Momen

This tofu store, established in 1958, adopted Sustainable U.S. Soy. The company’s official website explains that they won the 2018 U.S. Soy Ambassador Award.



受賞歴

アメリカ大豆サステナビリティ アンバサダーアワード2018 受賞



当店自販の本物豆腐「HANAMIZUKI もめん」が、「アメリカ大豆サステナビリティアンバサダーアワード2018」を受賞しました。この豆腐は、北海道産の大豆「とよみづき」に近い特性を持つ、アメリカ・バージニア州産の「MHL1028」という品種を使用しており、「とよみづき」とバージニア州の花「ハマミズキ」にちなんで名づけられました。この受賞を機に、札幌市はサステナブル（＝持続可能）な方法で生産されているMHL1028を学校給食で使用することを決定しました。

Product Category	Soybeans for food
Manufacturer	Saitama Ryoukoku Co., Ltd.
Product Name	Soybean Oil (concrete release agent), Food Soybean

サステナブルな生産方法に基づいた安心・安全な輸入大豆を提供します

当社の輸入大豆の多くは、当社と十年来の取引があるアメリカ合衆国・オハイオ州のSchwartz Farmsで生産されたNon-GMO大豆と、専社と連携し現地のサプライヤーから提供頂いた加工適正に優れた大豆となります。豆腐加工適正にすぐれた高たんぱく大豆、味噌、豆乳にすぐれた高たんぱく大豆などを取り揃えております。



This import trading company explains the added value of Sustainable U.S. Soy on its official website.

Sources:
- Miyoshi Food Industry Co., Ltd
- Itami Foods Co.
- Saitama Ryoukoku Co., Ltd.

SUSTAINABILITY TRENDS

The Japan Sustainable Brands Index, a survey released by Hakuten Corporation in February 2021, identified the top 20 Japanese companies in terms of their image of contributing to the SDGs and their overall SDG evaluation.

This section highlights Toyota Motor Corporation, which ranks first overall, and Suntory and Seven & i Holdings, which are representative companies in the food manufacturing and retailing industries, respectively.

Top 20 Sustainable Japanese Brands

順位	企業名	得点
1	トヨタ自動車(TOYOTA)	112.86
2	良品計画(無印良品) (MUJI)	108.76
3	味の素(AJINOMOTO)	108.74
4	日立製作所(HITACHI)	108.60
5	住友林業(SUMITOMO)	108.09
6	ライオン(LION)	106.89
7	ファーストリテイリング(ユニクロ) (UNIQLO)	106.62
8	ハウス食品 (HOUSE FOOD)	106.16
9	富士フイルム(FUJIFILM)	105.96
10	TOTO	105.92
11	パナソニック(Panasonic)	105.76
12	サントリー(SUNTORY)	105.59
13	イオン(AEON)	105.59
14	キューピー (KEWPIE)	105.41
15	クボタ(Kubota)	105.38
16	東京ガス(TOKYO GAS)	105.36
17	ユニリーバ・ジャパン (Unilever Japan)	105.23
18	Seven & i Holdings Co., Ltd.	
19	森永乳業(morinaga)	104.95
20	王子ホールディングス(ネピア他)	104.86

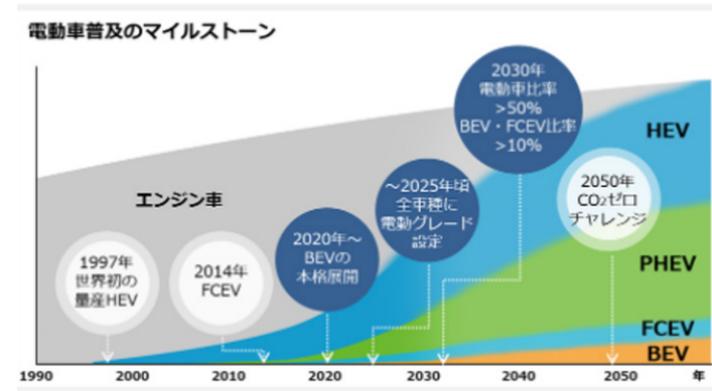




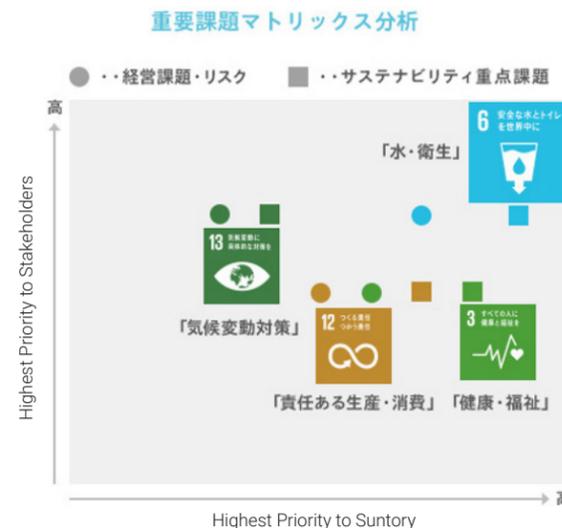
Toyota Motor Corporation, one of Japan's leading companies, has set up programs in each of the SDGs.

Particular emphasis has been placed on the challenge of achieving zero CO₂ emissions. But, the company's approach is different from that of other automakers that are promoting the shift to battery electric vehicles (BEVs), such as hybrid electric vehicles (HEVs) and fuel cell electric vehicles (FCEVs) that use hydrogen, a technology in which Toyota excels.

The program is set up with many goals.



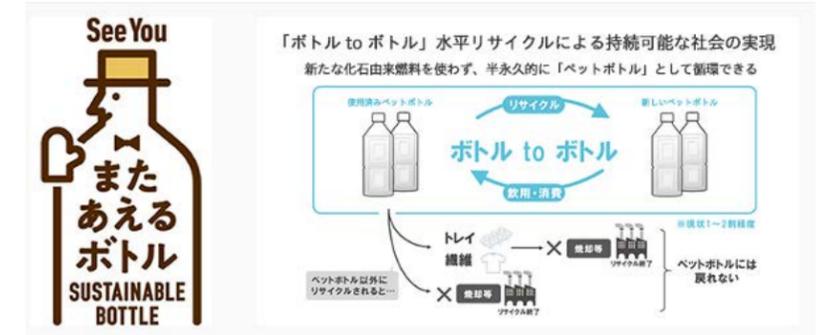
Water and sanitation is one of the most important sustainability issues for Suntory. In 2003, Suntory started a reforestation project called the Natural Water Forest. By 2019, the company will have achieved its goal of recharging more than twice the amount of groundwater pumped by its domestic factories, one year ahead of schedule.



To combat climate change, the company has set a goal of reducing greenhouse gas emissions throughout the value chain to zero by 2050. One tool is technology that can be recycled as a plastic bottle semi-permanently.



Labelless PET Bottles



7-Eleven is making efforts to reduce food loss and waste.

In addition to developing foods that can be kept fresh and preserved for long periods of time, the company is working to promote a proper understanding of expiration dates. The company is also working to reduce food waste by revising the one-third rule that states food cannot be delivered unless at least one-third of its best-before date remains, which had been an industry practice.

7-Eleven engages in environmental measures such as installing plastic bottles in stores and promoting recycling. As of October 24, 2021, 969 stores had PET bottles.

- Sources:
- Suntory Seven Themes on Sustainability
- Toyota Motor Company (Sustainability)
- 7-Eleven Green Challenge 2050

Long Shelf Life Foods



Example of Reviewing Delivery Deadlines

	納品期間	販売期間	お客さま購入後	賞味期限
変更前	1/3	1/3	1/3	賞味期限
変更後	3/6	2/6	1/6	賞味期限

賞味期限180日商品の場合			
	納品期間	販売期間	お客さま購入後
変更前	60日	60日	60日
変更後	90日	60日	30日

店頭での販売期限は変更なし



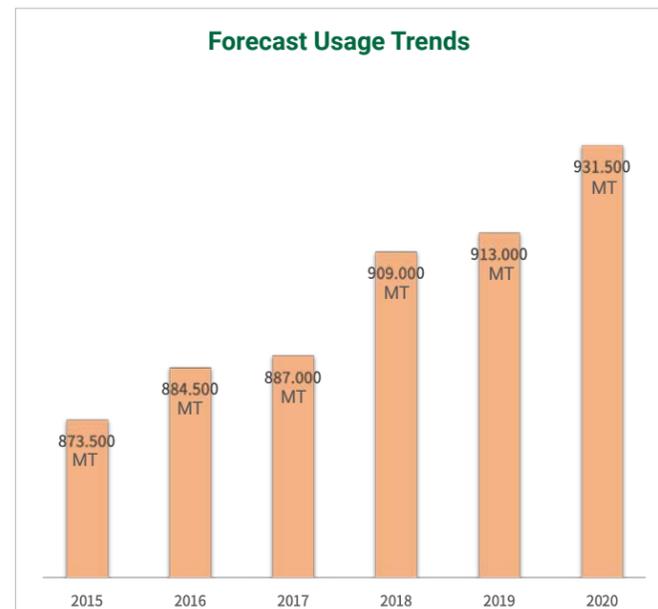
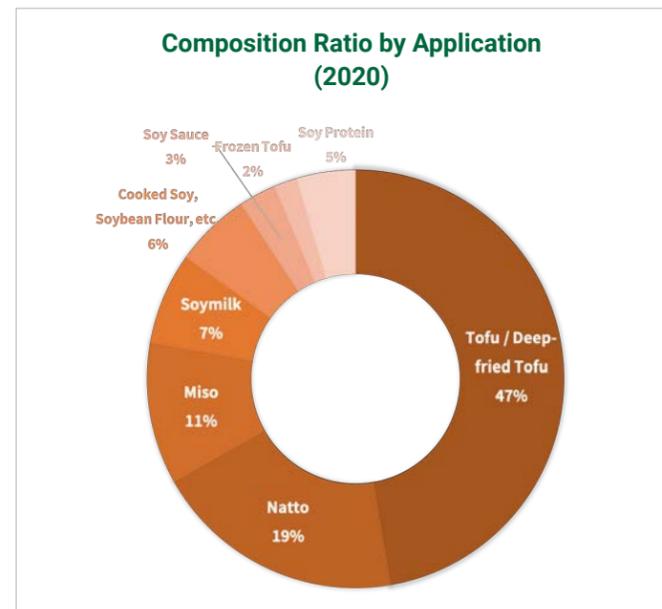
Soybean Consumption Trends

The consumption of soybeans in Japan is on the rise. It is assumed that the forecast for 2021 is influenced by the coronavirus pandemic.

About half the soybeans consumed are used for tofu, followed by natto, miso and soy milk.



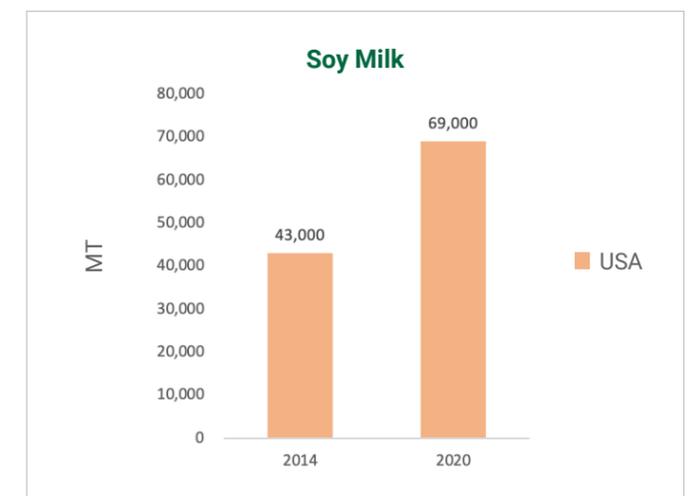
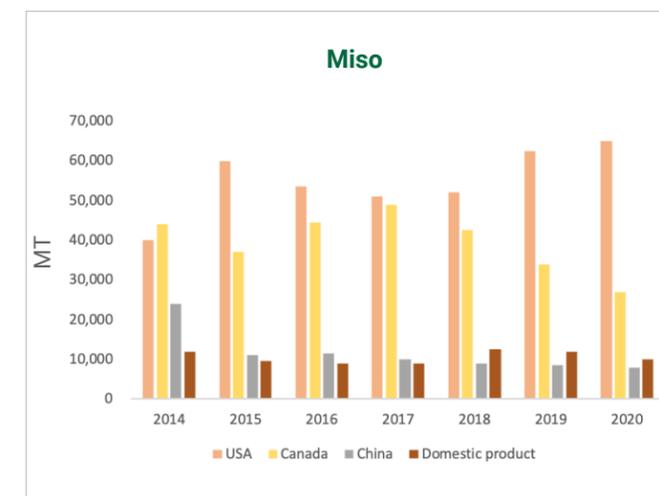
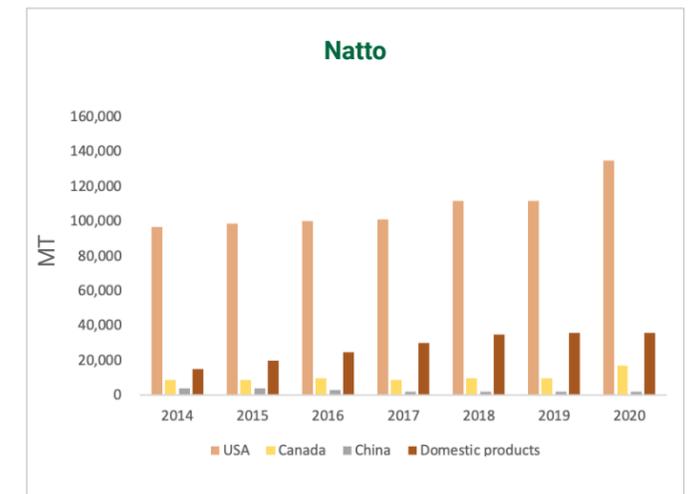
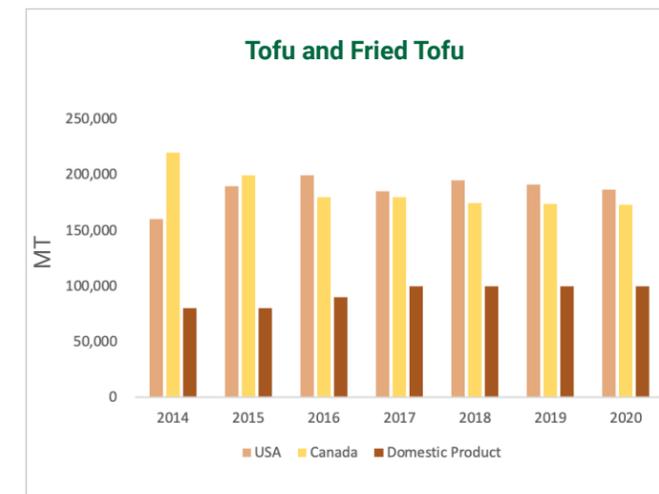
SOYBEANS USED FOR FOOD BY APPLICATION



Source: Soybeans Used for Food by Application, Food Industry News

U.S. soybeans account for a high share of the market in major categories, but especially in natto.

While the consumption of tofu and miso is on a slight downward trend, natto and soy milk are leading the market expansion.



Source: Soybeans Used for Food by Application, Food Industry News

MAJOR SOYBEAN PRODUCTS

TOFU

In addition to traditional tofu products such as cotton, silk and fried tofu, many products that expand the uses of tofu have been introduced. A typical example is Sagami-ya Foods Beyond Tofu, which takes the good protein and low carbohydrate characteristics of tofu and tailors it to the generation that demands it.



Takano Foods Tofu Lineup



Asahikco Tofu Bar



Sagamiya Food Beyond Tofu



NATTO

In the expanding market for natto, there is a trend toward appeal of functionality and diversification of taste. Takano Foods, which leads the market with its standard products and functional appeal, and Mitsukan, which sells aggressive products, stand out.

Takano Foods Natto Lineup



Unique Natto Products



Natto with thick yakiniku sauce and unagi teriyaki sauce goes well with Mizkan rice.

MISO

Miso is one of the traditional soybean products. Nowadays, many instant miso products with soup stock are easy to use, like instant miso with dashi.

Hanamaruki Mutenka Miso



Marukome Liquid Miso



SOY SAUCE

The market is dominated by Kikkoman and Yamasa soy sauce. Many of their products come in containers with high shelf life and are based on the concept of reduced salt.

Kikkoman



Yamasa Soy Sauce



SOY MILK

The market is growing because of health consciousness. Kikkoman is leading the market, and recently soy milk yogurt has also been marketed.

Kikkoman Soy Milk



Pokka Sapporo Soy Milk Yogurt



Source: Respective official websites of companies

OTHERS

Soy protein is used in a variety of major products, including protein and a new category of beer.

Kirin Beer Nodogoshi Nama



Meiji Zavas Soy Protein



NEW SOY FOOD TRENDS

DEMAND FOR LOW CARBOHYDRATES AND HIGH PROTEIN

Products that replace wheat with soybeans as an ingredient are trending, as people learn of positive nutritional benefits.

Many of these products are being released by brands that market their products to be associated with health, such as Natural Lawson and Muji.

Confectionery from Natural Lawson



Muji High-Protein Snacks



MEAT SUBSTITUTES

Soy meat products are gradually appearing in Japan.

Marukome Soybean Meat



Marukome Soybean Meat



TOFU STANDARDS AND REVISIONS

CURRENT STATUS OF TOFU STANDARDS

The definition of tofu is unclear, and many products are marketed as tofu regardless of the composition of the soybean material. It is difficult for consumers to understand the difference between high-end and low-priced products. With the growing popularity of tofu globally, Japanese tofu manufacturers believe products should meet basic quality standards.

In November 2015, the Fair Competition Code Setting Committee for tofu labeling was established. The committee consists of eight to ten members, including major tofu manufacturers, medium-sized tofu manufacturers and local

tofu manufacturers, with coagulant manufacturers, packaging material manufacturers and others participating as observers.

After the thirtieth committee meeting in November 2018, the committee was scheduled to be reorganized as the Tofu Fair Trade Preparatory Council, but this has been suspended due to the spread of COVID-19.

One of the issues that has arisen so far is that the original draft of the regulations categorized tofu into three categories: Tofu, Prepared Tofu and Processed Tofu.

Tofu using emulsified bitter was categorized as Prepared Tofu, which led to opposition and refusal to participate by many of the manufacturers using this coagulant. The current draft of the agreement does not include this category. In the current draft of the code, tofu using emulsified bitter is also included in the Tofu category.

In addition to the tofu classifications mentioned above, there are also concerns about the fragmentation of the enforcement regulations. As of November 2021, the issue is in the process of being reconsidered.

The philosophy behind the establishment of the Tofu Fair Competition Code

1. Inform consumers and give them choices.

2. Avoid unfair competition in the industry.

3. Solidify Japan's tofu standards against international standards such as CODEX.

Source: Respective official websites of companies

Sources:
- Japan Tofu Association
- Livedoor News
- Respective official websites of companies

NATTO STANDARDS

It can be said that natto, a traditional Japanese soybean food with a growing market, needs to be clearly defined from similar fermented soybean foods, including those from other countries.

The 43rd session of the Codex Alimentarius Commission of the General Assembly approved the start of work on the development of an Asian Regional Standard for Soybean Products Fermented with *Bacillus Subtilis*, covering natto and similar fermented soy products, in 2020.

In the future, Japan will work with interested countries in the Asian region to prepare a draft standard. The MAFF will continue to work in cooperation with industry associations and other related parties with the aim of establishing the standard as soon as possible.

According to the National Federation of Natto Growers Association, Japan has already submitted the standard for natto, and it is waiting for comments from South Korea, Thailand and China.

JAPAN'S PROPOSAL

Presented Definition of Natto

1. Traditional Japanese soy fermented food.
2. Steamed soybeans fermented with fermented soybeans and unsalted.
3. Those that become cloudy by stirring (mixing) and have a peculiar viscous substance.

CHONG GUTCHAN, KOREA

This soybean product maintains the shape of the soybean and is fermented using *Bacillus Subtilis*.

It is made by adding *Bacillus Subtilis* to boiled soybeans, fermenting them and then adding salt and chili powder.



KINEMA, NEPAL

This soybean product maintains the shape of the soybean and is fermented using *Bacillus Subtilis*.

Fermented soybeans have been steamed, lightly pounded and crushed, and then wrapped in banana or other broadleaf leaves without inoculating them with seeds. This includes those dried in the sun.

Other bacteria such as lactic acid bacteria or *Enterococcus*, yeast or *Candida*, and mold like *Geotrichum* may also be included.



TOFU, CHINA

Soybean products that maintain the shape of the soybean and are fermented using the genus *Bacillus* together with other genera such as *Aspergillus*.

Black soybeans are steamed, fermented with salt and koji, and then dried in the shade to reduce the water content.

In the case of production using mainly *Bacillus Subtilis*, when steamed black soybeans are wrapped in jute bags or grass bags and cultivated, the surface of the beans will have a lot of mucilage.



TUA NAO SA, THAILAND

A soybean product that maintains the shape of the soybean and is fermented using *Bacillus Subtilis*.

It is made by steaming whole soybeans, wrapping them in banana or other broadleaf leaves without adding salt, and fermenting them.

It is mainly fermented by *Bacillus Subtilis* but can also contain lactic acid bacteria, *Enterococcus*.



Sources:
 - Ministry of Agriculture, Forestry and Fisheries, Work on Codex Alimentarius Regional Standards for Natto and Similar Fermented Soybean Products Begins
 - Similar fermented soybean products

ADVANTAGES OF U.S. SOYBEANS

Although Japanese consumers prefer domestic soybeans, the stable supply, price and quality of U.S. soybeans are a major advantage for manufacturers.

In general, many senior Japanese consumers are relatively particular about Japanese products, so further market expansion is expected by promoting the merits of U.S. soybeans to younger consumers.

THE VIEW OF A DOMESTIC SOY FOOD MANUFACTURER



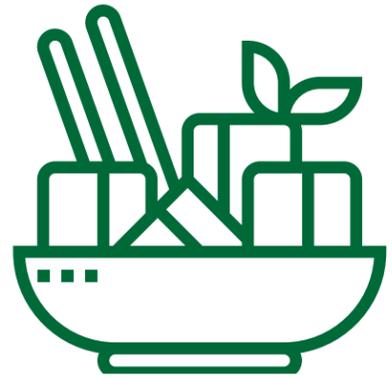
- This company has been using non-genetically modified U.S. soybeans to manufacture its products since the 1980s.
- In Japan, domestic soybeans are the most preferred by consumers, so this company uses domestic soybeans as well as U.S. soybeans to make their products.
- The strength of U.S. soybeans includes three points: stable supply due to huge production volumes averaging 112 million MT (4.1 billion bushels) annually in the past 10 years, stable price and quality. In addition, the state-of-the-art transportation infrastructure is a key factor.
- For these reasons, this company uses U.S. soybeans for the products that it produces stably throughout the year. The soybeans are well suited for processing and have a large number of fans.

Japanese consumers' strong preference for domestic products may not be changed, but U.S. Soy has opportunities.

The biggest challenge in the Japanese soy food industry is the inability to increase soy food price regardless of soaring prices of soybeans, freight, oil, packaging and other materials. To further improve the positioning of U.S. Soy and soy foods in the Japanese food industry, sustainability, relevant traceability for both transgenic and non-GMO and the marketing value story will be necessary.

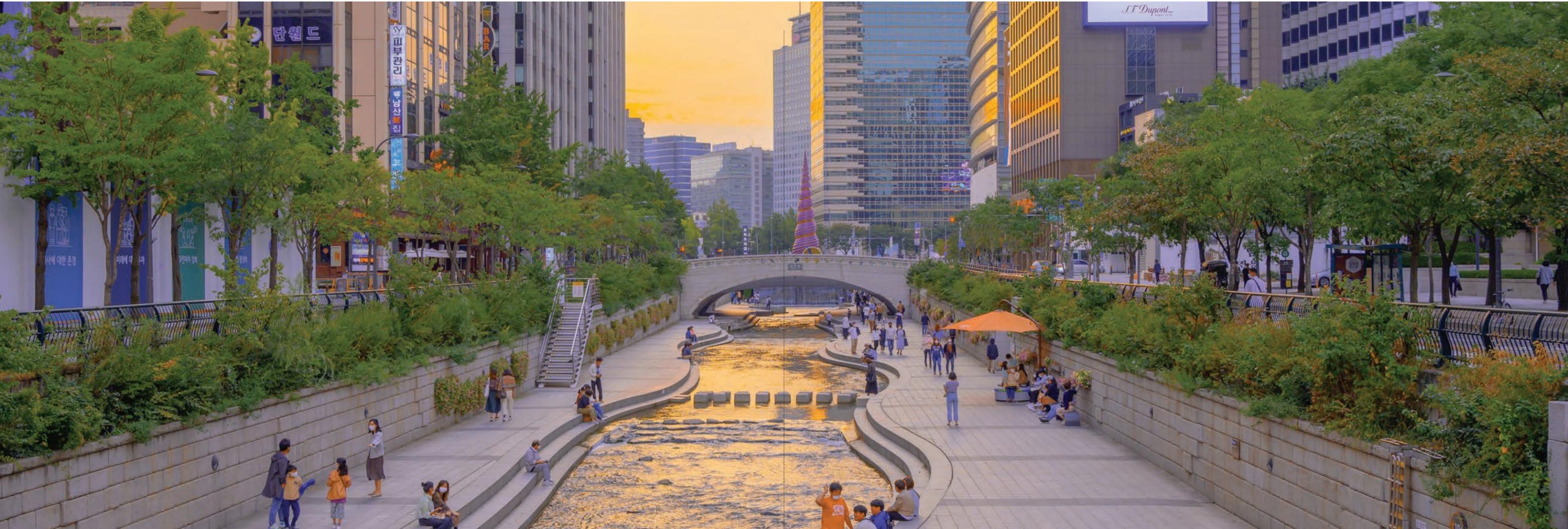
Source:
- Soybean Production, U.S. Department of Agriculture National Agricultural Statistics Service, 2022





Korea

SOY FOOD REPORT



Soy Food Market

Korea is located in East Asia and has a population of 51 million, with a per capita gross domestic product (GDP) of \$31,597 as of 2020. The global popularity of its K-pop music, dramas and films has led to the “Korean Wave” or Hallyu phenomenon, whereby Korean cultural contents have attracted fans in many parts of the world. The Hallyu is also driving up exports of food produced in Korea, including soy-based food products. Soy foods are an important staple food for Koreans, being a common part of the daily diet.

All soybeans grown locally in Korea are used for human consumption. The annual production, however, accounts for only about 22% of total food soybean demand. Hence, the country is highly dependent on imports to fully satisfy demand. Of the 280,000 MT of non-genetically modified (GM), food-grade soybeans it imports on a yearly basis, approximately 80% is from the United States.

Korea is the second largest market for U.S. non-GM food soybeans, with Japan being the largest. Demand for soy food products such as tofu and soy milk is growing, as more consumers become keen on health issues and plant-based proteins with the ongoing COVID-19 pandemic. However, food-grade soybeans were recently in short supply, putting the soy food industry in a difficult situation.

Most of the food-grade soybeans imported into Korea apply a low tariff rate of 5% under the World Trade Organization (WTO) tariff rate quota (TRQ) determined each year by the government. The state-run Korea Agro-Fisheries and Food Trade Corporation (aT) serves as an agent and has responsibility for the importation process. The associations of end users for tofu, soy paste and sauce, soy milk, etc., use the free trade agreement (FTA) TRQ system and bid for rights to directly import identity-preserved (IP) food soybeans that meet their processing needs.

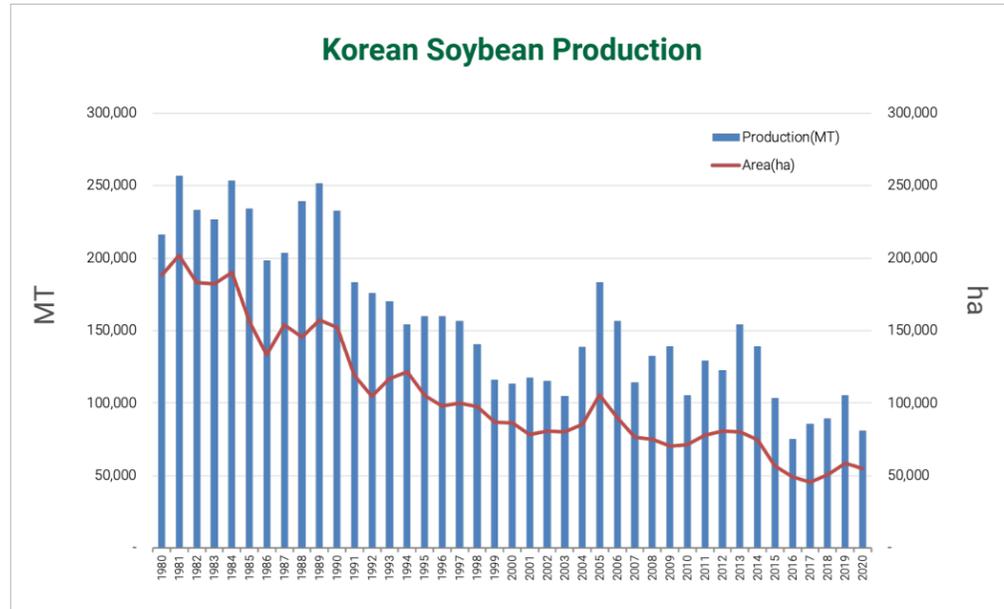
The soy food processing industry in Korea has a high preference for U.S. food-grade soybeans for their consistent quality and supply. In addition, growing consumer and corporate interest in sustainability and environmental, social and governance (ESG) is raising awareness regarding the sustainability of U.S. Soy. Recently, a product carrying the Sustainable U.S. Soy logo was launched in the Korean market.

Sources:

- Korea Customs Service, Trade Statistics
- On K-pop popularity, South Korea's exports of red pepper paste surge 63%, Business Standard, January 23, 2022
- When a Country's Cuisine Becomes a Cultural Export, New York Times, October 12, 2022
- USSEC staff and industry feedback



Trade



Source: Statistics Korea



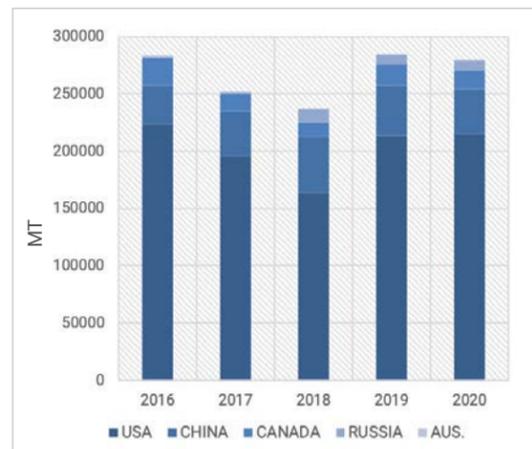
IMPORTS OF FOOD SOYBEANS

U.S. food-grade soybeans are primarily used in products such as tofu, soy sauce and paste and soy milk, while China mainly supplies soybeans for sprouts.

Food Soybean Imports

Unit: MT

	2016	2017	2018	2019	2020
USA	223,283	195,691	164,172	213,850	214,771
CHINA	34,111	39,027	48,706	43,599	39,344
CANADA	24,194	15,241	12,495	18,838	16,148
Russia	652	1,300	11,180	7,819	8,942
AUS.	1,296	814	907	213	254
Others	426	10	280	37	274
Total	283,962	252,083	237,740	284,356	279,733



Source: Korean Statistical Information Service

BUYERS OF FOOD SOYBEANS

The Korean government's state trading arm is the Korea Fisheries & Food Trade Corporation, known as aT.

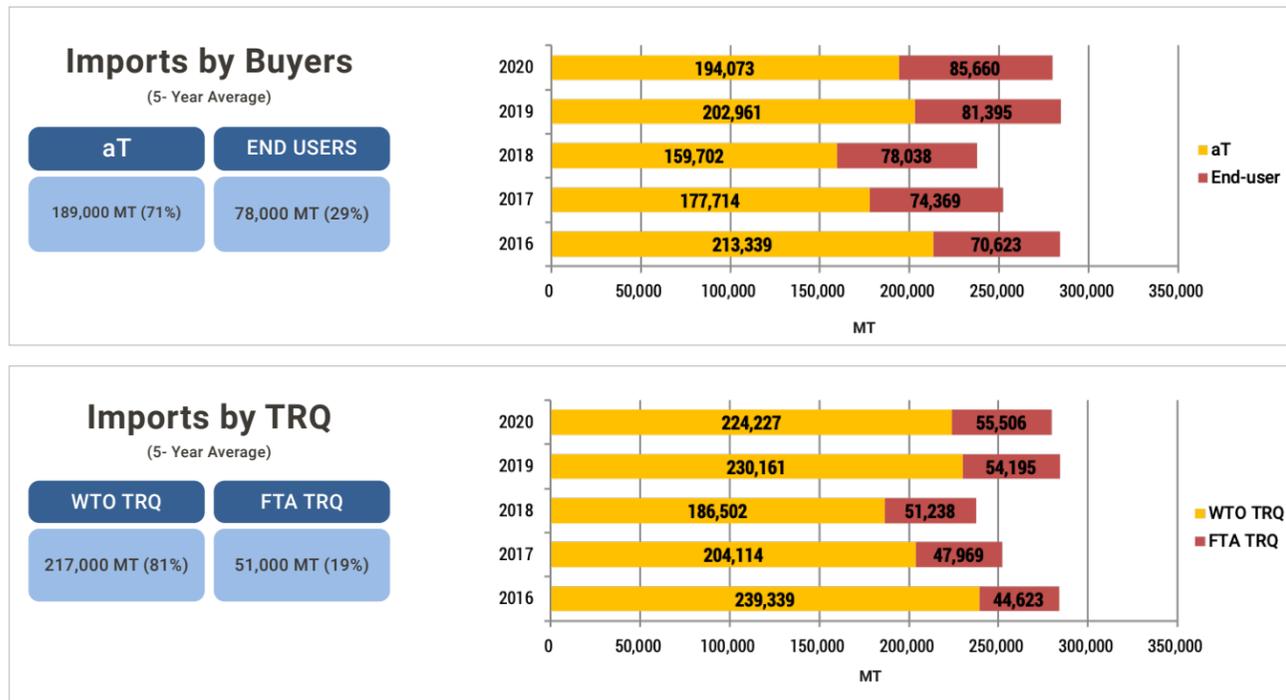
The end users of food-grade soybeans are the 12 associations of food soybean processors or their member companies. The companies produce tofu, soy sauce and paste, soy milk, bean sprouts, etc.

IMPORT SYSTEM OF FOOD SOYBEANS

aT purchases and distributes U.S. No. 1 non-GM soybeans to end users under the WTO TRQ. End users directly purchase IP food soybeans using FTA TRQ or import rights. FTA TRQ is allocated by aT to 12 associations of food soybean processors based on soybean use over the past two years. Import rights are given to the highest bidder in aT's tenders.

Since the FTA agreements became effective, the quantity directly imported by end users has been gradually increasing.

Imports by Buyers and Tariff Rate Quotas



Source: aT & Korean Statistical Information Service

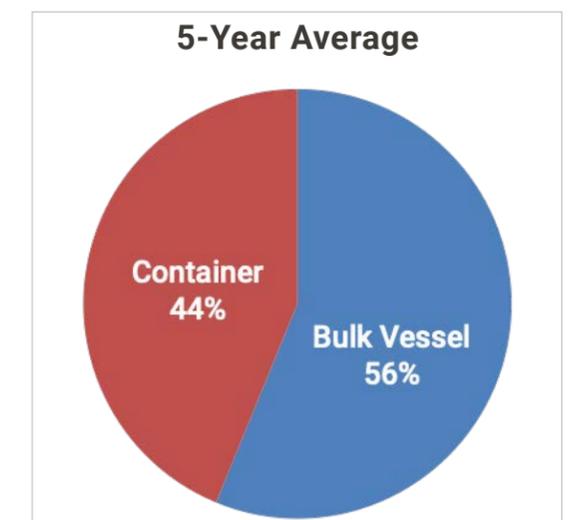
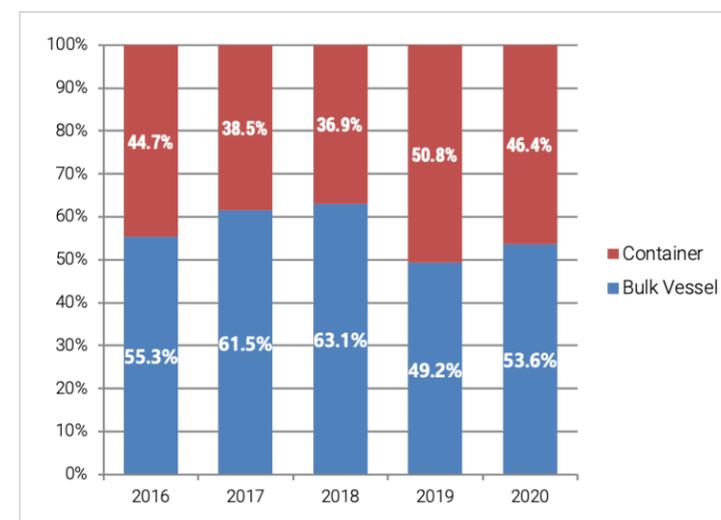
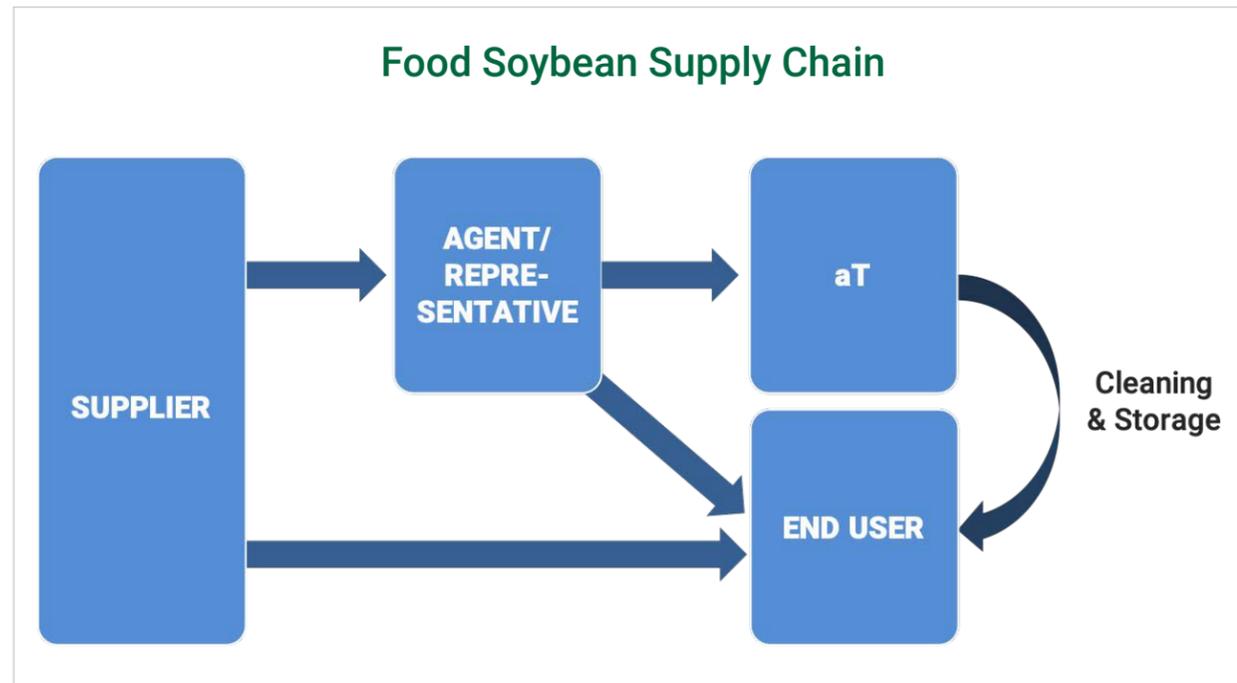


Shipment Types

Unit: MT

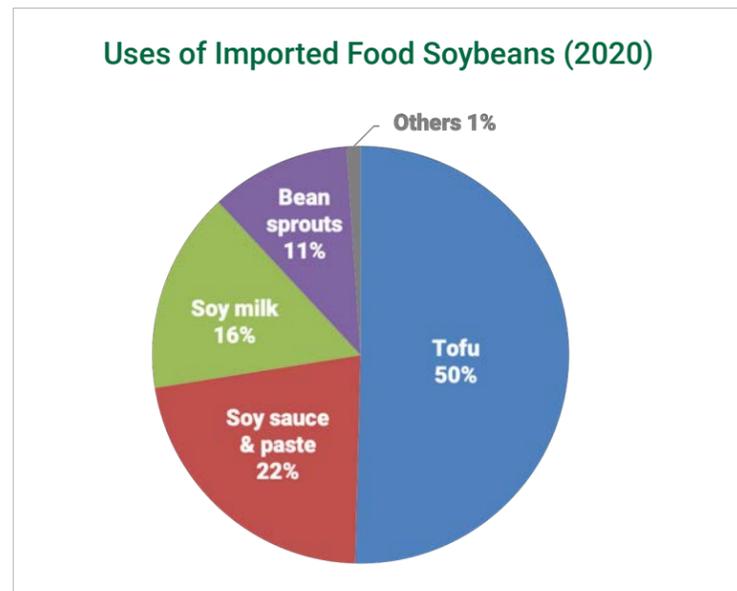
TYPE	2016	2017	2018	2019	2020	5-Year Avg.	
Bulk Vessel	157,000	155,000	150,000	140,000	150,000	150,400	56%
Container	126,962	97,083	87,740	87,740	129,733	117,175	44%
TOTAL	283,962	252,083	237,740	237,740	279,733	267,575	100%

Food Soybean Supply Chain



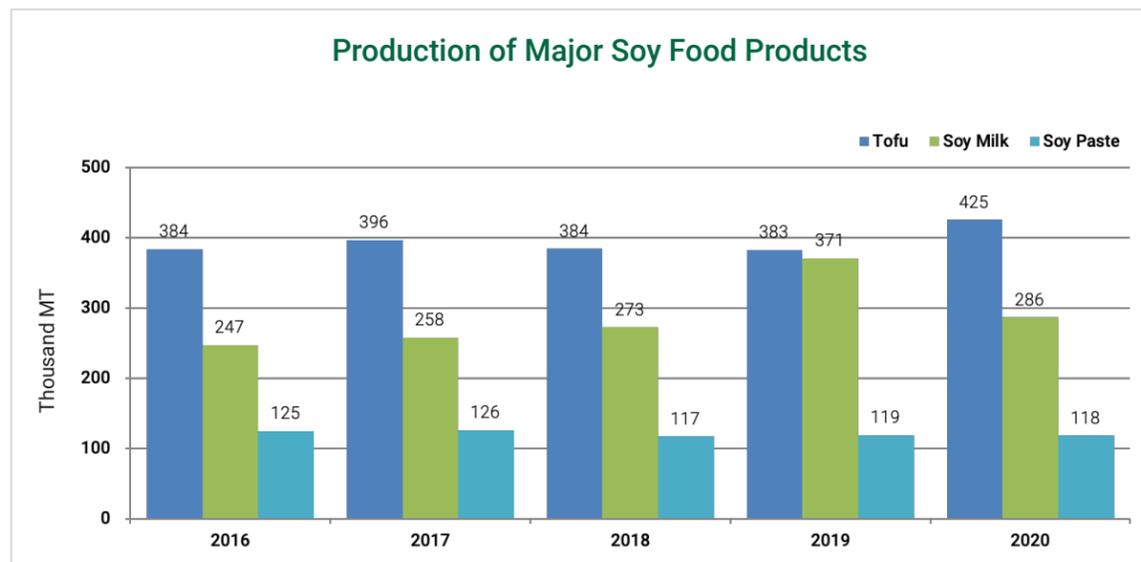
Source: aT & Korean Statistical Information Service

Consumption



Source: aT

The soy food market grew from 756,000 MT in 2016 to 829,000 MT in 2020. A shortage in food bean supply is due to increased demand for tofu, soy milk and soy sauce and paste.



Source: Korea Ministry of Food and Drug Safety



SOY FOOD TRENDS

Soybean and soy foods go back thousands of years in Korean history but new trends are emerging. Interest in health and plant-based foods is growing, especially during COVID-19. Demand for tofu, soy milk, soy sauce and paste has increased as home cooking, health management resources (HMR) and delivery food expanded due to COVID-19. Vegan population is also growing. In addition, consumers are showing more interest in plant-based meat such as soy meat.



Policy

TARIFFS



Tariff Rates

5%	<ul style="list-style-type: none"> • Under WTO TRQ • 80% of FOOD BEAN IMPORTS • Imported by aT(70%) & END-USERS(10%)
0%	<ul style="list-style-type: none"> • Under FTA TRQ • 20% of FOOD BEAN IMPORTS • Imported directly by END-USERS • aT allocates FTA TRQ to 12 assoc. of food-bean processors
487%	<ul style="list-style-type: none"> • Non-TRQ

World Trade Organization Tariff Rate Quotas

Unit: MT

	2018	2019	2020	2021	2022
Country Schedule	185,782	185,782	185,782	185,782	185,782
Voluntary	48,631	43,000	41,680	38,335	34,962

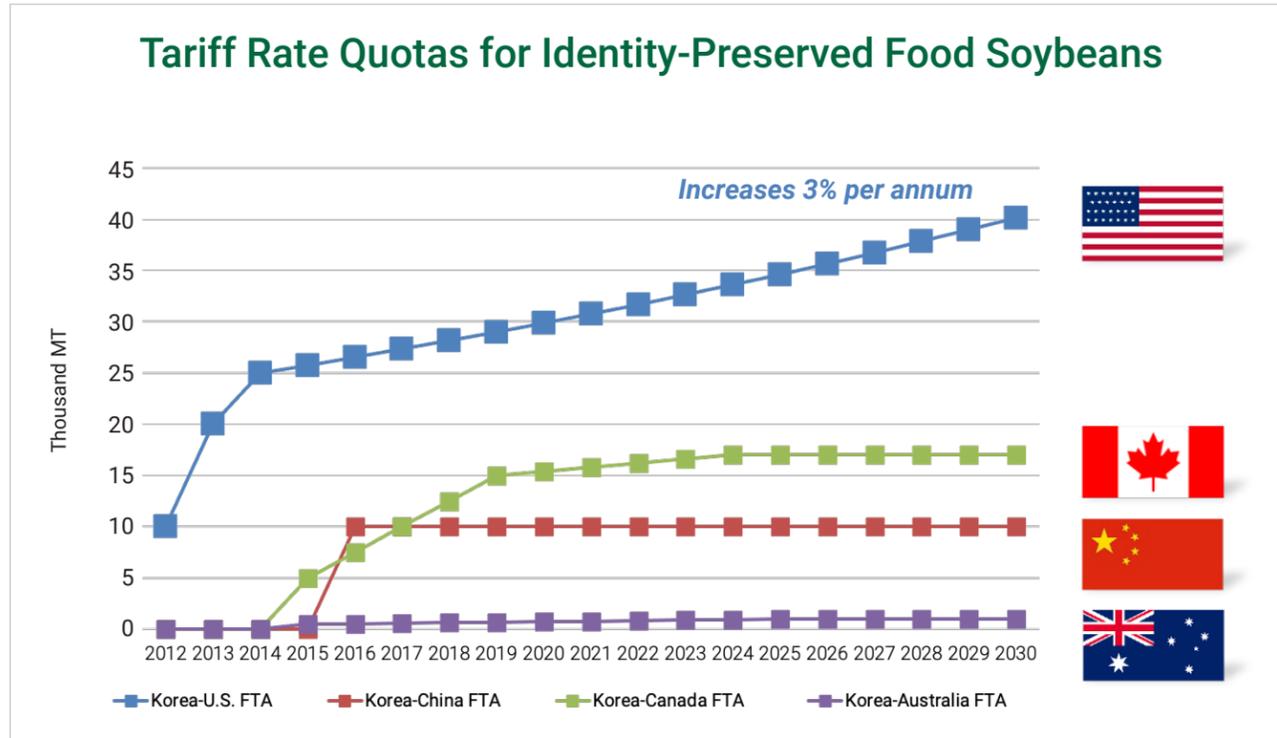
Korean government has reduced voluntary TRQ to promote local soybeans

Free Trade Agreement Tariff Rate Quotas

Unit: MT

	2022	2023	2024	2025	2026	Ceiling
USA	31,670	32,620	33,599	34,607	35,645	None
Canada	16,200	16,600	17,000	17,000	17,000	17,000
China	10,000	10,000	10,000	10,000	10,000	10,000
Australia	900	950	1,000	1,000	1,000	1,000

Source: Korea Trade Agreement, U.S. Department of Agriculture Foreign Agricultural Service



Source: Korea Ministry of Trade, Industry & Energy

GENETIC MODIFICATION TOLERANCE

The tolerance threshold in non-GM food soybeans is 3%.

Description	Cases where GMO labeling is not required
Agricultural Products	<ul style="list-style-type: none"> Identity-preserved agricultural products (up to 3% adventitious presence allowed)
Processed Foods	<ul style="list-style-type: none"> IP agricultural products used (up to 3% adventitious presence allowed) Content of GM agricultural products used is not within top 6 (excluding purified water); Genetically modified DNA or foreign protein not remaining in final product (ex. edible oils)

Source: aT



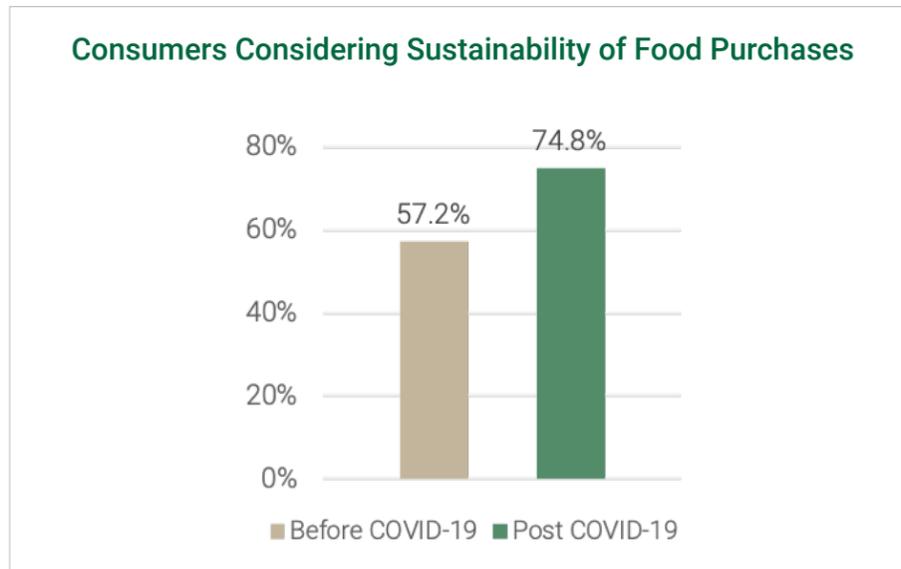
Sustainability in Korea

CONSUMER SUSTAINABILITY TRENDS

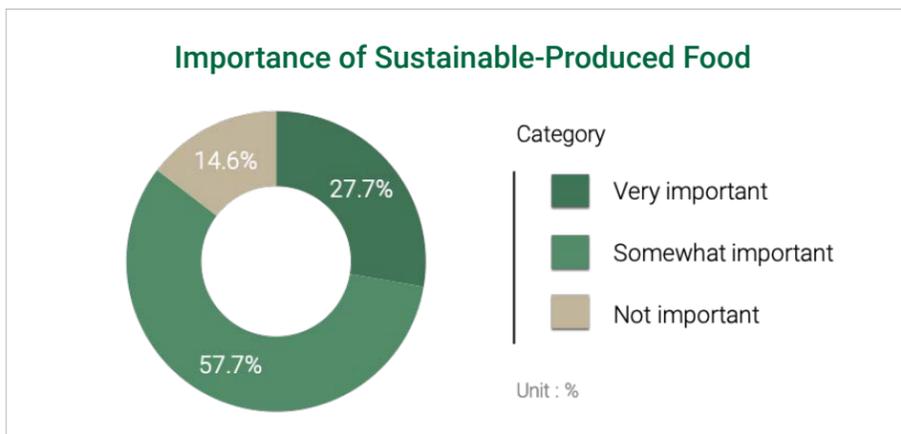
Based on a consumer survey in Korea, the number of consumers considering sustainability when purchasing food products increased by 17.6% from 2015 to 2020. A total of 85.4% of the surveyed replied that it is important for their family to consume sustainably-produced products.



The survey asked consumers, "Do you consider sustainability?" in reference to their food purchases. The percentage answering yes increased significantly from 2015, before the COVID-19 pandemic, to 2020.

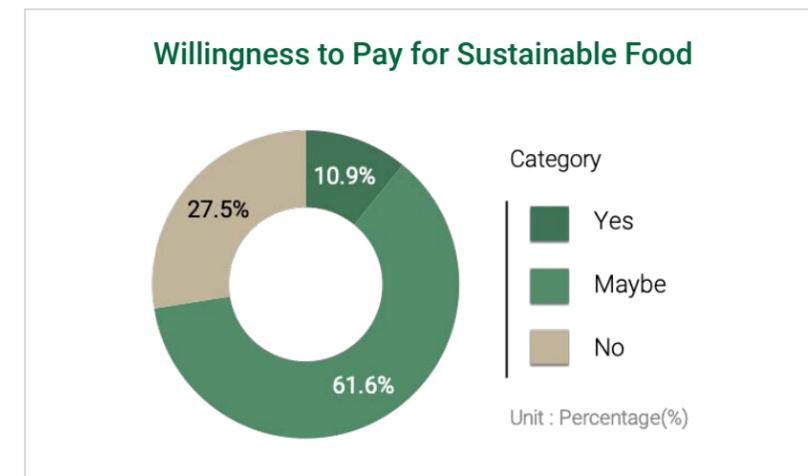


Most survey participants responded that it was very important or somewhat important for their families to consume sustainably-produced food.



Source: Korean Consumer Survey on Sustainability, Gallup, Regional coverage of online survey: Seoul, top 5 cities, 896 people, Period: 2020.8.24-9.1

According to the survey, 72.5% were willing to pay extra for sustainability in food products that they purchase. They replied they would pay a 9.4% to 22% premium for sustainable soy foods, noting that for tofu, which is a more affordable soy product, they would pay up to 100% in premium over non-sustainable tofu.



Price Expectations for Sustainable Soy Food Products

Food Product	MSRP of Non-sustainable Product in the Market	Appropriate Price for Sustainable Product
Vegetable oil (1.8L)	KRW 4,100	KRW 5,000
Tofu (300g)	KRW 1,000	KRW 2,000
Paste (1Kg)	KRW 6,700	KRW 7,650
Soy milk (1 box)	KRW 12,800	KRW 14,000

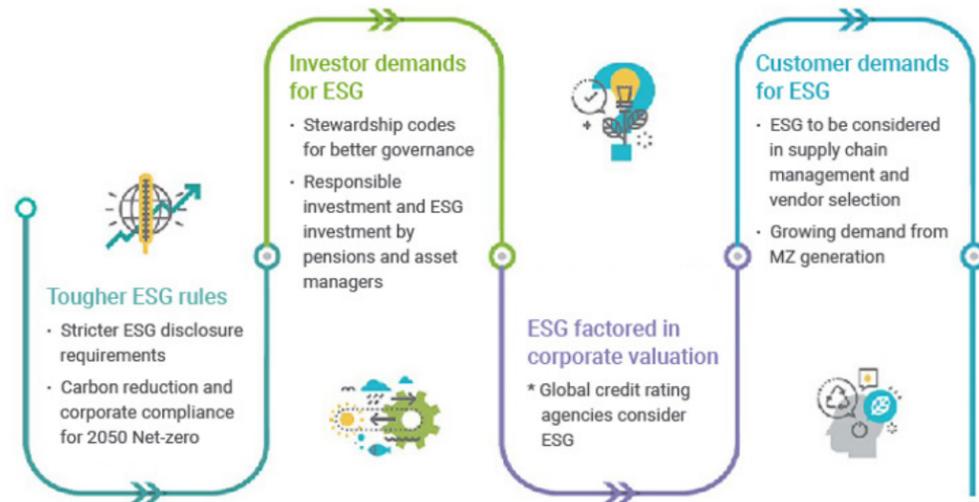
Source: Korean Consumer Survey on Sustainability, Gallup, Regional coverage of online survey: Seoul, top 5 cities, 896 people, Period: 2020.8.24-9.1

CORPORATE SUSTAINABILITY TRENDS

Since COVID-19, interest in ESG management has been growing at a rapid pace, with more investors and consumers calling for ESG management on the part of businesses. ESG has become an important factor in corporate valuation and product purchase decisions.

Korea's top 10 corporate groups are quick to respond to calls for ESG management, with all 10 having completed setting up ESG committees.

Importance of Environmental, Social, Governance (ESG)



Top 10 Corporations with ESG Committees



SUSTAINABLE U.S. SOY LOGO APPLICATION

Lotte Foods was the first company in Korea to apply the Sustainable U.S. Soy logo on high-oleic soybean oil, working to enhance the value of its products by using U.S. Soy.



Lotte Foods is using the Sustainable U.S. Soy logo on the front of its 18 L high-oleic soybean oil product used by restaurants, franchise dining establishments and other channels. On the side of the product is the phrase "Dare to Compare – Sustainability" with the QR code verifying sustainability, utilized for marketing purposes.

The not-for-sale 500 mL high-oleic soybean oil product also has the Sustainable U.S. Soy logo. Lotte Foods is planning to launch products for the consumer market, as well.



SUSTAINABILITY CAMPAIGN

With the view to communicating to Korean consumers the value, hard work and significance behind Sustainable U.S. Soy, USSEC created a promotional video and key visual materials on sustainability and carried out a campaign in 2021 via major online channels such as YouTube, Naver, Facebook and Instagram.

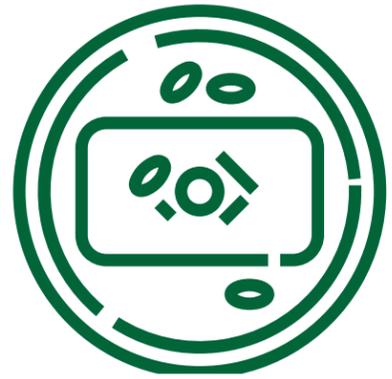
The campaign slogan was "U.S. Soy provides nutrition for the world. It must be passed on to future generations." A compelling message was delivered through the voice of Jim Douglas, a farmer who has grown soybeans his entire life by applying sustainable farming practices that preserve the land for future generations.

Video Advertisement, Full Story



Display Advertisement, Key Visual





Taiwan

SOY FOOD REPORT

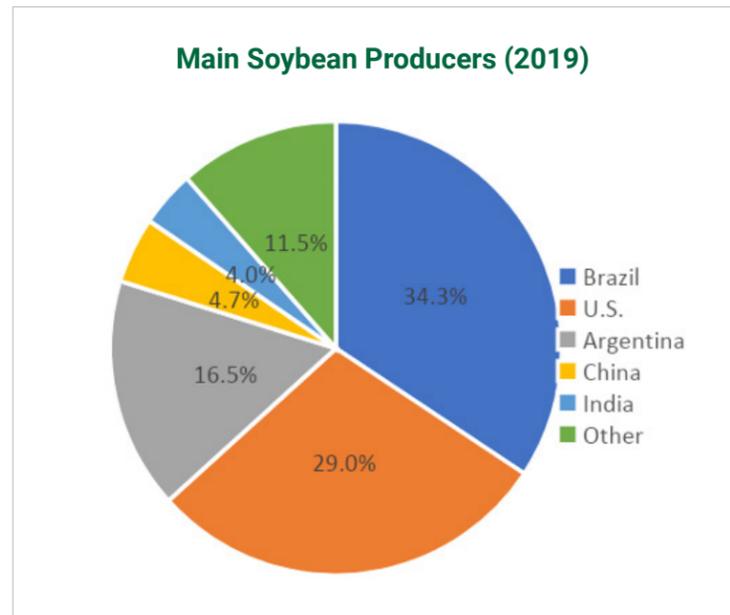


Soy Supply and Demand

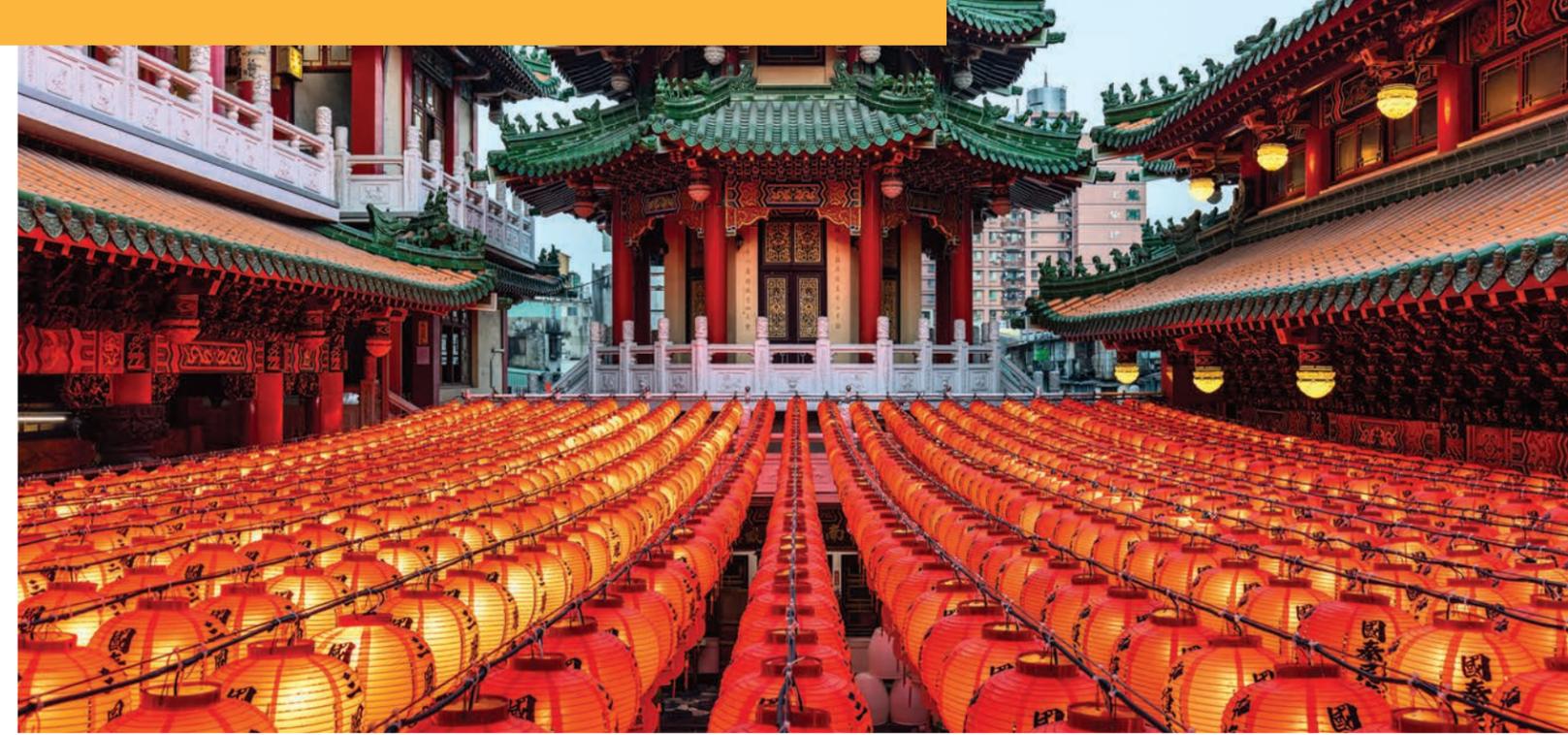
In recent years, the global plant-based eating trend has risen, and the number of people who switch from meat to vegetarian or are more inclined to eat less meat has been on the rise. In addition, more than 3 million Taiwanese people eat vegetarian food.

The high-quality protein provided by soybeans is comparable to meat. Also, diversified soy products have been developed after years of hard work by soy products manufacturers, providing vegetarians with diverse choices in Taiwan. In order to provide high-quality soybeans, Taiwanese soybean importers have signed contracts with suppliers in the United States to purchase identity-preserved (IP) soybeans by May every year. Importers have also invested in cold storage systems for soybeans. This elaboration on the soybean market in Taiwan provides an overview of procurement procedures, storage and transportation methods.

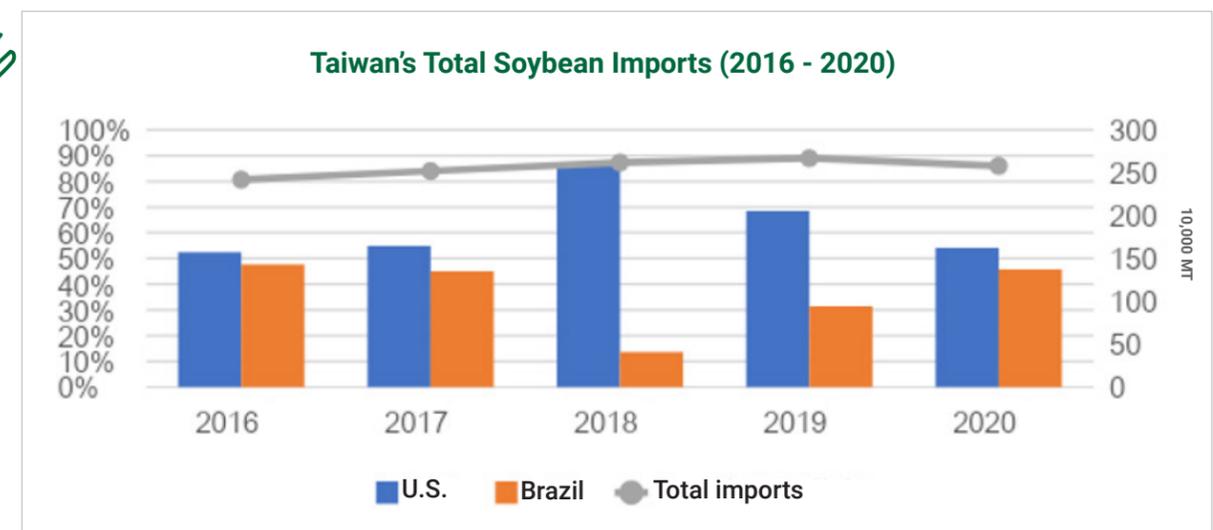
Soybeans are one of the world's major bulk grains. According to the Food and Agriculture Organization (FAO) of the United Nations, in 2019 soybeans were cultivated on 120.5 million ha (297.8 million acres) worldwide, and global soybean production reached 336.33 MMT (12.36 billion bushels). The main producers of soybeans include Brazil with 114.3 MMT (4.2 billion bushels), or 34.3% of production, the United States with 96.8 MMT (3.6 billion bushels) or 29%, Argentina with 55.3 MMT (2 billion bushels) or 16.5%, China with 15.7 MMT (576.8 million bushels) or 4.7% and India with 13.3 MMT (488.6 million bushels) or 4%. These five countries account for 88.5% of world production, as shown in the Main Soybean Producers chart. The United States, Brazil and Argentina are the biggest producers, while China is the largest importer, accounting for approximately 60% of the global soybean trade volume and a third of the world's demand. As the world's largest soybean consumer, China's demand has a strong influence on global prices.



Source: FAO



In the last five years, Taiwan has imported 2.5 MMT (91.6 million bushels) of soybeans annually, predominantly from the United States and Brazil as shown in the Soybean Import chart below. More than 90% of the soybeans are crushed to produce soybean meal and soybean oil, highlighting its enormous economic value. Soybean meal, serves as a protein source for livestock feed, while soybean oil is a common cooking oil in Taiwan. Soybeans are also the world's second largest source of plant-based oil, following palm oil, and soybean oil widely used in food for human consumption, such as salad dressings and margarines, as well as chemical and industrial uses like paints, soaps and pesticides.

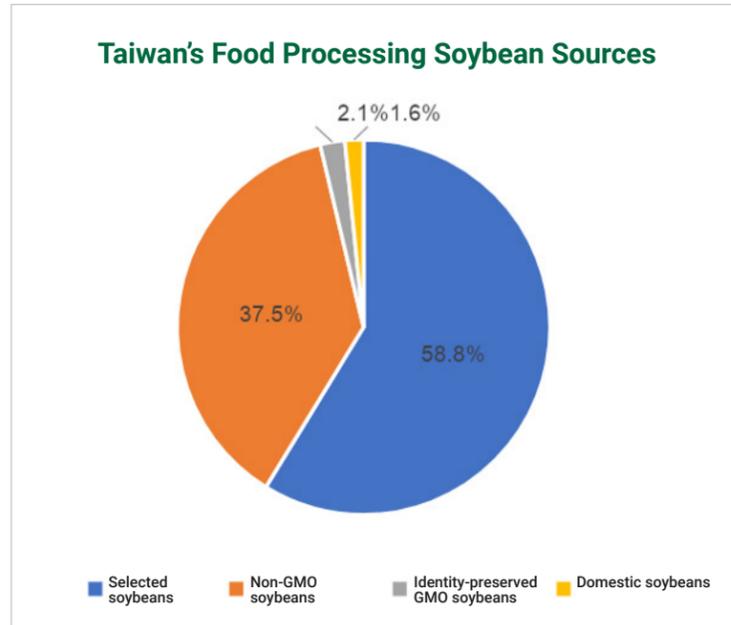


Source: Taiwan Customs Administration, Ministry of Finance

Source: - Taiwan: Oilseeds and Products Annual, U.S. Department of Agriculture Foreign Agricultural Service

In addition to its value as a feed and oil, soybeans play an important role in Asian diets. In the 2020 Food and Supply Utilization Yearbook, an annual report published by the Council of Agriculture (COA), Executive Yuan, it can be deduced from 10% of the amount of soybeans processed in Taiwan that the annual demand for soybeans used for soy foods, including tofu, dried tofu, soy milk, meat alternatives, miso, etc., is projected at 230,000 MT (8.45 million bushels). This is close to the 220,000 MT (8.08 million bushels) in market demand estimated on the retail end. Following the series of food-safety scandals in late 2014, Taiwan saw a significant boost in the market for non-genetically modified organism (non-GMO) soybeans.

However, most of Taiwan's current market share, roughly 60%, comprises selected soybeans, specifically GMO soybeans from the United States that have been screened, cleaned and removed of foreign material, and repackaged into 30-kg (66-pound) or 60-kg (132-pound) bags. According to sales and industry figures, Taiwan's annual demand for selected soybeans is approximately 132,000 MT (4.84 million bushels), non-GMO soybeans at 84,000 MT (3.09 million bushels), IP GMO soybeans at 5,000 MT (183,700 bushels), and domestic soybeans at 3,000 MT (110,200 bushels). Domestic production in 2020 was 4,400 MT (161,600 bushels), of which 60 to 70% is food-grade. See the Taiwan's Food Processing Soybean Sources chart for details.



Source: Customs Administration, Ministry of Finance; 2020 Food and Supply Utilization Yearbook, Council of Agriculture

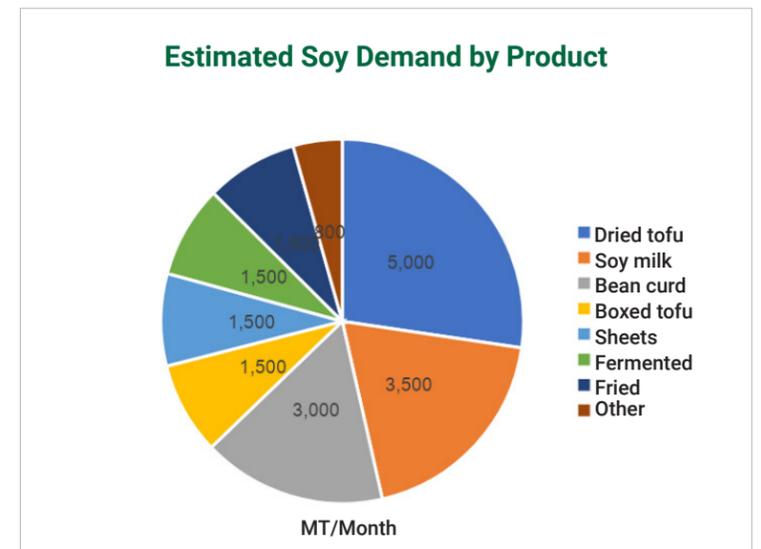
Main Processing Methods of Traditional Soy Foods



No studies are available in Taiwan regarding the ratio of different processed soy foods among all soy food products. Market share estimates are made for products based on the demand for soybeans from various processing plants.

Soy product categories:

1. Dried tofu: Dried bean curd, black dried tofu
2. Bean curd: Hard bean curd tofu, frozen tofu, fermented bean curd
3. Sheets: Tofu noodles, soy-meat substitute, dried tofu snacks
4. Fermented: Miso, soy sauce, tempeh
5. Fried: Marinated bean curd, triangle-fried tofu, fried tofu skin
6. Other: Hundred-layer tofu, natto, bean sprouts



INDUSTRY OVERVIEW

DEMAND SIDE

Soybeans are an important plant-based protein source. The Taiwanese people may not consume whole soybeans, but a wide variety of processed soy foods make up a considerable part of their everyday diet. They drink soy milk at breakfast shops, eat frozen tofu and deep-fried tofu skin with hot pot and consume tofu noodles and sweet bean curd in their lunchboxes. At night markets, they snack on braised dried tofu, marinated bean curd, dried tofu, tofu pudding, stinky tofu, triangle fried tofu, hundred-layer tofu, soy-meat substitute and five-spice tofu. Soy foods are an inseparable part of their lives.

In traditional soy food processing, the main procedures include soaking, grinding, heat treatment, filtration, cooking to destroy bacteria, adding coagulants, breaking, molding, dewatering, preliminary processing or cutting, and frying. See the Processing Methods chart for more details.

Sources:
 -Taiwan: Oilseeds and Products Annual, U.S. Department of Agriculture Foreign Agricultural Service
 - USSEC staff and industry feedback

SUPPLY SIDE

Taiwan's two main suppliers of selected soybeans are TTET Union and Central Union Oil Corporation, who together meet the vast majority of demand. The larger the amount of raw soybeans they screen, the higher the quality of screened soybeans. Screening selects a specific volume of the highest quality soybeans. Statically, the larger the volume of raw soybeans screened, the smaller the percentage needed to fulfill the given volume, and the more likely the selected soybeans will be more uniform based on quality standards. This perfectly illustrates the concept of economies of scale.

Due to the low entry barrier to supplying non-GMO soybeans, various importers and foreign suppliers are fighting for market share. According to the Bureau of Foreign Trade, Ministry of Economic Affairs, a total of 113 companies imported non-GMO soybeans into Taiwan this year. Although this is a decrease from the more than 160 importers from three years prior, this is still a sign of a highly competitive market.



PROCUREMENT PROCESS

Taiwan's main mode of soybean import is via shipping, which can be differentiated into container ships, bulk carriers and oil tanks/LPG carriers, as shown in the table. Most bulk carriers transport unpackaged bulk cargo, such as grains, cement, coal, iron ore and bauxite ore. Of these, iron ore, coal and grains make up the majority of cargo.

Types of Shipping Vessels

Type	Main types of cargo
Container Ships	Various finished and semi-finished products
Bulk Carriers	Grains, cement, coal, iron ore, bauxite ore, etc.
Oil Tanks/LPG Carrier	Petroleum, liquified petroleum gas, liquified natural gas

Bulk carriers are segregated into four major size categories based on their deadweight tonnage (DWT), as detailed in the second table. Bulk carriers differ by typical cargo, pricing depends on global economic conditions and merchant fleets may have varying numbers and types of vessels depending on their needs.

Size Categories of Bulk Carriers

Category	Deadweight tonnage (tons)	Main cargo	Shipping rate
Cape size	> 100,000	Coal, iron ore, phosphate ore, bauxite ore, and other raw materials	BCI
Panamax	60,000 to 100,000	Basic commodities and grains; will also transport coal and iron ore	BPI
Supramax / Handymax	40,000 to 60,000	Grains, cement, wood, sawdust, fertilizer, pulp, etc.	BSI
Handysize	10,000 to 40,000		BHSI

Trends, or arrival times of commodity shipments, may cause a catastrophic error. Taiwan mainly imports soybeans through cooperative procurement, where the needs of member buyers are aggregated and procured in the unit of one bulk carrier, lowering costs and risk to all. Oil crushers and feed producers largely adopt this method. The basis for freight calculation is determined by open tender or price negotiation. To really minimize costs, it's important to have a good eye and sense of timing on soybean futures. Futures orders are determined by the price on the Chicago Mercantile Exchange (CME), and once the quantity is determined, the shipping vessel will set out with its cargo.

During the period when the order is first submitted through five days before the bulk carrier pulls into a Taiwanese port, buyers can decide whether to meet their demands in one order, or to put in a series of orders based on daily ups and downs in pricing. All that matters is that all of the cargo has been ordered by the time the ship arrives in port. Additionally, some raw soybeans and non-GMO soybeans are transported by container ships, due in part to the fact that container ships are occasionally more competitively priced than bulk carriers, and in part due to the fact the raw soybean quality determines the quality of final products. The procurement method is quite similar to bulk carriers: First the basis is determined, and then the cost is decided by futures orders. Some suppliers even offer cost and freight (C&F) and cost, insurance and freight (CIF) prices, allowing buyers to avoid the hassle of additional paperwork.



SHIPPING AND STORAGE PROCESS

After being harvested in the U.S. Midwest, the raw soybeans are transported to ports along the Mississippi River via trains and trucks, then sent by barge to the Gulf of Mexico, where they are loaded into giant bulk carriers. After 30 to 40 days at sea, through the Panama Canal and across the vastness of the Pacific Ocean, the cargo finally arrives in Taiwan. Some soybeans arrive by container ships from the east or west coasts of the United States. Non-GMO soybeans enter the Taiwan market in 30-kg (66-pound) paper bags, after having been processed, screened, packaged and transported by container ships, although some are packaged in big bags of 1 MT and sent by container or in bags. As mentioned before, because we have not reached economies of scale, unlike Korea and Japan, Taiwan is currently unable to screen non-GMO soybeans imported by bulk carriers after arrival.

At present, the soybeans imported by two Taiwanese soybean oil producers conform to Grade 2 by the National Standards of the Republic of China (CNS). As shown in the Standards for Soybean chart below, food-grade selected soybeans that have been screened and selected generally conform to the standards of Grade 1. However, because non-GMO soybeans are sourced from so many brands and suppliers, each with their own different standards for assessment, the Quality Assessment Standards table below shows only the quality assessment standards of non-GMO soybeans at Central Union Oil Corp.

Chinese National Standards for Soybeans

Grade	Minimum bulk density (g)	Moisture	Splits	Maximum allowance %			
				Damaged kernels		Foreign material	Beans of other color
				Total	Heat-damaged kernels		
1	730	13.0	10	2.0	0.2	1.0	1.0
2	700	14.0	20	3.0	0.5	2.0	2.0
3	670	14.0	30	5.0	1.0	3.0	5.0
4	630	14.0	40	8.0	3.0	5.0	10.0

Source: National Standards of the Republic of China (CNS), Bureau of Standards, Metrology, and Inspection, Ministry of Economic Affairs

Central Union Oil Corp. Soybean Quality Assessment Standards

Quality	
Protein	40% Min.
Moisture	13.5% Max.
Damage	1.0% Max.
Split	1.0% Max.
Foreign Materials	1.0% Max.
Stone Beans	0.5% Max.
Wrinkled Beans	1.0% Max.
Beans of Other Color	1.0% Max.
Purity	99.1% Min.
Cleaning	Over a 12/64 Slot

Source: Central Union Oil Corp



In Taiwan, the shipping and storage of soybeans is generally conducted in bulk or in 1-MT (1.1 U.S.-ton) bags for larger food processing plants; in 60-kg (132-pound) bags of selected soybeans and 30-kg (66-pound) bags of non-GMO soybeans for small to midsize processing plants; and in 30-kg (66-pound) bags of selected soybeans or non-GMO soybeans for breakfast shops and grocery stores. The comparison of different types of packaging and consumer features are shown in the following table.

Packaging and Consumer Features

Soybean	Packaging type	Consumers	Consumption
Selected soybeans	30-kg PP bag	Breakfast shops, grocery stores	< 120 kg/day
	60-kg PP bag	Small to midsize soy food processing plants	120 kg~3,000 kg/day
	In bulk or 1-MT bags	Large soy food processing plants	> 3,000 kg/day
Non-GMO soybeans	30-kg paper bag	Soy food retailers	
	1-MT bags	Mid to large soy food processing plants	> 600 kg/day
Organic soybeans	30-kg paper bag	Organic stores	

Source: Industry feedback

On average, each Taiwanese person consumes 11 kg (24 pounds) of soybeans a year, not including soybean oil, more than neighboring China and Japan. However, producers of soy products will likely not see opportunities in significant growth, as any growth may only be in the margins of choosing between selected soybeans and non-GMO soybeans. But based on customs data for the past five years, Taiwan's supply of soybeans is holding steady, meaning that the chances of explosive growth in non-GMO soybeans looks thin.

Although GMO soybeans imported to Taiwan are strictly regulated by the Council of Agriculture and the Ministry of Health and Welfare, many countries have approved their cultivation or importation. In fact, GMO soybeans are more insect- and herbicide-resistant, thereby decreasing the environmental impact associated with pesticide use. The advancement and adoption of biotechnology has also lowered production costs of genetically engineered soybeans compared to those produced through traditional means, making it both economic and beneficial. By understanding the science and expertise and learning about genetic engineering, Taiwan can establish correct knowledge of food safety and protect its rights to safe food.

Source: - Taiwan: Oilseeds and Products Annual, U.S. Department of Agriculture Foreign Agricultural Service



Soy Food Market Development

In 2020, 250,000 MT (9.2 million bushels) of soybeans were consumed as food products in Taiwan, including 80,000 MT (2.9 million bushels) of non-GMO soybeans and very small amounts of organic soybeans. Due to historical and cultural factors, the varieties of soybean food products were mostly developed and manufactured in Taiwan. Hence, people of Taiwan are enthusiastic about soybean food most of the time.

There are more than 200 soybean food manufacturers in Taiwan. They operate at different levels of productivity; however, they all confront a similar difficulty.

The soybean food industry is weakening, with less support and resources provided by Taiwan's government agencies. The government agencies have no control of precise statistics regarding the industry.

This section of the report provides an overall background regarding Taiwan's soybean food industry, market situation, issues and counter measures. Products, technologies and future development will be elaborated, as well.

It is widely recognized that global soybean food demand is growing quickly, and a reliable supply of quality soybeans is required. USSEC and U.S. Soy works to bring farmers, processors, certified agencies, research labs and manufactures together to build an integrated, sustainable soybean industry.

Taiwan is an aging society where issues such as healthier lifestyles, exercise and environmental sustainability are rapidly gaining prominence. Plant protein, of which soybeans are the main source, is an important part of these trends.

Many clinical studies have demonstrated that soybeans contain various beneficial compounds for the human body that can help prevent diseases common in modern society. This has contributed to the growing demand for soybeans and an era of new soybean products.

The humble soybean packs a nutritional punch. However, soybeans are rarely eaten directly in everyday meals; they are usually consumed in the form of various processed soybean products. Cholesterol-free, containing protein and easy to process, soybeans have become an important food source for people of all ages.

Within the soybean processing field, tofu manufacturing has a relatively low barrier to entry, and therefore, it has a more complex ecosystem of producers. These producers should consider the societal view of tofu, the state of the current industry and future developments and goals.

Taiwan has a wide variety of processed soybean products. The diverse selection of options is popular with consumers.



Imports of GMO and Non-GMO Soybeans to Taiwan (2015-2019)

Year	Non-GMO	GMO	Total (MT)	Non-GMO %
2015	71,784	2,618,070	2,689,854	2.67%
2016	90,573	2,348,790	2,439,363	3.71%
2017	99,279	2,446,735	2,546,014	3.90%
2018	80,357	2,546,986	2,627,343	3.06%
2019	85,532	2,589,283	2,674,815	3.20%

Source: Taiwan Ministry of Finance Customs Administration Database / Lookup Date: Feb. 25, 2020 / Compiled by No GMO Lunch

Types of Soybean Products

大豆
DÀ DÒU

Soybean is a species of legume whose beans are rich in protein, giving in the moniker "the meat of the fields." Soybeans picked before ripened can be made into edamame. Ripened beans are called "yellow beans" (huangdou) or "black beans" (heidou) in Chinese based on their color, though both come from the same plant.

Common soybean products

- Tofu**: The most common soybean product, could be made into oil tofu, stinky tofu, fried tofu, frozen tofu, etc.
- Natto**: A common traditional food in Japan. A love-it-or-hate-it food due to its strong odor.
- Tofu pudding (doughua)**: Known as doufunao when only semi-congealed, and doughua when fully congealed.
- Dried tofu (dougufan)**: Made by dehydrating and compressing tofu, often used in cooking.
- Tofu skin (doupil/fuzhu/qianzhang)**: Made by heating soy milk and then skimming off and processing the dregs that float to the top. A wide variety of variations.
- Soy milk (baijiang / qingjiang)**: Soybeans ground into liquid. Variants may resemble dairy milk more or less.
- Soy Meat Substitute (suji)**: A common ingredient in vegetarian food so named because of its texture similar to chicken.
- Soybean oil**: Extracted from soybeans. Used in food and also printing.
- Soybean dates (douzao)**: Often seen in lunchboxes and with breakfast porridge. Many people do not know what it is actually called and just say "the red thing".
- Miso**: A Japanese bean sauce made with fermented beans, rice, and wheat.
- Soy sauce (jiangyou)**: Made with soybeans fermented with a starter known as qu, water, and salt.
- Fermented tofu (dofuru / nanru / maoru)**: Made with tofu that is fermented, brined, and reprocessed.
- Totoro**

Source: <https://health.ettoday.net/news/1159262>

Sources:
 - Taiwan: Oilseeds and Products Annual, U.S. Department of Agriculture Foreign Agricultural Service
 - Shadow demand, or unmet demand, cannot be accurately shown. It must be based on expert feedback. USSEC staff both provides and receives this industry insight and feedback.

STATE OF THE INDUSTRY

The culture of tofu-making originated in Han-dynasty China, with the invention of tofu credited to Liu An, Prince of Huainan, 179 to 122 BCE. The craft, along with the food culture associated with tofu, was passed down through the generations to this day.

Taiwan is home to a wide variety of soybean processing manufacturers, existing in different ecosystems and at varying levels of market competitiveness. An important differentiating factor is whether a company targets domestic or export markets. Taiwan's processed food exporters have grown and transformed as food safety has become an increasingly prominent issue internationally. Exporters have received international certifications to access worldwide markets. In contrast, producers for domestic markets vary greatly in quality.

The past decade has seen waves of panic over GMO soybeans among the general public, driven by misinformation. This has caused severe pressure on companies and factories that use GMO soybeans, with some going out of business as a result. The controversy has also posed difficult dilemmas for companies that use both GMO and non-GMO soybeans.

In response to the discourse between GMO and non-GMO supporters, Taiwan's government set stricter standards for GMO labeling than other countries in Asia. Compliance with these standards led to an period of slower sales for soybean processing companies.

Fortunately, media attention has been diverted to other topics. With the issue fading from consumers' minds, the choice between GMO and non-GMO soybean products can once again be a matter of individual preference and awareness, based on product labeling.

However, the industry is facing more emerging challenges, including inconsistent quality and unstable supply due to climate change, the effects of the COVID-19 pandemic, and problems of shipping materials to Taiwan. These crises cannot be ignored.

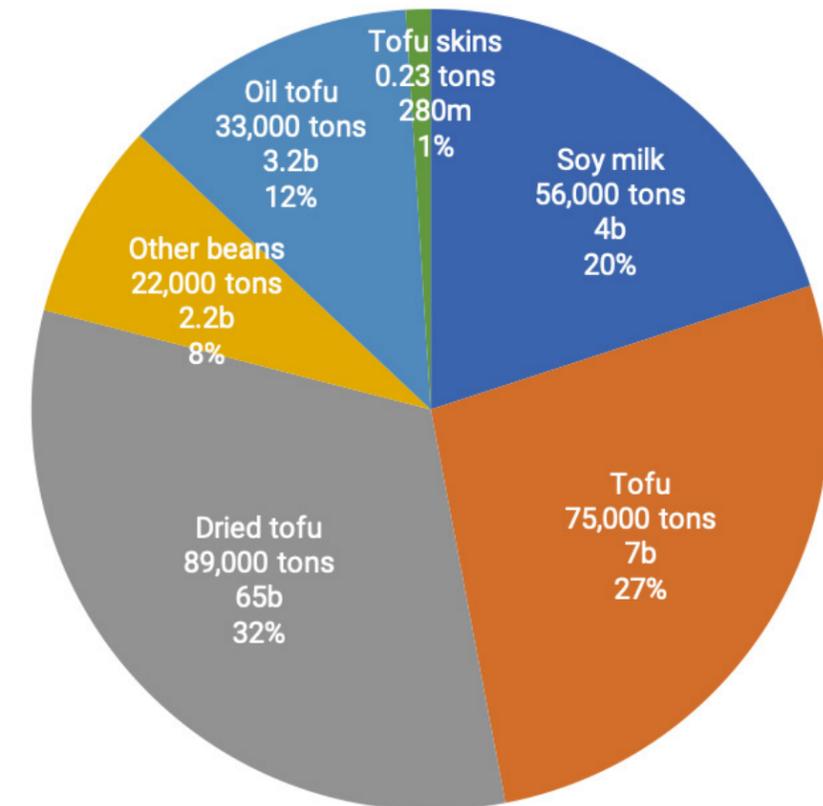
In this era of low profit margins and the issues described above, it is difficult for companies on the supply chain to achieve high performance. Traditional tofu producers are particularly hard-hit.

The largest market channel for soybean products in Taiwan is traditional markets, where the products are sold to families and businesses. Restaurants and snack food producers are secondary channels.

The supply of soybeans has been flat in recent years. Just 9 to 10% of total soybean imports are used for food products, not including soybean oil. Significant growth on the sales side will be difficult. The only likely point of growth will be diversification with new products that use soybeans and development to use soybeans as a lower-cost alternative in other products.



Soybean Products Volume, Market Share and Projected Value



Sources:
 - Taiwan: Oilseeds and Products Annual, U.S. Department of Agriculture Foreign Agricultural Service
 - USSEC staff and industry feedback

INNOVATION

In low-margin, mature markets, traditional products like soybeans need attention-grabbing innovations to sell. In addition to developing innovative new products, companies must also work diligently to improve their operations and management.

In recent years, companies have invested in their own supply chain fleets and management systems to diversify sales. They are also increasingly developing their own sales channels to shake off the market malaise. This has led to more brick-and-mortar stores and more innovative products. For example, blending soy milk with tea provides a unique flavor compared to tea drinks with dairy milk. Soybeans are also used in plant-based protein products targeted at middle-aged and older consumers, as well in soft drink products competing with sodas and juices.

New soy milk specialty shops are springing up all over. Brick-and-mortar stores specializing in soybean products are expanding their presence in Taiwan's cities, providing specialization, diversity and convenience. These stores are able to set much higher prices than what traditional producers can sell through the usual sales channels.

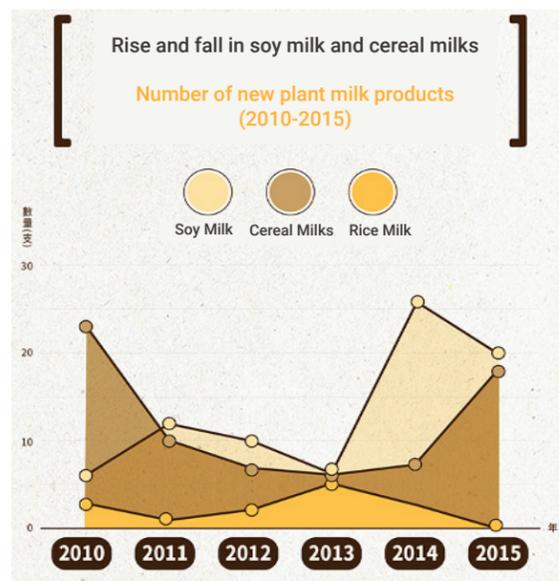
Soybean Product Specialty Stores



Source: <https://food.suiis.com/main.aspx?id=700100235>



Growth in Soybean Drinks



Source: Food Industry Research and Development Institute, compiled by FoodNext



Source: <https://www.foodnext.net/issue/paper/4593743575>

FUTURE DEVELOPMENT

Many uncertainties and challenges lie ahead for the soybean product market, in particular the challenge of innovation. From simple processing to further biotechnology or circular economy applications, innovation could add great value to the humble crop.

SOYBEAN PROCESSING

The tofu industry uses several different processes to grind beans, extract soy milk and heat and remove the dregs, producing tofu in a variety of textures, as well as other products taking very different forms.

The dregs left behind in the production of tofu and soy milk are known as okara. It is low in value and unappealing in texture, but it has nutrients and components such as protein, calcium and iron, and it is low in saturated fat, making it a potential ingredient in new food products. While okara is used in many dishes in southeast Asia, the current utilization and production rate is not ideal.

What to do with okara is an important challenge that the industry must confront now and in the future. For large-scale soybean processing companies, this is an important issue of risk management. It also will be a basic environmental question that must be adequately answered for sustainable operations.

Possible channels for disposing of okara including drying and processing, fertilizer and fermentation for animal agriculture. However, all of these methods require expanded investments or collaboration with other companies. Small and medium enterprises or micro-size producers may be unwilling or unable to face this issue.

BIOTECHNOLOGY

Adding carefully selected microbes into the processing of soy milk, tofu or okara allows the soybeans to be broken down and fermented, so that the nutrients can be concentrated and the molecules shrunken to maximize bioavailability.

Eating food does not ensure that the nutrients are completely absorbed by the body. Specific fermenting techniques allow the most important molecules to shrink down and become more easily absorbed by the human gut. With high-quality probiotics, this could produce activated enzymes that benefit human health.

Sources:
 - Okara, nutritionvalue.org
 - Japan Tofu Association, Effects, Nutritional Value of Okara

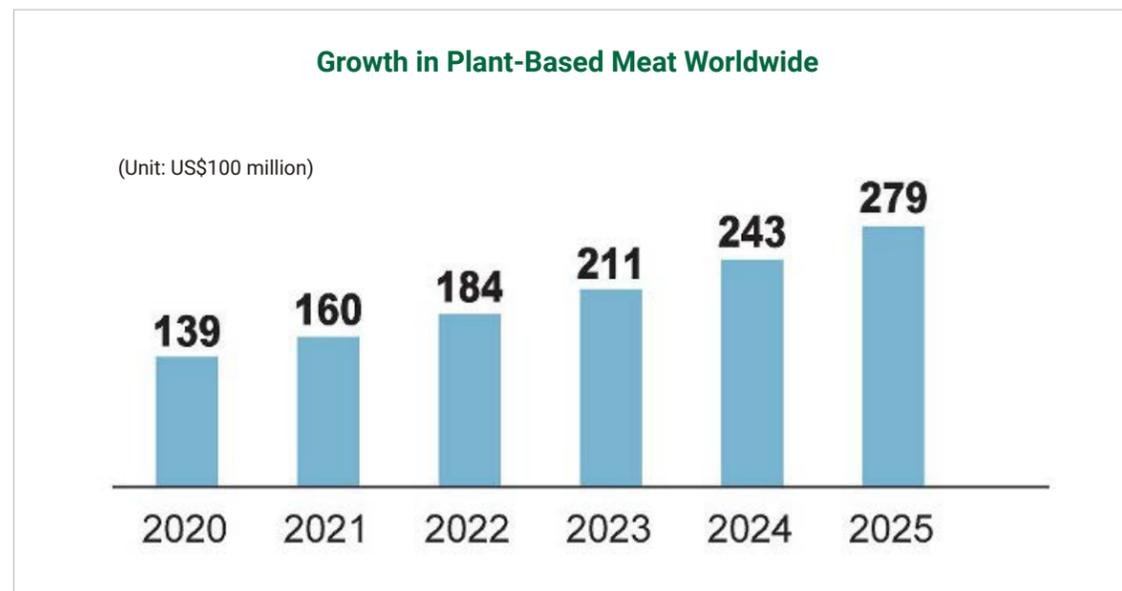
VALUE-ADDED USES OF OKARA IN BIOTECHNOLOGY

- High-end: Providing raw materials for personal care products such as soy facial washes. Japan is the world leader in biofermenting technology for food products, and a possible model to learn from.
- Mid-grade: Use in processed food products, bakery products, fried foods, hamburger patties, dumplings, fish paste and minced meat products.
- Low-end: The agriculture industry uses liquid fertilizer, which releases amino acids that help plant growth and improve fruit development. Composted okara can be used in soil mixtures or as an organic fertilizer.

In animal husbandry, fermented okara can break down proteinase inhibitors, improving the utilization of proteins.

From a circular economy perspective, as the world turns its attention to environmental and food issues, plant-based meats are gaining awareness in the non-religious vegetarian and younger market segments. The feed conversion ratio of various meats and meat alternatives is becoming a topic of discussion. With these global trends, plant-based meats will become an major area of development.

In these circumstances, the Soy Sustainability Assurance Protocol (SSAP) promoted by U.S. Soy is a good way to encourage support among Taiwanese consumers.



Note: All numbers 2021 and after are projected; reflects Apr 2021 data
Source: Markets and Markets AXA, compiled by Taishin Investment Trust

THE CIRCULAR ECONOMY

This time of profound worldwide change is also a great opportunity for companies to diversify their operations, creating more value using less resources.

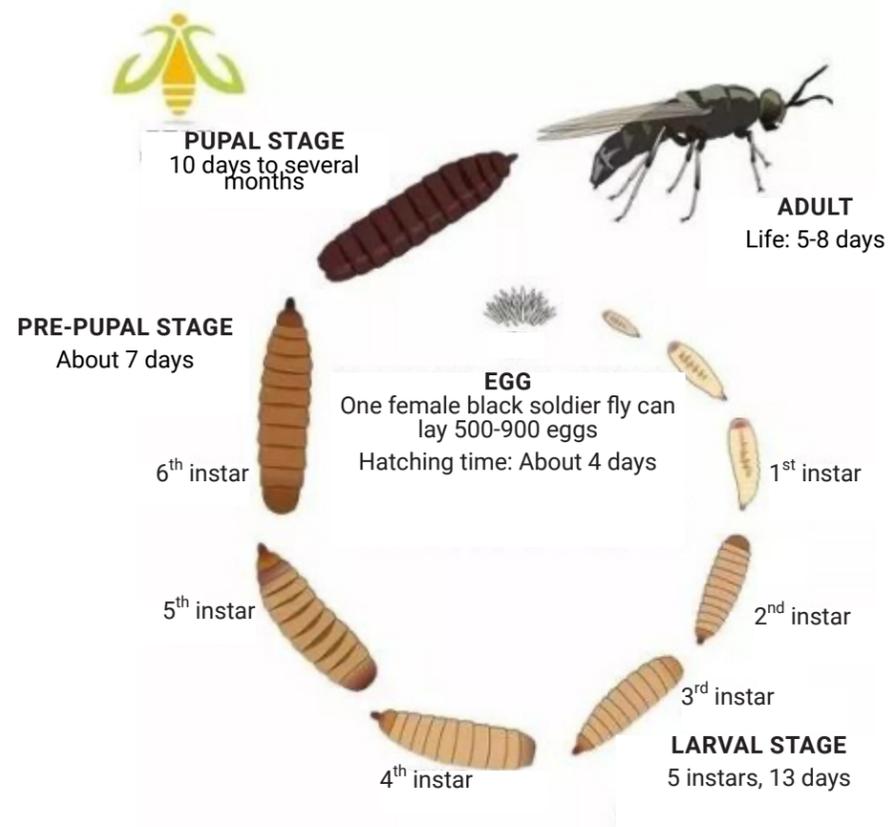
Circular economy applications for soybean processing allow producers to maximize the value of soybeans through introducing high-value products.

“Reuse without waste” and “everything has a use” are the key maxims for soybean processors in the circular economy field. This extends to the wastewater produced in the manufacturing process, which presents another major obstacle to sustainable operations.

This is an extremely difficult challenge, and a vulnerability for the soybean processing industry. The wastewater issue puts the industry at a disadvantage; however, this disadvantage could be turned into a strength through learning. Investments into research and development (R&D), hardware and talent could turn wastewater into another product for the circular economy. With the appropriate treatment facilities, wastewater from soybean processing could meet national standards. This wastewater, full of trace elements from the production process, could even be used in aquaculture or hydroponic vegetables.

The use of okara in the farming of the black soldier fly, *Hermetia illucens*, has been planned for years. The model has been successfully used for community enterprises, and the push for environmentally friendly agriculture could lead to widespread commercialization.

Lifecycle of the Black Soldier Fly



Source: https://twgreatdaily.com/mrtsd24BMH2_cNUgxbts.html

The black soldier fly can serve as a source of protein with many uses in agriculture and animal husbandry.

Live black soldier flies can be used in chicken feed. Dried adult black soldier flies can be used as a source of protein in aquaculture or animal feed. Black soldier flies are also an ideal way to eliminate okara and kitchen scraps.



ADDITIONAL PROSPECTS AND CONCERNS

To stem an outbreak of African swine fever (ASF), Taiwan's government banned the use of kitchen scraps to feed pigs several years ago. The ban caused a panic among soybean processing companies.

The spread of ASF was mainly attributed to kitchen scraps, or leftover food from restaurants and homes, most of which contain leftover meats. However, most pig farmers mixed in okara with the kitchen scraps used to feed their pigs, leading some to mistakenly believe that okara could also spread ASF.

Taiwan's government has clarified the issue, explicitly classifying okara as "plant-based scraps" to differentiate it from kitchen scraps with meat mixed in. With effective management in normal times, the disposal of okara no longer poses an issue. However, due to the nature of the tofu industry, the government may still crack down on using okara as pig feed if an ASF outbreak does occur. This poses a risk for the disposal of okara.

To sum up the above, stable and moderate growth is projected for soybean products and the tofu industry in the future. As companies move up the sales chain, trends such as Taiwan's aging society, growing awareness of environmental issues, the fashion for plant-based meats and the development of new products could all create momentum for demand and growth in soybean products.

In the global market, U.S. soybean growers are more consistent in supply and more advanced in technology compared to those of other countries. If uncertainties in the various steps in the chain between the growers, processing plants and end consumers could be eliminated, and the various parts of the industry chain brought together to form a soybean development ecosystem based on sustainable concepts, then its competitiveness will be unmatched.



Plant-Based Meat

Following the Industrial Revolution, the global average temperature has risen 1°C (1.8°F) higher than pre-industrial levels. The Intergovernmental Panel on Climate Change (IPCC) of the United Nations issued a special report on the risk of a global average temperature increase of 1.5°C (2.7°F), based on research from 91 experts and citations from more than 6,000 research reports. The report pointed out potential biological hazards due to drastic changes in the environment if the temperature rises more than 1.5°C to 2°C (2.7°F to 3.6°F).

MARKET INTRODUCTION

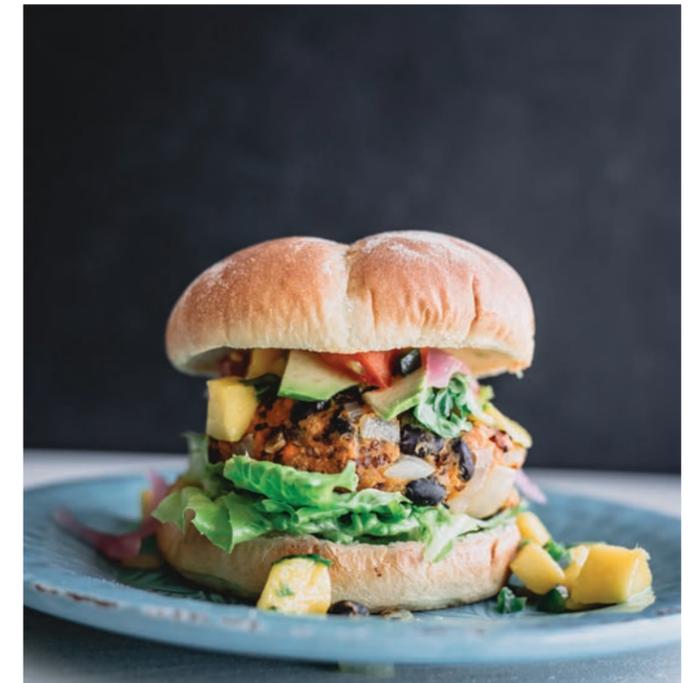
In May 2019, the U.S. plant-based meat company Beyond Meat had its initial public offering. The stock price surged from \$25 to reach approximately \$239 in two months, hitting a record high. Invested in by many celebrities and well-known venture capital firms, the company quickly set off an artificial meat rage around the world.

According to Euromonitor International, a global market research company, about 42% of the world population eats flexitarian as of 2020. Flexitarian is a plant-based diet that claims to reduce carbon footprint and improve health with an eating regime that's mostly vegetarian, yet allows for the occasional meat dish. In the same year, the vegetarian population of Taiwan reached about 3 million, or approximately 13% of the total population, ranking second with of Israel, behind world-leader India, where 38% of the population is vegetarian.

Taiwan's plant-based meat technology among the most advanced in Asia. Due to the number of people who adopt vegetarian lifestyles for religious reasons, Taiwan developed artificial vegetarian meat, complete with fibers to recreate muscle tissue, by the late 20th century. This was accomplished by extruding soy protein and adding powdered egg and whey as binding agents.

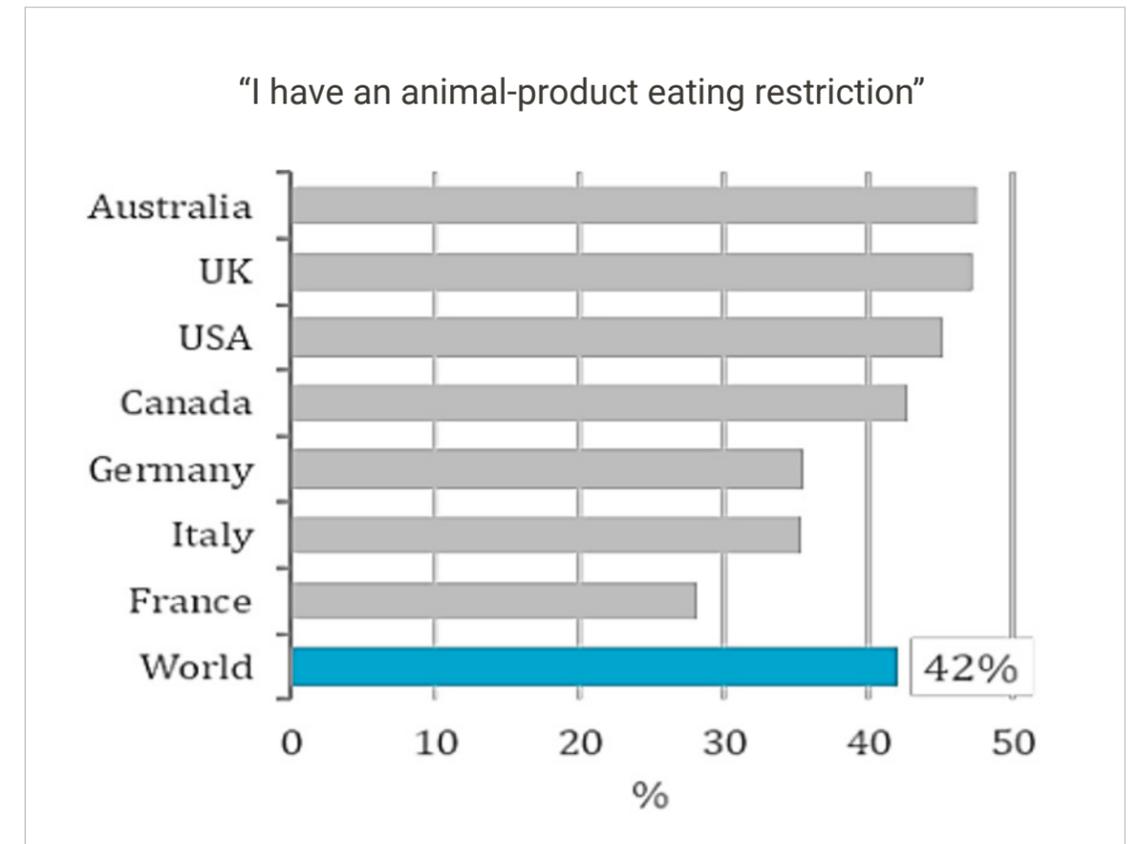
With the advancement of the food industry and changes in consumer demand, current technology allows creation of 100% vegan plant-based meat, free from food additives and with a layered, fibrous structure with a bloody color and juicy appearance. The popularity of artificial meat and significant increase in the flexitarian population have attracted many meat manufacturers in Taiwan to invest in developing plant-based meat. Trends indicate it will be in high demand with both vegetarians and flexitarians.

Crops that contain plant-based protein, such as soybeans and peas, are common sources to develop alternative proteins.





Flexitarian Consumers Restricting Animal-Based Products (2020)



Source: Euromonitor International, The Rise of Vegan and Vegetarian Food, Nov. 2020



TAIWAN'S VEGETARIAN EVOLUTION

In terms of percentage of vegetarians per country, several Asian countries rank highly. Many people choose to forgo meat due to Buddhist beliefs. In fact, the term for mock meat has been found as far back as the Song Dynasty, where it was recorded that soy was used to create meat-like food.

From 1940 to post-1990s, Taiwan's food industry, affected by economic changes and shifts in the environment, greatly impacted the dietary habits of Taiwanese citizens. This timeline can be divided into three periods. From 1940 to 1970, the food industry was very export-oriented, led by the sugar industry and the canned food industry. Canned food exports declined in the late 1960s and were replaced by the rapidly developing frozen food industry. From 1970 to 1990, the focus shifted to domestic sales due to the rising costs of raw materials and labor. After 1990, with the increase in demand for leisure, education and health awareness due to growing per capita income and information access, vegetarian food products expanded from traditional soy foods to customized and highly functional bionic, or artificial, foods to fit consumer needs.

Traditionally, vegetarian protein sources primarily came from tofu, tofu skin and dried tofu. Later advances in food technology used molds to create meat alternatives from plant-based protein extracted from soybeans and wheat, as well as raw materials such as konjac, or konjac taro, and edible mushrooms. These are the most common ingredients used in mock meat or meat alternatives. The main market of vegetarian products expanded from Buddhist vegetarians, to those in the process of converting to vegetarianism due to recently held religious beliefs. With the creative use of molds and flavoring, plant-based meat products can now satisfy many desires. In Taiwan, products include vegetarian pork, beef, mutton, chicken, fish and sausages. For exports, the food industry has developed vegetarian ham and hot dogs, effectively mimicking the appearance and taste of practically all meat and processed meat products.

Vegan Hot Dog



Sources:
- The Industrial Heritage in Taiwan
- Taiwan's Economic Development



TECHNOLOGICAL DEVELOPMENTS

Starting in 1990, the vegetarian food industry experienced explosive growth in step with industrial progress, with a comprehensive industry structure including raw materials, processing, branding and distribution channels. Upstream importers obtained the raw material of plant-based protein from soybeans and wheat. This was then processed into the material for vegetarian meat through food extrusion. Midstream companies mostly comprise small and medium enterprises that flavor and mold the vegetarian meat. Some of these companies have established their own brand, or work on behalf of the restaurant industry or retail sales channels. Downstream retail channels largely include vendors in traditional markets, as well as wholesale and retail vegetarian food shops.

Technology has unlocked a whole world of possibilities for traditional vegetarian protein sources. Plant-based proteins were adopted to create protein alternatives for vegetarians, and the vegetarian food industry increasingly recognized the value of imported soy protein isolates rich in 7S and 11S. In 1994, the Food Industry Research and Development Institute (FIRDI) established the vegetarian meat development team, dedicated to food technology programs under the Department of Industrial Technology, Ministry of Economic Affairs. The development team used protein extracted from soybeans and wheat to produce the first type of vegetarian meat analogues in place of mock chicken made of tofu, dried tofu or tofu skin.

Vegetarian meat is composed of textured soy protein (TSP) made of soy protein and wheat protein, soy protein isolate, soy milk and flavoring. TSP is a highly processed food product made from concentrated plant protein isolate, other plant proteins and flour that has undergone extrusion cooking. This is a thermo-mechanical process, which combines high shear, high heat and high pressure to form a product that can be molded into various forms for different uses. Soy protein isolate is most commonly used in Taiwan.

Extrusion breaks apart the quaternary structure of plant proteins in a process called denaturation, and as the pressurized molten protein mixture exits the extruder, it is squeezed out into coarse fiber TSP that is dried for convenient storage. Because the fibers of TSP are bigger and more irregular compared to meat fibers, it undergoes a secondary processing where it is soaked, broken apart, pulped, emulsified and gelatinized according to soy protein's physicochemical properties, added with artificial flavoring and coagulating agents, and shaped by pouring into a mold that resembles a meat product. TSP includes soy protein pulp with coarse fiber additives, making it more accurately resemble meat compared to tofu, tofu skin and mock chicken. Using coagulating agents including either eggs or dairy, TSP became a predominant vegetarian product. Since 1994, TSP has been a common Taiwanese vegetarian meat product seen in local and foreign markets like Europe and the United States.

In the East, vegetarianism is closely linked to religious beliefs, while Western influences tend to come from international awareness of environmentalism, health, and animal welfare.

As of 2020, Taiwan has higher expectations for plant-based meat in terms of visual presentation, texture, taste and mouthfeel. The vegetarian lifestyle is decoupled from traditional religious views, and demand for plant-based and alternative proteins has shot up due to global environmental issues. Consumers prefer natural foods without additives, and look for certifications of sustainable foods and processes.

The number of flexitarians who care about global issues, personal health and low carbon emissions has skyrocketed, driving development of vegetarian meat products with fewer or no additives. Advances in extrusion technology are made to meet market demands, and these advances have led the way to developing TSP with finer fibers, like those in vegetarian chicken strips. This second-generation vegetarian meat greatly improves upon the chewiness and appearance compared to the first generation. Even better, it doesn't require secondary processes, radically reducing the number of additives and artificial flavoring added, allowing consumers to purchase ready-to-cook vegetarian meat.

Mock meat using plant-based protein has undergone a revolutionary change in appearance and texture, from dried TSP with single directional fiber that required secondary processing, to high-moisture vegetarian meat with coarse single directional fiber that doesn't require secondary processing. Now, third generation plant-based meat not only looks like meat, its thin, short fiber bundles provide a taste and texture similar to actual meat.

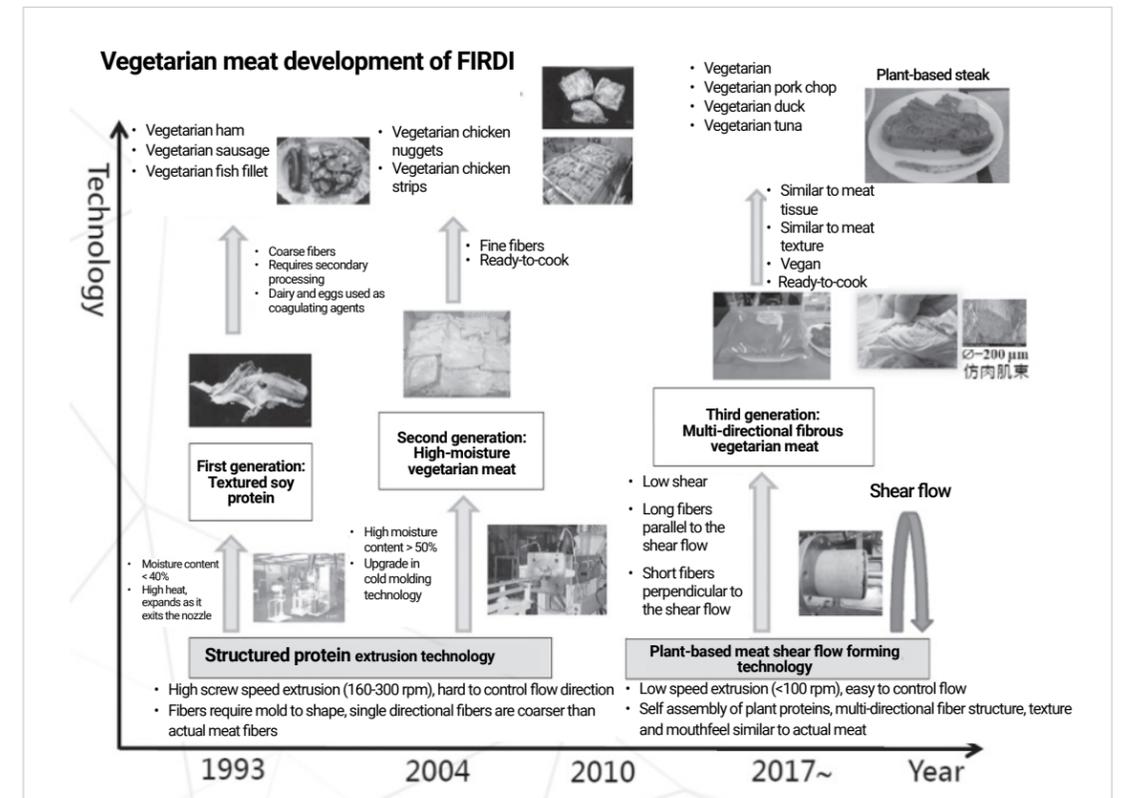
Textured Soy Protein with Coarse Fibers



High Moisture Vegetarian Chicken Strip



Evolution of Plant-Based Meat in Taiwan



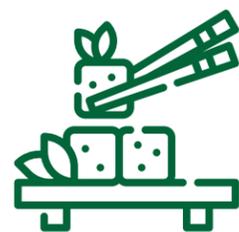
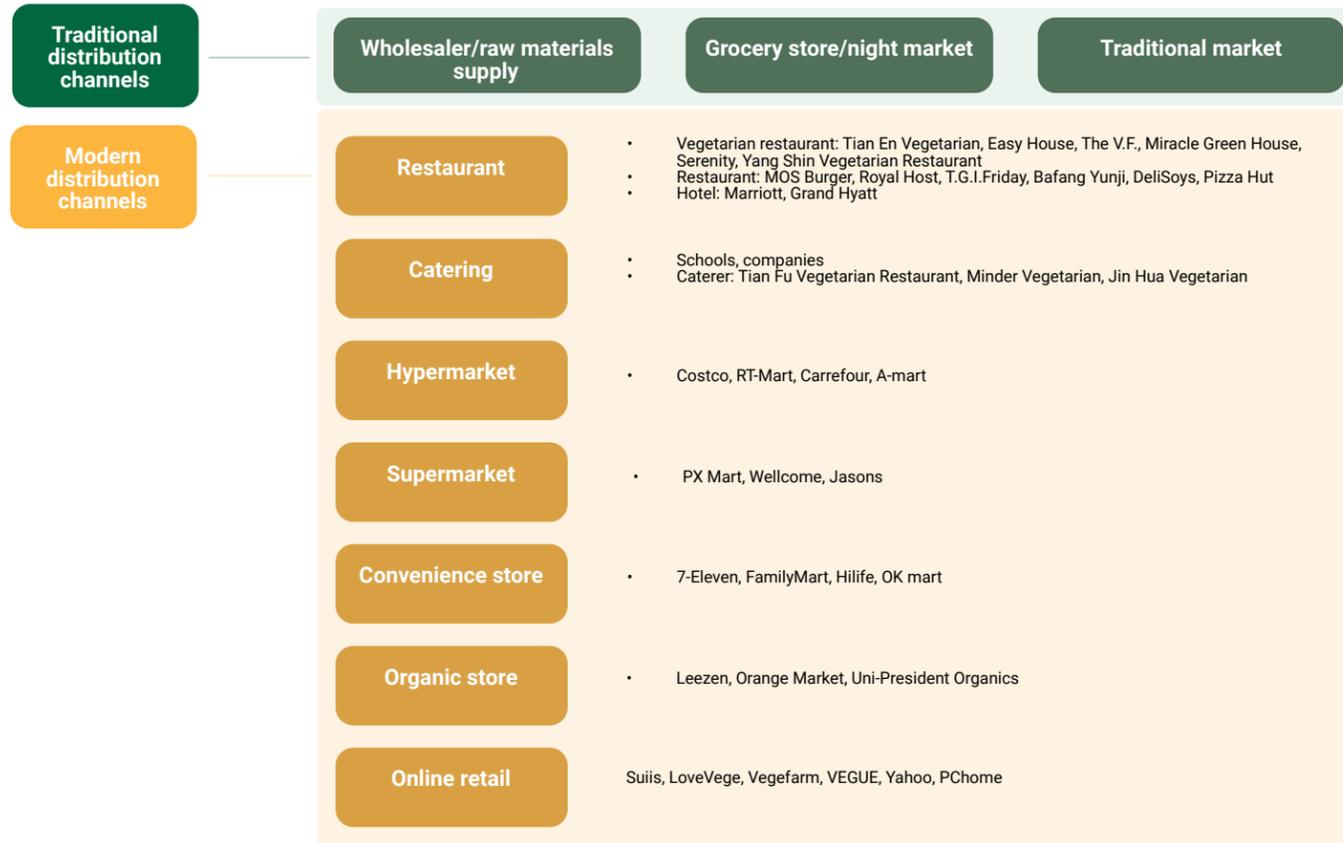
Taiwan's traditional processed vegetarian products have moved toward functionality. In addition, advances have been made using additives such as red yeast rice, DHA-containing microalgae and vitamins to create vegetarian ham. Producers are also using different ingredients to recreate meat in textures and appearances in innovative new ways, such as steak and chicken nuggets, as well as popular local cuisine, including Taiwanese-style popcorn chicken, Taiwanese sausages and tonkatsu, or Japanese fried pork cutlet. Riding high on the trend led by U.S. plant-based meat companies Beyond Meat and Impossible Foods, producers are incorporating plant-based meat with multi-directional fiber structure into common Asian and Chinese dishes. This cuisine heavily feature plant-based minced pork in foods such as vegetarian dumplings, pot stickers, minced pork sauce and bitter melon stuffed with minced pork.

FUTURE DEVELOPMENT

According to The Good Food Institute, the plant-based meat market grew 27% in 2020 over the previous year. In total, the global market for meat substitutes is set to grow to \$23.4 billion by 2024, according to market research company Euromonitor. Barclays, a multinational investment bank, projects that the global vegan meat market could hit \$140 billion in sales by 2029.

In 2020, Taiwan distribution channels for plant-based meat expanded from traditional markets to retail, franchises and restaurants, which has driven innovation and boosted exposure to consumers. As the international trend toward plant-based meat sweeps into Taiwan, the visibility of products imported from North America, Germany and Hong Kong by local retailers and restaurants as well as co-branded products, have gained traction. This has led Taiwanese brands to improve their competitiveness by adopting new sales strategies, expanding and innovating product lines and creating eye-catching, convenient and ready-to-eat packaging, working together with convenience stores. Companies in other industries, such as meat and biotech, have also joined the plant-based meat market using their innovative technologies.

Tiawnese Distributions Channels for Plant-Based Meat

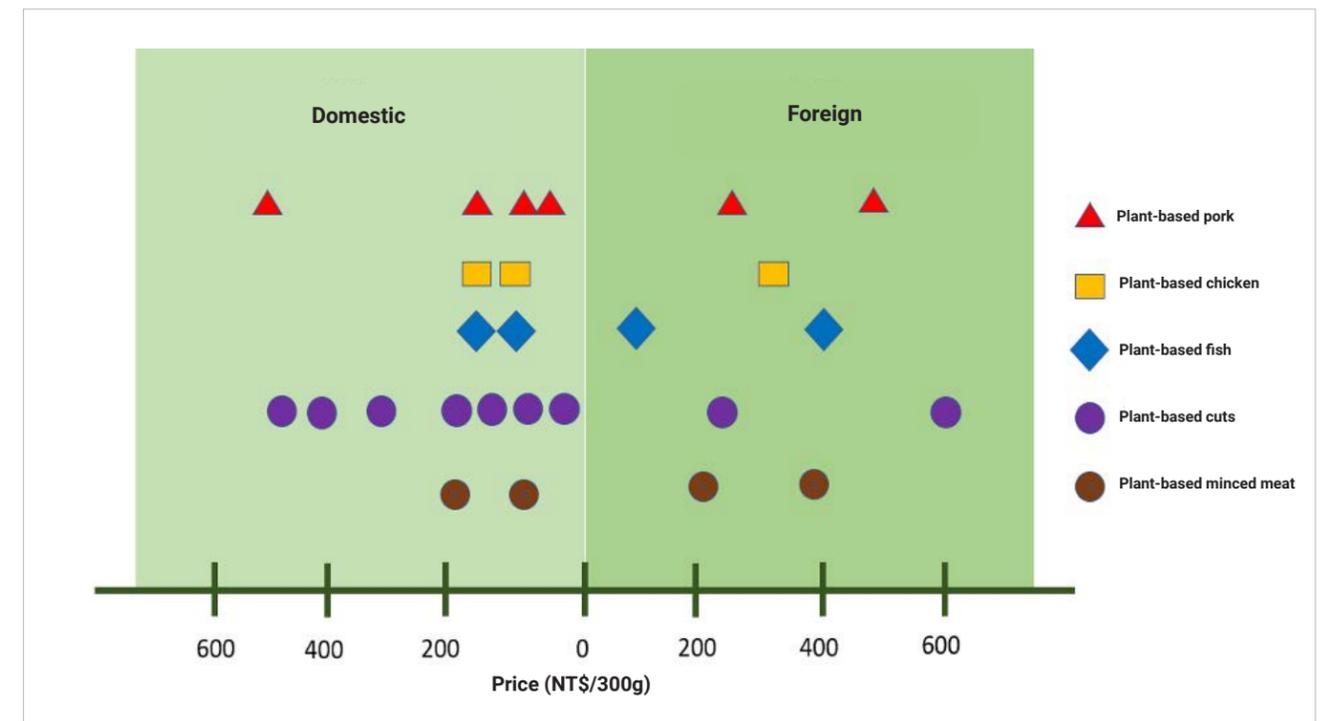


The COVID-19 pandemic disruption of meat and seafood supply chains have served to accelerate the shift from traditional meat to plant-based meat. Moving forward, producers of plant-based meat will seek to reduce the number of additives and create high-fidelity products that match the muscle texture, juiciness, appearance, color and mouthfeel of different cuts and types of meat. It is also important to develop products with a low carbon footprint.

The numerous people and celebrities investing in plant-based meat are shining a global spotlight on the impacts of climate change, thereby attracting experts from various fields to develop plant-based products. With time and the advancement of technology, plant-based meat products will become more affordable and accessible.



Plant-Based Meat Pricing Analysis in Taiwan



Source: Taiwan 2021 Food Industry Yearbook

Regulations

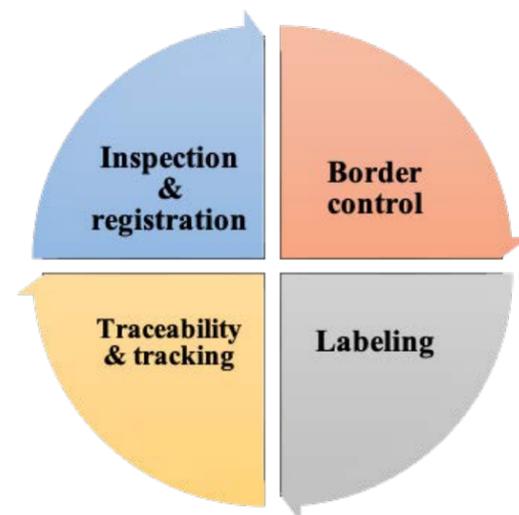
In Taiwan, around 2.5 million MT (91.9 million bushels) of soybeans are imported per year according to government records, and most of them are genetically modified (GM). The central competent authority for the management of GM food is the Taiwan Food and Drug Administration (TFDA), part of the Ministry of Health and Welfare. According to the Food Safety and Hygiene Management Law, GM food needs to be managed, including inspection, registration, import and border management, chain traceability and product labeling.

Since 2002, 29 transgenic soybean events have been approved for food use by the Taiwanese government. For soybeans and soybean-related products, genetic modification and non-gene modification have separate, exclusive numbers for border management. Food and food additives containing GM ingredients must be declared.

In recent years, Taiwan has produced only a few thousand metric tones of soybeans in total, while by contrast approximately 2.5 million MT (91.9 million bushels) are imported each year. While Taiwan has huge demand for soybeans, it has to rely almost entirely on imports, most of which are GM soybeans. In Taiwan, some soybeans are made into tofu, dried tofu, soy milk or plant-based meat, but most imported soybeans are used for oil extraction, and the residual soybean meal left after extraction is used for animal feed.

The central government agency in charge of GM soy product management is the TFDA. The main legal basis for GM food management is the Act Governing Food Safety and Sanitation, the 2014 amendment of which stipulates provisions regarding the inspection, registration, importation, border control, traceability and flow tracking of food raw materials and the labeling of GM food products.

Management of Genetically Modified Foods in Taiwan



Sources:
 - Country Snapshot: Taiwan, USSEC
 - Taiwan Act Governing Food Safety and Sanitation



INSPECTION AND REGISTRATION

According to Paragraph 2, Article 21, of the Act Governing Food Safety and Sanitation, “None of the genetically modified food raw materials shall be used as food raw materials without being reviewed by the central competent authority in the health risk assessment, filing product registration with and procuring a permit document.” Because of this provision, which came into effect in 2001, the manufacture, processing, preparation, re-packaging, import or export of GM soy and maize products must be inspected by and registered with the TFDA. The 2014 amendment to the act expanded the scope of GM food raw materials that are subject to more stringent regulation, but the GM soybean management regimes remain unchanged. For GM soybeans to be used as food raw materials requires passing a health risk assessment, filing a registration and obtaining a permit.

The current version of Taiwan’s Food Safety Assessment Methodology for Genetically Modified Food was promulgated on September 9, 2010. It is based on the Guideline for the Conduct of Food Safety Assessment of Foods Derived from Recombinant-DNA Plants (CAC/GL 45-2003), developed in 2003 by the Food and Agriculture Organization (FAO), the World Health Organization (WHO) and the CODEX Alimentarius Commission. The Taiwanese methodology provides a clear definition of gene modification techniques: Techniques using genetic engineering or molecular biological technology to transfer genetic material into living cells or organisms, which results in genetic modification. However, this excludes techniques such as traditional breeding, fusion of cells and protoplasts of the same species, hybridization, mutagenesis, in-vitro fertilization, somatic mutation and chromosome doubling. While the methodology covers food products containing GM plants and GM microorganisms, those containing GM animals fall outside its scope.

Health risk assessments and the inspection and registration of GM soybeans must be carried out in reference to the Food Safety Assessment Methodology for Genetically Modified Food. A Genetically Modified Food Application is submitted, detailing product specifications, basic information on genetic modification, composition analysis of key ingredients, toxicity, allergenicity and nutritional composition. To ensure the safety of GM soy food products, the data are closely reviewed on a case-by-case basis and inspection is carried out to verify the gene expression of transgenic lines.

The management of food products containing GM plants with stacked traits developed by conventional breeding methods follows the Guidelines for Food Safety Assessment of Food Products Derived from Genetically Modified Plants with Stacked Traits, promulgated on May 6, 2008. These guidelines classify GM plants with stacked traits into three categories. For food products derived from the plants in categories 1 and 2, businesses must provide bridging study data and, where necessary, data on protein safety assessment and animal feeding trials.

However, food products derived from category 3 plants, those combining several genes with inserted traits whose functions belong to the same biosynthetic pathway, are assessed using the same methodology as those derived from single-trait GM plants.

To process applications for the inspection and registration of GM food, the TFDA has a review panel consisting of 17 to 23 members who are responsible for reviewing the documents and data that businesses provide, inspecting the safety of GM food products and providing written review opinions. As of November 5, 2021, a total of 154 GM events have been approved for use as food raw materials, of which 29 were soybean products. Those include 17 single-trait events and 12 stacked events, as shown.

The ten single-trait GM soybeans approved in Taiwan consist of three with an insect-resistant trait, seven with a herbicide-tolerant trait, one with both insect-resistant and herbicide-tolerant traits, and three with modified oil or fatty acid composition traits. The GM food permit is valid for five years, after which time applicants must seek an extension.

Soybean Traits Approved in Taiwan

Name	Transgenic event	Date of authorization
Glyphosate-tolerant GM soybean	40-3-2	7/22/2002
Glufosinate-tolerant GM soybean	A2704-12	5/1/2007
2nd-generation Glyphosate-tolerant high-yield GM soybean	MON89788	12/28/2007
High-oleic GM soybean	DP-305423-1	7/23/2010
Glufosinate-tolerant GM soybean	A5547-127	8/31/2010
Insect-resistant GM soybean	MON87701	7/6/2011
High-oleic GM soybean with low level of saturated fat	MON87705	2/8/2013
Dicamba-tolerant GM soybean	MON87708	4/2/2013
Imidazolinone-tolerant GM soybean	BPS-CV127-9	4/16/2013
Stearidonic acid (SDA) producing GM soybean	MON87769	12/16/2013
Herbicide-tolerant GM soybean	DAS-68416-4	12/16/2013
Glyphosate- and isoxaflutole-tolerant GM soybean	FG72	12/24/2013
Herbicide-tolerant GM soybean	SYHT0H2	3/28/2014
Herbicide-tolerant GM soybean	DAS-44406-6	9/4/2014
Insect-resistant GM soybean	DAS-81419-2	5/5/2015
Insect-resistant GM soybean	MON87751	1/29/2016
Cyst nematode-resistant and herbicide-tolerant GM soybean	GMB151	9/13/2021

Source: Ministry of Health and Welfare

Stacked Soybean Traits Approved in Taiwan

Name	Transgenic event	Date of authorization
Stacked-trait GM soybean	DP-305423-1 x 40-3-2	6/11/2012
Insect-resistant and Glyphosate-tolerant stacked GM soybean	MON87701 x MON89788	9/24/2012
Stacked GM soybean with low saturated fat, high oleic acid, and Glyphosate tolerance	MON87705 x MON89788	9/4/2014
Dicamba- and Glyphosate-tolerant stacked GM soybean	MON87708 x MON89788	9/24/2014
Stacked-trait GM soybean	DAS-68416-4 x MON89788	2/26/2015
Stearidonic acid (SDA) producing and Glyphosate-tolerant stacked GM soybean	MON87769 x MON89788	6/26/2015
Stacked-trait GM soybean	FG72 x A5547-127	5/13/2016
Stacked-trait GM soybean	DAS-81419-2 x DAS-44406-6	7/12/2016
Stacked-trait GM soybean	MON87705 x MON87708 x MON89788	7/31/2017
Stacked-trait GM soybean	MON87751 x MON87701 x MON87708 x MON89788	9/10/2017
Stacked-trait GM soybean	MON87708 x MON89788 x A5547-127	5/29/2018
Stacked-trait GM soybean	DP-305423-1 x MON87708 x MON89788	7/8/2019

Source: Ministry of Health and Welfare

BORDER CONTROL AND IMPORT DUTY

In 2014, the Act Governing Food Safety and Sanitation was amended to strengthen import management and border control of GM food. New entries were also made in the Commodity Classification Code (CCC Code) to classify GM food raw materials. GM and non-GM soybeans and soybean meal products are now under different codes.

In 2019, in response to continued demand from consumer advocacy groups that the government distinguish between food-grade and feed-grade soybeans, the Ministry of Economic Affairs added two new entries to Taiwan's CCC Code: "Genetically modified soybeans, for feeding" and "Non-genetically modified soybeans, for feeding." Soybeans imported under the classification of animal feed may not enter the human food chain.

However, soybean producers in other countries do not distinguish between food-grade and feed-grade soybeans throughout production from planting to harvest, and soybeans imported to Taiwan are usually transported in bulk ships or container ships. Taiwanese food companies select beans by appearance, with plumper whole beans mostly made into soy products such as soy milk and tofu.

When importing GM soybeans to Taiwan, importers must provide the declaration document, invoice or cargo manifest issued by the suppliers of the export country. Importing non-GM soybeans requires product samples or IP documentation, official non-GMO certification, product or raw material test reports, organic certification by approved country or international agencies or organizations announced by the Council of Agriculture under the Executive Yuan, and other documents specified by the TFDA.

Average food prices have continued to rise. This can be attributed not only to inflation, but also to increased demand for meat. With the upward pressure on soybean prices, Taiwan has slashed soybean tariffs from 7% to 3.5%, 3%, 1.5% and now all the way to 0%, which has helped businesses reduce costs. Animal feed producers, soybean processors, traders and the food industry no longer pay tariffs on imported soybeans, and there are no restrictions on import qualifications or quantity. Although the government's tax revenues will fall by several billion Taiwan dollars, the zero-tariff measure will help businesses reduce production costs and keep prices in Taiwan under control.

Soybean Ingredient Codes

CCC Code	Goods
12081000104	Flours and meals of genetically modified soya beans
12081000202	Flours and meals of non-genetically modified soya beans
12019000916	Other genetically modified soybeans, whether or not broken
12019000925	Other non-genetically modified soybeans, whether or not broken
12019000211	Genetically modified soybeans, for feed, whether or not broken
12019000220	Non-genetically modified soybeans, for feed, whether or not broken

Source: Customs Administration, Ministry of Finance



According to Paragraph 1, Article 9, and Paragraph 3, Article 21, of the Act Governing Food Safety and Sanitation, suppliers of GM food raw materials have to set up a traceability or tracking system. This provision became mandatory on February 5, 2015. Certificates, documents, and records of GM food and related products must be retained for at least five years.

Suppliers are also required to upload data for the previous month to the government's food traceability and tracking system by the tenth day of each month. The uploaded data must include the following.

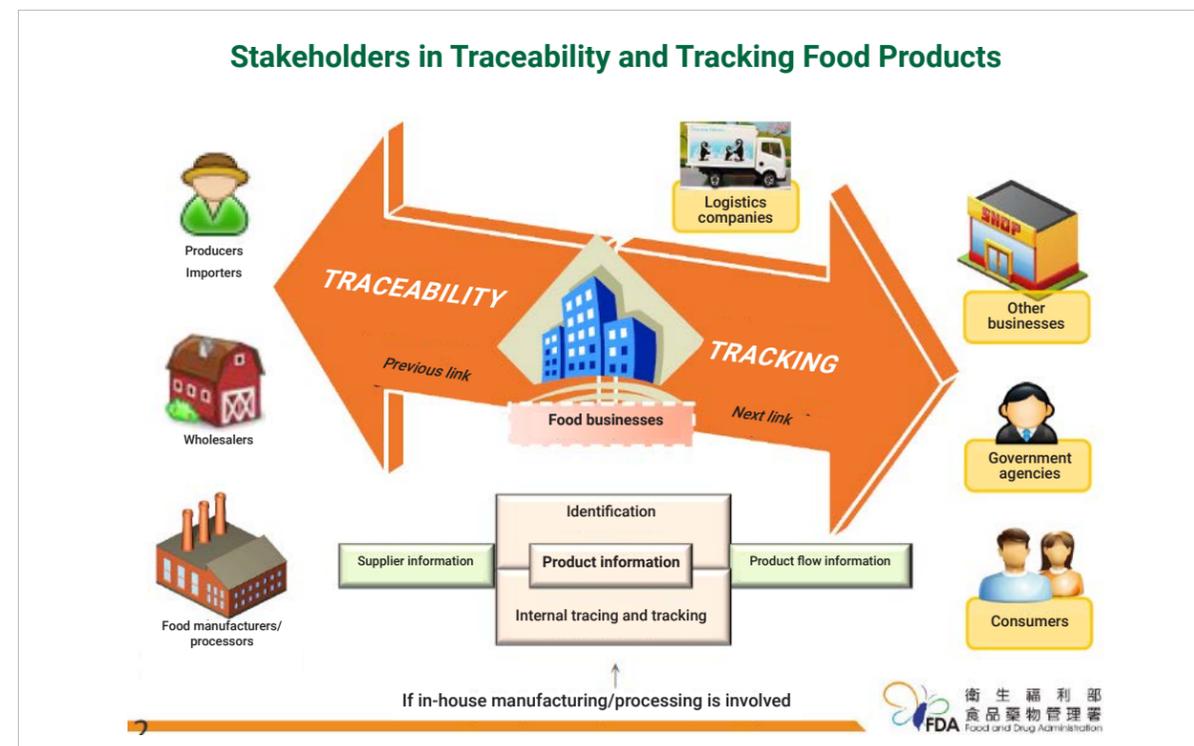
- Raw materials
- Product details, including the soybeans' transgenic line
- Identification markings
- Product flow
- Records for internal traceability system management, with effective connections for tracing the source and tracking flow

In addition, food businesses must ditch hard-copy uniform invoices for electronic invoices. Setting up a traceability and tracking system will enable food businesses to instantly trace the source of raw materials and track the flow of products. If concerns arise regarding a product, it can be quickly recalled, which will make food safety management more efficient.

TRACEABILITY AND TRACKING

Paragraphs 1 and 3, Article 7, of the Act Governing Food Safety and Sanitation stipulates that suppliers of GM food raw materials implement self-management and enact food safety monitoring plans to ensure food sanitation and safety. Testing of GM food raw materials became mandatory on July 31, 2015, while food safety monitoring plans have been required since July 31, 2017.

GM soybean importers who import 40 MT (1,470 bushels) or more within three months or in a single batch are required to formulate food safety monitoring plans. All imports of GM soybeans are subject to mandatory testing, regardless of import volume. Items to be tested include mycotoxins, pesticide residues, heavy metals and other items related to food hygiene. Testing must be conducted at least once every quarter or every batch, and the records of test results must be kept for at least five years.



Source: Food and Drug Administration, Ministry of Health and Welfare

PRODUCT LABELING

GM food labeling requirements were first announced in 2001. At that time, labeling was only mandatory for packaged food using GM soybeans or GM maize as raw materials, while highly processed products that did not contain transgenic fragments or transgenic proteins were exempt. Moreover, an adventitious GM presence of 5% was allowed in non-GM food.

In 2014, the Act Governing Food Safety and Sanitation was amended. Articles 22, 24 and 25 stipulate that the presence of GM raw materials must be labeled in packaged food, food additives, bulk food and places directly supplying food. Labeling requirements were introduced in three phases and reached full implementation on December 31, 2015. Non-GM food raw materials with an adventitious GM presence exceeding 3% are regarded as GM food raw materials.

For highly processed products that directly use GM food raw materials but no longer contain transgenic gene fragments or transgenic proteins in the final products, including soybean oil and soy sauce, exemption from GM labeling no longer applies. These products now have to carry the GM label with statements such as “genetically modified,” “contains GMO ingredients” and “uses GM ingredients.” Labels may not measure less than 2 mm in either length or width, and the font used for the label must be clearly distinguishable from other text.

The labeling provisions are now more stringent: The scope was expanded from packaged food to food additives and bulk food, the allowable adventitious

presence of GM ingredients was lowered from 5% to 3% and highly processed food products are no longer exempt from GM labeling.

According to Items 7 and 9, Paragraph 1, Article 47, of the Act Governing Food Safety and Sanitation, inadequate labeling of GM food carries a fine of between NT\$30,000 and NT\$3 million. In addition, under Paragraph 1 of Article 45, any false, exaggerated or misleading labeling, promotion or advertisement of GM food products is punishable by a fine of between NT\$40,000 and NT\$400,000. Severe violations or repeat offenses may lead to the termination or suspension of business, or the revocation of all or some of the items listed in the company registration, business registration, factory registration or registration of the food business. If the registration of a food business is revoked, the business may not reapply for new registration for one year.

Non-GM soybean products may be labeled “Non-GMO” or “Not GMO” at the seller’s discretion, but not all food ingredients can carry such labels. Only when food raw materials also have GM counterparts approved in Taiwan, such as maize, canola, sugar beet and cotton, may they be labeled non-GMO. For example, although GM wheat, rice, papayas, potatoes and pumpkins have been authorized in other countries, their non-GM counterparts may not be labeled as non-GMO in Taiwan. This is to avoid confusion among consumers, to ensure they do not mistakenly believe that GM foods that have not been approved in Taiwan are being sold in the domestic market.



Food Labeling

All about GM food labeling

GM food products

- Packaged food:** Dried tofu (GMO), Soy milk, Tofu pudding.
- Bulk food:** (Illustrated with a bowl of food).
- Food additives:** Food additive (GMO).
- GM food raw materials approved to be used in Taiwan:** Soybeans, maize, cotton, canola, sugar beets.
- Highly processed food products:** Corn syrup (GMO), Soybean Oil, Soy Sauce.

The wording "GMO" or "contain GMO ingredients" should be added if GM ingredients are used. N.B. Labels may not measure less than 2 millimeters in either length or width and the font used for the label must be clearly distinguishable from other text. If markings other than labels are used for bulk food, they must not measure less than 2 cm.

Should be labeled "GMO" or "this product uses GMO ingredients but no longer contains any genetically modified DNA."

This product uses GMO ingredients but no longer contains any genetically modified DNA.

Source: Food and Drug Administration, Ministry of Health and Welfare

The Ministry of Health and Welfare has set up a comprehensive system, including border controls and labeling requirements, to regulate GM soybeans, which make up most of the 2.5 million MT (91.9 million bushels) of imported soybeans, and review their safety on the basis of scientific evidence. Since 2002, 29 types of GM soybeans have been approved for use in food, but Taiwanese consumers are still very vocal in their opposition to GM food. On December 14, 2015, the legislature passed amendments to the School Health Act, stipulating that GM food raw materials and their primary processed products may not be used in meals served in schools, from elementary school to university, effectively banning GM soybeans and tofu or soy milk made from such beans from school campuses.

Apart from the Ministry of Education’s opposition to the serving of GM food in schools, the Council of Agriculture has also stressed that it wants to promote organic agriculture and has banned the cultivation of GM crops. The Ministry of Health and Welfare is the only government agency that has authorized the use of GM crops in food and is disseminating truthful information about GM food to the public. The fact that the same GM food is treated differently by different government agencies has resulted in a lower level of public trust in government. In the future, Taiwanese consumers are likely to continue to look at GM food with suspicion.

Sustainable U.S. Soy Logo Use

In order to control the stability of the process and the consistency of the final soy products, the quality of food-grade soybeans plays a very important role in purchasing for the soy product manufacturers in Taiwan. Therefore, the United States Standards for Soybeans and Identity Preservation are key references for soybean variety selection.

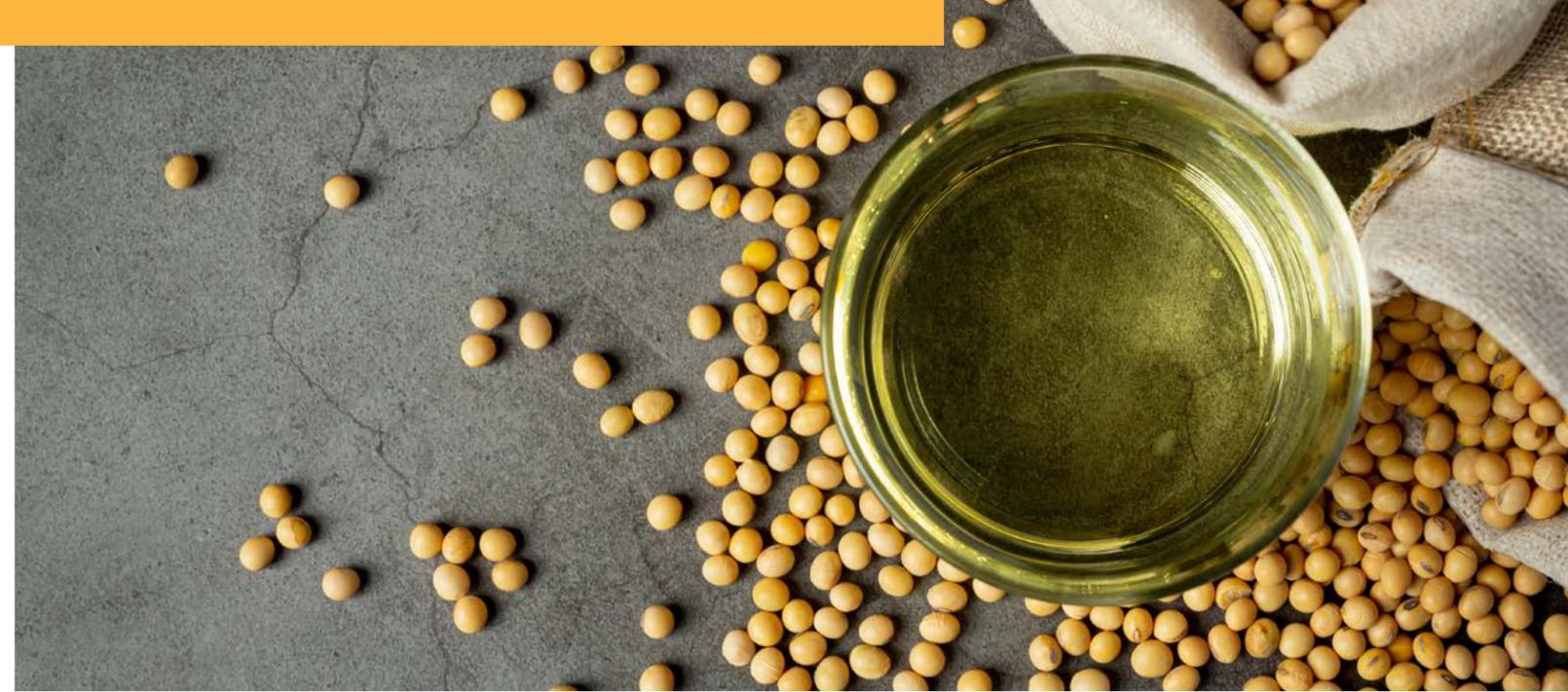
Most U.S. farmers grow soybeans that meet the requirements of the Soybean Sustainability Assurance Protocol (SSAP) defined by U.S. Soy.

For the food companies in Taiwan, the Sustainable U.S. Soy logo product package labels help to build a strong brand image and even enhance the reputation of the enterprises as the idea of sustainability is a part of corporate social responsibility (CSR). However, the Sustainable U.S. Soy logo is not yet widely recognized for a few reasons. Taiwanese consumers are just getting to know about the importance of sustainability. Meanwhile, many people have inaccurate perceptions about environmental protection; they think it should be corporate responsibility without recognizing the added value to the brand. Furthermore, there are too many certified labels with various purposes, which cause consumer confusion.

In Taiwan, the plant-based food market has been expanding rapidly in recent years, especially soy milks. Taiwanese people are paying more attention and taking actions in response to environmental issues. What's more, USSEC Taiwan has continued promoting the advantages of Sustainable U.S. Soy through online and offline media. The Sustainable U.S. Soy logo has potential to become a recongnized logo of sustainability in the near future.

Soybeans produced in the United States and soy products produced in Taiwan have developed in conjunction with one another for many years. The United States is endowed with large tracts of fertile soil and has been recognized worldwide as a leader in agricultural management practices and technology. Conducting long-term research into soybean breeding and development has led the United States to produce many different varieties of soybeans, each with different traits. This diverse array has, in turn, allowed manufacturers of soy-based foods to select the soybean variety most suitable to their needs and processing requirements. Furthermore, the U.S. Department of Agriculture (USDA) has established standards that not only introduce clear, comprehensive regulations on how to determine soybean grades, but that also establish third-party auditing procedures to ensure the purchase of quality soybeans.

USSEC has promoted IP soybeans. IP soybeans must meet rigorous quality standards to ensure buyers receive pure variety, high quality and traceable soybeans. Large Taiwanese companies that use U.S. soybeans not only insist on purchasing top-grade U.S. No. 1 soybeans, they also highly value the use of such traceability systems.



In addition to being concerned about food safety, Taiwanese companies also want growers to ensure they are planting a single, uniform soybean variety, and that this variety, remains uniform throughout the production chain. Variety purity is critical because it represents a guarantee of the soybean composition specifications such as protein, and it is also beneficial to controlling the traits and quality of the end product. Furthermore, because the origin of IP soybeans is clearly recorded, Taiwanese consumers can be assured they are receiving what the label claims.

The Taiwanese sector has realized the grading and IP designation processes can serve as means of controlling quality. As a result, these processes help relevant parties to stay atop of global trends and have guaranteed access to export channels.

In 2016, USSEC began a long-term campaign to promote the Sustainable U.S. Soy logo, with funding from the soy checkoff. USSEC encouraged and supported food manufacturers to feature this logo on their product packaging as a way to improve brand image and to serve as a symbol of CSR.

Over the past few decades, the USDA has introduced laws aimed at supporting and encouraging farmers to adopt sustainable farming practices, and as a result, 95% of U.S. land used for soybean farming currently meets federal government requirements for sustainable production. When the Sustainable U.S. Soy logo first came out, the soy foods sector in Taiwan strongly approved of the firm vision and concerted efforts of USSEC to encourage environmentally sustainable practices. In fact, it was a Taiwanese food company that became the first in the world to use products verified by the U.S. SSAP. As a result, this company's soy milk products went from being virtually unknown to being ranked as the third most popular soy milk in Taiwan.

In addition to improving corporate image, the use of SSAP-verified soybeans helps food companies fully realize their corporate policies and missions. However, at the time SSAP verification first emerged, most consumers showed little interest, revealing that adoption of sustainability logos and seals does not guarantee a company rapid growth. Potential reasons for consumer disinterest can be grouped into the following categories.

OVERUSE OF LOGOS AND SEALS

Following a succession of food safety incidents in Taiwan, many food manufacturers have sought to gain consumer trust through obtaining recognition by certification schemes such as Food Safety System Certification 22000 (FSSC 22000), Safe Quality Food (SQF) and International Taste Quality Institute (ITQI) as well as obtaining carbon footprint certificates or seals. Recognizing everything from quality and taste to environmental sustainability and beyond, the presence of certification symbols on nearly every brand's packaging often overwhelms consumers with information.

Market surveys have found that consumers can only somewhat remember certification and verification symbols for certain products. However, they tend to be unclear about the actual name and meaning of the symbol in question. Even after extensive advertising campaigns, consumers are often still unable to correctly identify these symbols.

PREMATURE MARKETING OF SUSTAINABILITY

In 2021, Oatly prominently introduced its oat milk into the Taiwanese market by promoting it as an alternative to cow's milk. Oatly's first step was to work with Starbucks and 7-11 in order to promote oat milk as an alternative for lattes. Next, Oatly partnered with Haidilao Hotpot to create an oat milk hotpot broth. As a result of the significant resulting media coverage, Oatly successfully created more opportunities for the introduction of further plant-based milk products in Taiwan.

Furthermore, Oatly has invested in media aimed at spurring discussions about environmental sustainability. These discussions highlight the fact that, in comparison to livestock and poultry products, plant-based alternatives produce lower greenhouse gas emissions, require a smaller area of land, and consume less energy. By highlighting this comparatively advantageous carbon footprint, Oatly has tried to call on Taiwanese consumers to place more emphasis on environmental sustainability. Consumers, however, may recognize that environmental sustainability is important and directly impacts the survival of future generations, but they are not necessarily willing to spend more to support the cause.

ENVIRONMENTAL CONSERVATION IS A RESPONSIBILITY, NOT A MEANS TO ADD VALUE

Over the past several years, pollution and climate change have continued to pose a threat to humanity. Environmental conservation has, thus, become a common goal and focus of discussion worldwide. In 2014, Taiwan's Financial Supervisory Commission began to require listed companies to compile CSR reports in hopes of directing greater corporate attention to social responsibility.

An important part of a company's overall image, CSR encompasses critical issues such as environmental conservation and company policies. However, most people tend to equate social responsibility and environmental conservation efforts with serving the public good. Since these efforts are recognized as an expectation or basic responsibility, they are often taken for granted and are not seen as directly related to the adding of value to a product.



Starting in 2013, the soy milk market began to expand rapidly around the world, and Taiwan was no exception. Fitness trends were one reason behind this growth, as was the COVID-19 pandemic. In response to COVID-19, soy milk has continued to grow in popularity. Nearly 58% of all people in Taiwan now drink soy milk, inching closer to the 70% of all people that drink cow's milk. In addition, Taiwanese food companies have continued to build off of Oatly's success by releasing a range of oat milk products throughout the latter half of 2021. At the same time, plant-based milks continued to receive a lot of attention in the market, leading many to anticipate 2022 to be a strong year for plant-based milks.

Over the past few years, USSEC has quietly continued to engage a wide range of experts, organize forums and participate in various exhibitions. Moreover, USSEC has continued to reach out to industry and consumers to promote the significance of the Sustainable U.S. Soy logo. To this end, media outlets and social media platforms feature reports on U.S. sustainable production of soy. These articles and reports, published both online and offline, educate consumers on the Sustainable U.S. Soy logo and use of U.S. Soy, which they often see noticeably featured on processed soy food packaging.

In the near future, concern about sustainability issues is expected to reach an all-time high in Taiwan. Finally, after a long wait, the Sustainable U.S. Soy logo may be set to become a trusted and esteemed symbol of certified sustainability.

Taiwan-Made Dried Bean Curd Sticks or Tofu Skin



Taiwan-Made Dougan or Firm Tofu



Product Labeled "Made from U.S. Soybeans"



Source: - September 2021 Monthly Report, Kantar Group



North America

SOY FOOD REPORT

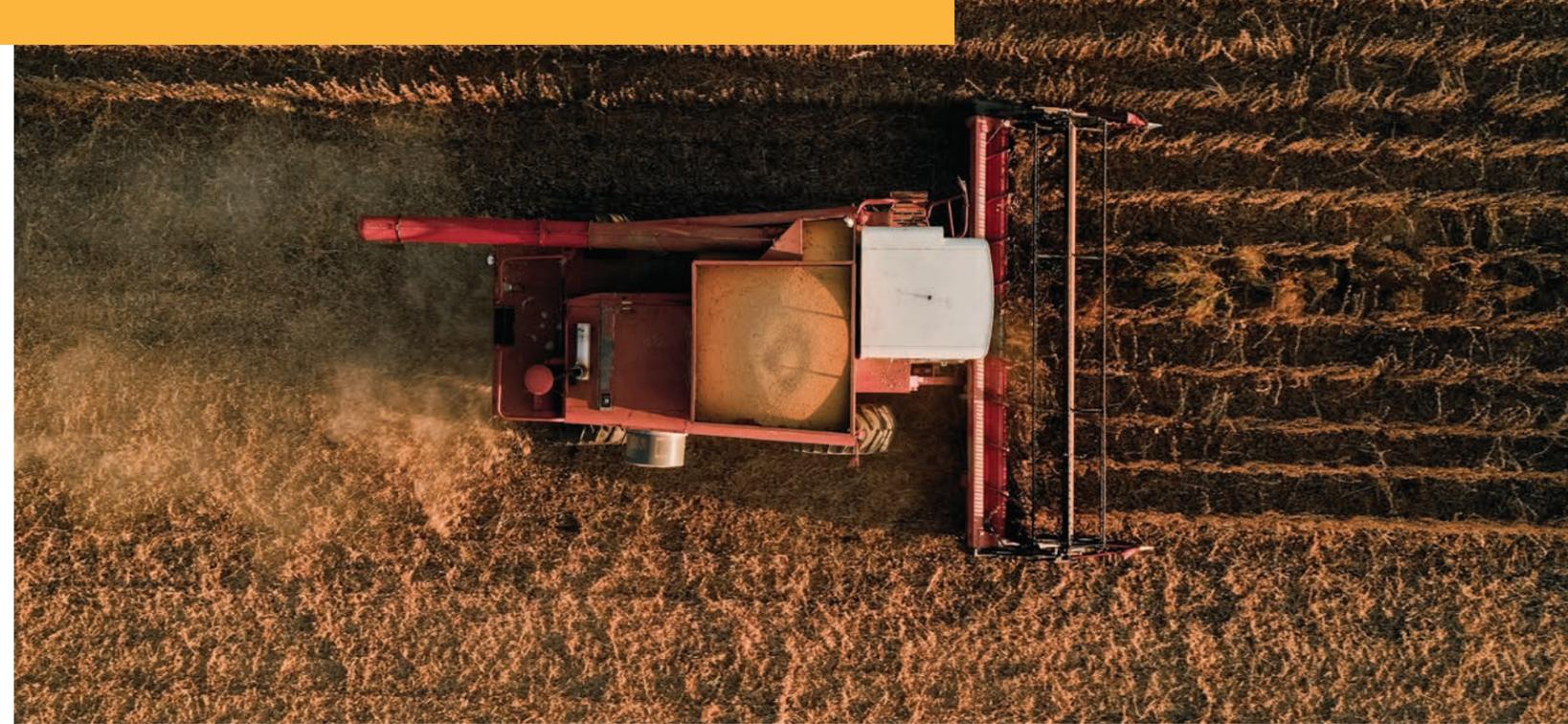




Food-Grade Soybean Production

UNITED STATES PRODUCTION

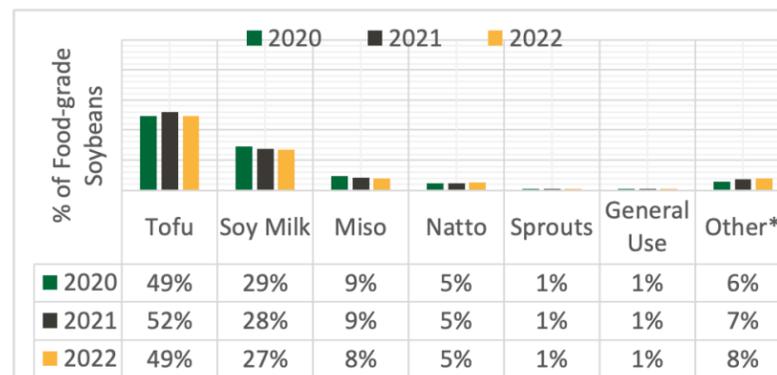
In 2021, U.S. soybean production covered 35.6 million ha (87.9 million acres), including 1.78 million ha (4.4 million acres) of non-genetically modified organism (non-GMO) soy, according to the U.S. Department of Agriculture (USDA). Historically U.S. non-GMO production has been approximately 5 to 6% of total U.S. production, with annual production generally around 2 million ha (5 million acres). U.S. non-GMO production decreased in 2021 due primarily to the high Chicago Board of Trade (CBOT) price for commodity soybeans, with prices reaching around \$588 per MT (\$16 per bushel) in April, with these high prices disincentivizing specialty soybean production.



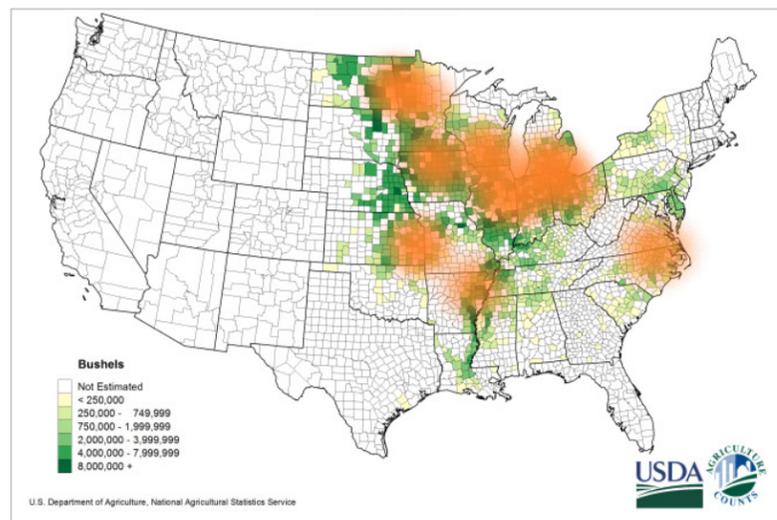
The 1.78 million ha (4.4 million acres) of contracted non-GMO soybean production are split evenly between being destined for food uses and non-GMO feed. Food-grade non-GMO soybeans are grown primarily for export markets in Asia, while feed-grade non-GMO soybeans are primarily consumed in the U.S. as animal feed. According to estimates, 52% of the non-GMO food-grade soybeans produced in the United States are destined for the tofu market. Another 28% will be used for soy milk. All other uses, such as miso, natto and sprouts, account for less than 10% each.

In the United States, non-GMO soybean production centers are dispersed geographically over an area approximately 1,700 km (1,050 miles) north to south and 2,000 km (1,250 miles) east to west. States with centers of non-GMO soybean production include Arkansas, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, North Carolina, North Dakota, Ohio, Virginia and Wisconsin.

U.S. Food-Grade Soybean Production



U.S. Soybean Production by County (2019)



U.S. Soybean Production



Information from Secondary Sources	2020	2021	2022
Total U.S. soybean acres planted (millions)	83.1	87.2	88.2
Total U.S. soybean bushels (millions)	4,136	4,374	4,459
U.S. Non-GM soybean acres (millions)	5.0	4.4	4.1
Biotech/specialty soybeans acres (millions)	78.1	82.9	84.1

Source: USDA/NASS, September 2021

According to a recent study that interviewed soy food export companies and non-GMO farmers, about 90% of non-GMO food-grade soybeans are grown via contract, on either an acre or bushel basis. Farmers who grow non-GMO these soybeans will generally grow commodity GMO soybeans as well, with the average split about 30% non-GMO food-grade soybeans and 70% GMO soybeans. Identity perseveration (IP) is used to ensure strict segregation of GMO and non-GMO soybeans, both at the farm and at export facilities.

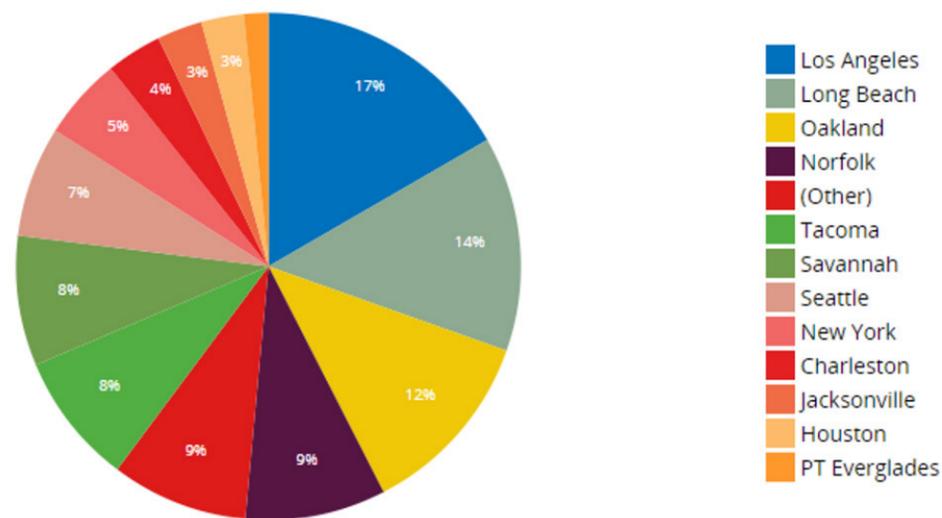
U.S. food-grade soybeans are primary exported via container. These soybeans are loaded bulk into containers, placed in 1-mt (1.1-short ton) totes or bagged in 30- to 50 kg (66- to 110-pound) bags. Containers are generally loaded at exporter facilities located throughout the U.S. Midwest, in those states producing food-grade soybeans. Soybeans are inspected by the Federal Grain Inspection Service (FGIS), or by private companies at the site of container loading. Containers are then railed from the Midwest to export facilities on the West or East Coast.



U.S. Food-Grade Production by State (2021)

State	All Non-GMO Soybean Acres (USDA Estimate)	Estimated Food-Grade Soybean Acres	% of Total Food-Grade Soybean Acres
Illinois	636,000	375,240	16%
Indiana	513,000	302,670	13%
North Dakota	511,000	301,490	13%
Missouri	399,000	235,410	10%
South Dakota	330,000	194,700	8%
Minnesota	308,000	181,720	8%
Iowa	303,000	178,770	8%
Nebraska	224,000	132,160	6%
Kansas	194,000	114,460	5%
Ohio	194,000	114,460	5%
Wisconsin	189,000	111,510	5%
Michigan	150,500	88,795	4%
Arkansas	61,000	35,990	2%
Mississippi	22,300	13,157	1%
Total	4,034,800	2,380,532	

U.S. Agricultural Export Ports

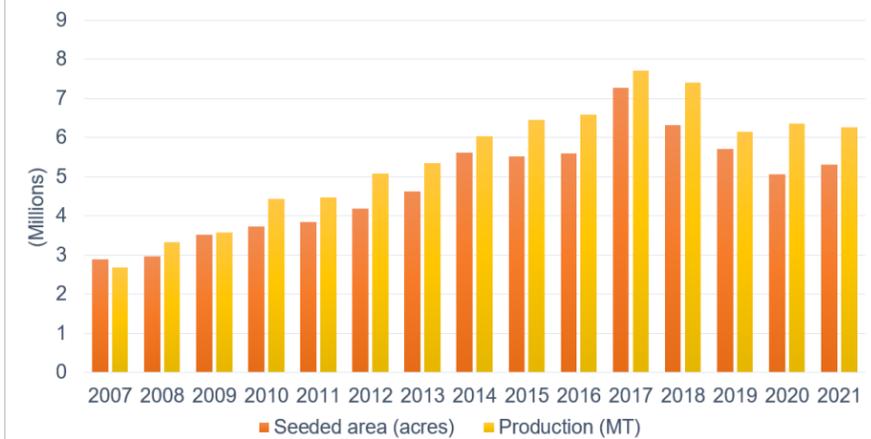


CANADIAN PRODUCTION

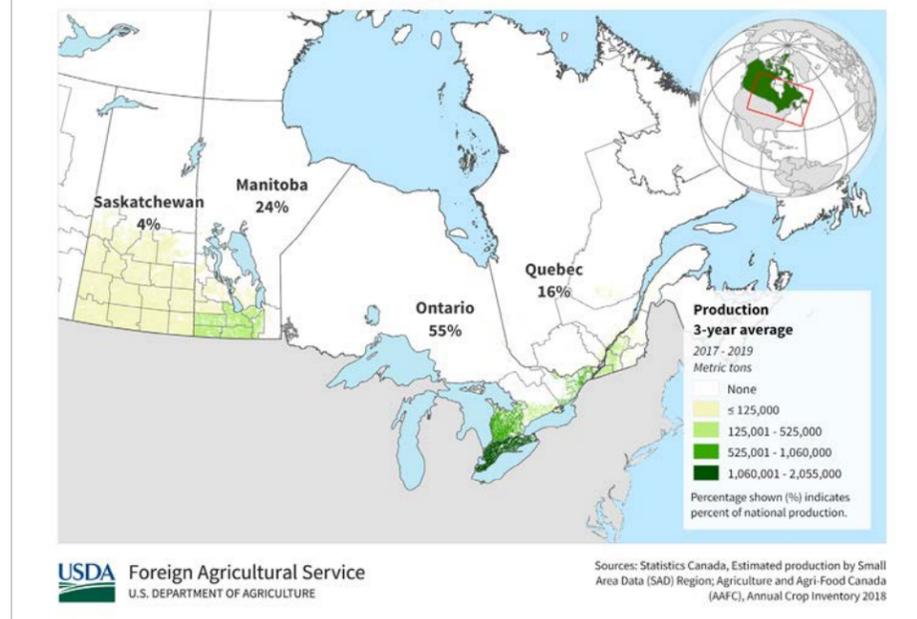
According to the USDA-Foreign Agricultural Service (FAS), Canadian farmers planted soybeans on approximately 2.13 million ha (5.2 million acres) in 2021. An estimated 1.7 million ha (4.2 million acres) are GMO varieties with approximately 0.42 million ha (1 million acres) being planted to non-GMO soybean varieties.

Canadian soybeans are primarily grown in Ontario, with major production also found in Manitoba and Quebec. Most non-GMO soybeans are produced in Quebec and Ontario.

Canadian Soybean Production



Canadian Soybean Production by Region



Soy Food Market

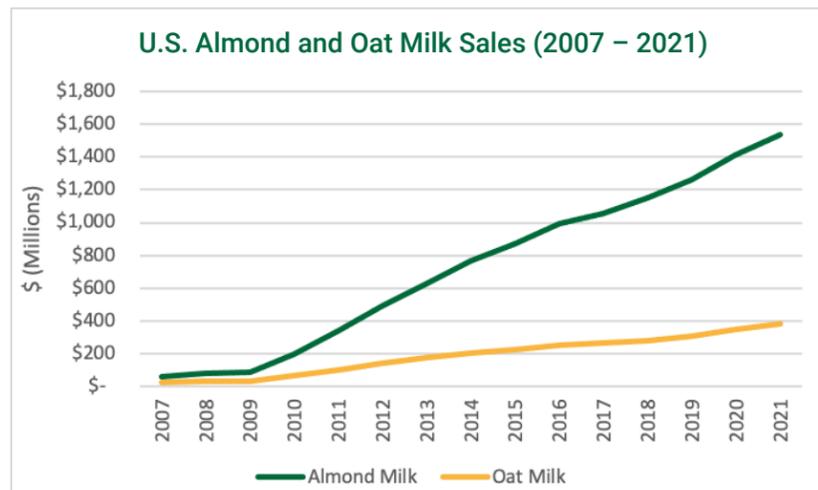


Soy foods sales in the United States have been in decline for more than a decade as almond milk and other plant-based alternatives to soy milk have taken market share. However, that trend has lately reversed itself driven by growth in consumption of soy-based meat alternatives. In addition, soy milk sales show potential for recovery as the explosive growth of plant-based foods has renewed U.S. interest in soy milk, which is higher in protein than other commonly available plant-based beverages.

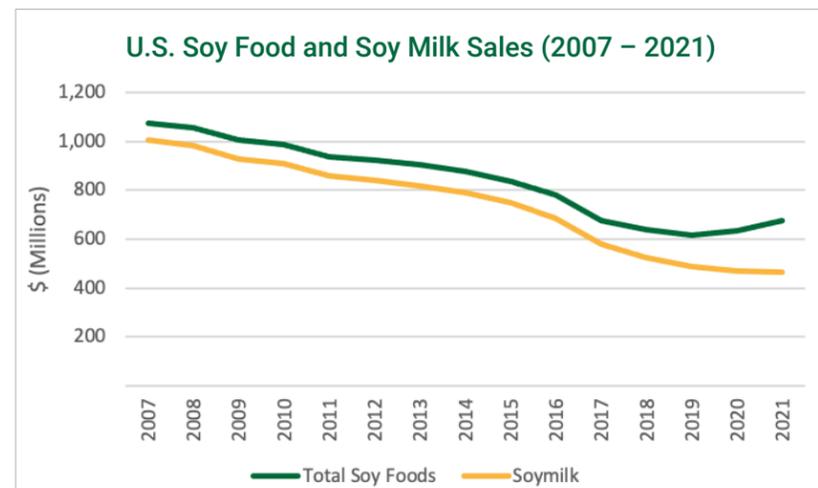
DOMINANCE OF SOY MILK

As is the case globally, the soy foods market in the United States is dominated by soy milk. The more than decade-long decline in soy foods sales in the U.S. has been driven by the decline in soy milk sales. The primary driver of America's ebbing consumption of soy milk has been growth in the consumption of other plant-based dairy alternatives, especially almond milk.

The ascendancy of almond milk, and to a lesser degree oat milk and other plant-based beverages made from nuts and peas, among other plant protein sources, has come at the cost of soy milk sales. This trend has driven a decline in total soy foods sales, despite the historical dominance of soy milk within the category.



Source: GlobalData



Source: GlobalData

GROWTH OF MEAT ALTERNATIVES

While soy milk remains by far the largest segment in the category, starting in 2019 total soy foods sales and soy milk sales started to diverge, with the total category having entered a growth mode. This recent growth of soy foods sales in the United States has been driven primarily by growth in the consumption of soy foods as an alternative to meat.

U.S. Whole Soy-Based Foods Retail Sales (2017 - 2021)

\$ (Millions)	2017	2018	2019	2020	2021	CAGR
Soy Milk 1/	\$ 578.04	\$ 525.91	\$ 486.81	\$ 469.23	\$ 463.52	- 4.3%
Tofu 2/	\$ 98.54	\$ 113.19	\$ 131.11	\$ 167.31	\$ 210.88	16.4%
Tempeh	\$ 13.45	\$ 15.19	\$ 16.49	\$ 17.89	\$ 19.42	7.6%
Total Sales	\$ 690.03	\$ 654.29	\$ 634.40	\$ 654.44	\$ 693.82	0.1%

Source: Agromeris estimates

The retail sales table shows historical sales for the three major categories of soy foods sold in the United States: soy milk, tofu and tempeh. In addition to ready-to-drink liquid soy milk, the soy milk category includes soy creamers and the very small U.S. subsegments of soy-based desserts, soy drinks and powdered soy milk.

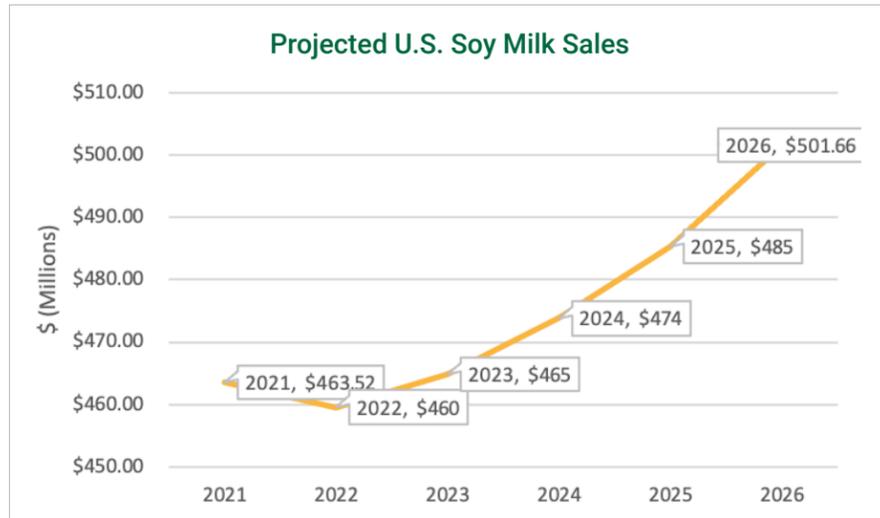
Over the last five calendar years, total soy milk sales have declined at compound annual growth rate (CAGR) of 4.3%. However, this decline has been slowing. During the period from 2019 to 2021, soy milk sales declined at a CAGR of 1.6%.

While the growth of almond milk came largely at the expense of soy milk, there is a sense within the industry that the recent proliferation of new plant-based milks made with nuts other than almonds, peas, oats, etc., is sparking a growing interest in plant-based milks and their comparative nutritional value. To the extent that consumers base their plant-based milk consumption on nutrition, soy milk is likely to gain share.

This sentiment is encapsulated in a statement made by Shane Grant, the CEO of Danone North America, the largest U.S. soy milk producer, in February of 2021.

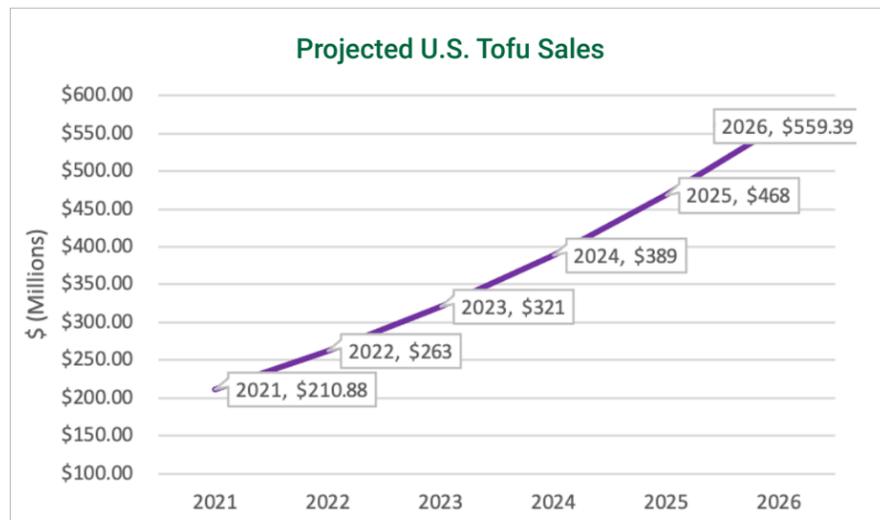
"We have a strong conviction we can grow that [soy milk] segment where we have clear leadership," Grant said, "and over the last 18 months we have put a lot of emphasis on reaccelerating that segment."

Expectations of growth in soy milk sales in the U.S. are not limited to key stakeholders. GlobalData projects U.S. soy milk sales will grow from \$463.52 million in 2021 to \$501 million in 2026, a CAGR of 2.7%.



Source: GlobalData

While soy milk sales in the U.S. were declining over the last five calendar years, tofu, including plain tofu and tofu formed and marketed as meat substitutes, grew at a CAGR of 16.4%. GlobalData projects that not only will this growth continue, but that it will accelerate, growing from \$210.88 million in 2021 to \$559.39 million in 2026 – a CAGR of 21.5%!



Source: GlobalData

Source: GlobalData's historical U.S. foods sales data begins in 2007



If we assume that tempeh sales continue to grow at a CAGR of 7.6% through 2026 – most likely a reasonable assumption, given the projected accelerating growth in tofu sales over the same period – tempeh sales in the United States will reach \$28 million in 2026.

If the GlobalData growth projections for soy milk and tofu are correct, and tempeh continues to grow steadily at its current five-year CAGR, total U.S. soy foods sales will grow from \$693.82 million in 2021 to \$1.09 billion in 2026, a total category CAGR of 9.4%.





Labeling

Nomenclature is important when discussing genetically modified products in the United States, as terminology is different for government regulators and commercial or common usage. The term genetically modified organism, or GMO, is in common usage in the U.S. both for the public and for many commercial usages, while U.S. government agencies use the term bioengineered (BE). The standard defines BE foods as those containing material that has been modified through in-vitro rDNA techniques in a way not possible through conventional breeding or found in nature. Commercial GMO labeling, such as non-GMO product verified, set their own standards, detailed below.

Within the United States, BE and GMO labeling exists as both a federal guideline and for commercial application purposes. However, until recently, no government labeling requirements existed for BE and GMO products. Most labeling has traditionally been used commercially for product differentiation.

THE BIOENGINEERED DISCLOSURE ACT

In July of 2016, the U.S. Congress passed the National Bioengineered Food Disclosure Law, which directed the USDA to establish a national mandatory standard for disclosing foods that are or may be bioengineered. The USDA published the standard in December 2018.

Foods and ingredients that meet the definition of bioengineered food must include a disclosure on the packaging or label. However, the following options can be used to meet this disclosure requirement.



The packaging or label can include this statement: "Contains a bioengineered food ingredient."



Inclusion of the USDA Bioengineered symbol can be printed on the label in black and white or color.



Insertion of an electronic or digital link on the packaging can be scanned to load a web page on a consumer's mobile device.



The packaging or label can offer a phone number consumers can text to receive information in response.



It should be noted that the disclosure requirement only applies to foods and ingredients with detectable bioengineered ingredients. Certain refined foods derived from BE foods and ingredients may not include any detectable markers of being bioengineered. For example, when a BE soybean is processed into meal and oil, the oil is not detectable as being BE. In these cases food manufacturers may voluntarily identify products as derived from BE food using the USDA's "Derived from Bioengineering" label.

The USDA does not require specific tests or testing methods for determining the presence, absence or detectability of BE material in a food product. But the USDA does offer guidance on this testing which is available online.

NON-GMO PROJECT

The Non-GMO Project is a 501(c)(3) non-profit organization that provides badging on food product packaging verifying these products as being free from genetically modified or transgenic organisms.

According to The Organic and Non-GMO Report, an unaffiliated industry newsletter, the Non-GMO Project's butterfly logo is second only to the USDA's Certified Organic logo in U.S. consumer recognition.

OVERVIEW

The Non-GMO Project was founded by two natural foods stores, The Natural Grocery Company in California and The Big Carrot Natural Food Market in Toronto, Canada, in 2007. Both retailers had previously led grassroots efforts to get food processors to disclose whether their products contain GMOs. These companies also banned the sales of GMO-containing products in their stores.

A report published by Consumer Reports, a broadly read and highly respected consumer advocacy publication in the United States, indicated the Non-GMO Project Verified seal to be the only "highly meaningful" label for consumers seeking to avoid GMOs. The non-GMO project does not individually test and inspect samples, meaning that there is no set standard for maximum allowable GMO materials in their products.

The Non-GMO Project Verified logo, commonly referred to as the butterfly, began appearing on products in 2010. It currently appears on over 50,000 products representing more than 3,000 brands and \$26 billion in annual sales.



Sources:

- Linkage Research and the Non-GMO Project survey, which indicated 63% of U.S. consumers recognized the USDA Certified Organic logo and 54% recognized the Non-GMO Project Verified butterfly logo
- Consumer Reports Food Safety and Sustainability Center Report on GMOs in Corn and Soy, October 2014



Industry Standards

The following summaries describe the voluntary standards for tofu and soy milk production and labeling developed decades ago by the Soyfoods Association of America – a now defunct organization that has been largely replaced by the Soy Nutrition Institute (SNI).

These standards are voluntary and so not enforceable, but in the years since they were developed, they have been largely adopted by the soy foods industry in the United States. They can be considered the de facto industry standards. In other words, these are the standards and practices that American consumers of soy foods are familiar with.

TOFU

PRODUCT CATEGORIES AND PROCESSING



Standard Tofu

The basic ingredients of tofu are whole soybeans; one or more food-grade coagulants, which are typically a salt, such as magnesium chloride or calcium sulfate, or an acid or acid-forming compound, such as glucono delta-lactone; and water.

Other ingredients, excluding spices, sweeteners, seasonings, etc., such as defoamers, preservatives and various quality improvers, can be used provided the ingredient is not a food additive or color additive as defined in the Federal U.S. Food, Drug and Cosmetic Act.



Manufacturing Process

1. Whole soybeans are ground with or without water, and then cooked with water.
2. The resultant soy slurry goes through an optional filtration process to remove all or part of the soy pulp or fiber.
3. The resulting product, now referred to as soy milk, is then coagulated to form curds and whey.
4. The whey is removed before and/or while the curds are pressed.
5. The finished, pressed curds may now be referred to as tofu.



Tofu Characteristics

Variety of Tofu	Food Energy Kcal/100g	Moisture %	Protein %	Fat %	Carbs (w/fiber)	Ratio Pro/Fat
Soft Tofu	63	88.0	6.0	3.5	1.9	1/7
Tofu	79	84.9	7.8	4.3	2.3	1.9
Firm Tofu	102	79.3	10.6	5.3	2.9	2.0
Extra Firm Tofu	115	79.3	14.0	5.3	2.9	2.6
Silken Tofu						

Note: "Silken" refers to a process for making tofu, and all above tofu varieties can be produced using that process and should meet the representative compositions described in this table for that particular variety.

Source: Soyfoods Association of America

Types of Tofu

Standard tofu is divided into four consistencies: soft, regular, firm and extra firm. These categories are classified by protein content.

- Soft tofu contains from 5.0 to 6.4% protein.
- Regular tofu contains from 6.5 to 9.4% protein.
- Firm tofu contains from 9.5 to 13.9% protein.
- Extra firm tofu contains 14.0% or more protein.

These standards were developed decades ago. This list of does not necessarily reflect current tastes or preferences of American soy foods consumers.

Silken Tofu

The production of silken tofu differs from the production of standard tofu only in step 4 of the manufacturing process.

Steps 1 through 3: Identical to the manufacturing process for standard tofu.

Step 4: The process of making silken tofu generally includes forming the product in a container, which may be the same container in which it is sold.

Tofu Products

Tofu products either contain 50% or more tofu by weight, or they have additional ingredients, including spices, flavorings, sweeteners or seasonings.

Established varieties of tofu products include the following.

- Deep-fried tofu
- Deep-fried tofu pouches
- Tofu burgers, tofu balls or tofu frankfurters
- Grilled tofu

LABELING AND ADVERTISING REQUIREMENTS

Tofu products shall be labeled in compliance with all applicable state and federal laws, including the labeling requirements of the Federal U.S. Food, Drug and Cosmetic Act, the Fair Packaging and Labeling Act, and other Food and Drug Administration (FDA) requirements.

Statement of Identity

The principal display panel of each retail package of tofu shall bear an informative statement of identity that is truthful and not misleading. For the purposes of these standards, the statement of identity shall include the following elements.

1. The word “tofu”
2. The term “soft,” “regular,” “firm” or “extra firm”

Elements of the statement of identity shall appear together on the principal display panel.

Use Date Labeling

Nonfrozen tofu or tofu products shall bear a prominent statement of the date by which the product should be used. All shelf-life claims must be verified by objective laboratory tests. Frozen products shall bear a production date and may bear a use date.



Refrigeration Information Labeling

Tofu that is not heat sterilized and aseptically packaged may be labeled “fresh,” and shall bear on the principal display panel and in boldface type the declaration: “Perishable, keep refrigerated.”

Tofu that is heat sterilized and aseptically packaged may not be labeled “fresh,” need not include any refrigeration instructions, and shall include with directions for use, in boldface type, the statement: “Disregard if package is bloated or broken.”



Substantiation of Advertising Claims

All advertisements for tofu that make objective claims about the properties or benefits of the product should be properly substantiated. Substantiation for all such claims should be in the advertiser’s possession before the claims are disseminated to the public.



SOY MILK

PRODUCT DEFINITION AND CLASSIFICATION

Soy milk is a liquid food obtained as a result of combining aqueous-extracted whole soybean solids and water; or other edible-quality soy protein solids, soybean oil and water; to provide the basic compositional levels recommended below in soy milk classification.

Heat treatment is applied to soy milk to inactivate possible antinutritional factors, such as trypsin inhibitors, and to ensure safety by adequate pasteurization.

Vegetable oils, sweeteners, salt, seasonings and other functional or flavoring ingredients may be added to soy milk. Resulting products should have a soy protein and fat content in accordance with the criteria stipulated for the specified classification.

Soy Milk Classification

Soy milk products are classified according to composition, or the concentration of soybean-derived nutrients and total soybean solids, as follows.

Soy milk shall contain no less than 3% soy protein, 1% soybean fat and 7% total solids.

Soy milk drink, or soy drink, is a beverage that does not qualify as soy milk but that contains no less than 1.5% soy protein, 0.5% soybean fat and 3.9% total solids.

Soy milk powder is the product obtained by removal of water from liquid soy milk, or by the blending of edible-quality soy protein and soybean oil powders.

Soy milk powder shall contain no less than 38% soy protein, 13% soy fat and 90% total solids.

Soy milk concentrate is the product obtained by modifying the level of water in soy milk so that the product shall contain no less than 6% soy protein, 2% soy fat and 14% total solids.

Source:
- Soyfoods Association of America

Soy Milk Composition

Classification	% Soy Protein	% Soy Oil	% Minimum Total Solids
Soy Milk	≥ 3.0	≥ 1.0	≥ 7.0
Soy Milk Drink	1.5-2.9	≥ 0.5	≥ 3.9
Soy Milk Powder	≥ 38.0	≥ 13.0	≥ 90.0
Soy Milk Concentrate	≥ 6.0	≥ 2.0	≥ 14.0



PRODUCT LABELING

All soy milk products shall be labeled in compliance with all applicable state and federal laws, including the labeling requirements of the Federal Food, Drug and Cosmetic Act, the Fair Packaging and Labeling Act and FDA requirements.

Statement of Identity

Soy milk products should be identified by the terms listed above in these voluntary standards, which describe their composition by classification.

Statement of Identity Modifiers

A soy milk product may be labeled as “made from...” or “made with...” in relation to the primary soy protein source used in its manufacture as follows.

1. If the soy milk is made from whole soybeans that have not been subjected to processing to separate the protein and fat components prior to manufacturing the soy milk, the following terms may be used as descriptors.

- Made from whole soybeans
- Made with whole soybeans

2. If the soy milk is made from soybean protein and soybean oil ingredients, other than whole soybeans, the following terms may be used as descriptors.

- Made from isolated soy proteins
- Made with isolated soy proteins
- Made with soy protein
- Made from soy protein

Use Date Labeling

Each package of soy milk should bear a prominent statement of the date by which the product should be used. For example, appropriate phrases include “Use by [month/day/year]” or “Best before [month/day/year].”

Each manufacturer shall determine the shelf life of its products by conducting tests that approximate conditions of handling and storage reasonably expected to be experienced by the products, in a reasonable attempt to ensure that no sour or spoiled soy milk reaches consumers.



Refrigeration Information Labeling

Refrigeration information should be provided prominently together with the use date labeling discussed above, e.g., “Perishable, refrigerate below 40° F (4.4°C),” except for those products which are either canned or aseptically processed and packaged to not require refrigeration.



USSEC Headquarters Office

16305 Swingley Ridge Road, Suite 200, Chesterfield, MO 63017 USA
Phone: +1 (636) 449-6400 • Fax: +1 (636) 449-1292

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