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# China Plant-based Meat Industry Report 2018



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**CEVSN** is a leading industry, market, and economic third-party research firm in China that serves enterprises, organizations, and governments.

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## Section 1: Introduction

### Elaine Siu, Managing Director, Asia Pacific

Taste is the top driver of consumer food choice,<sup>1</sup> and one thing that has always been clear is that consumers love the taste of meat. The global appetite for meat has been increasing for decades.<sup>2</sup> With the world's population projected to reach 9.8 billion by 2050,<sup>3</sup> demand for animal-based foods is expected to rise by nearly 70 percent.<sup>4</sup> China already consumes 28 percent of the world's meat - twice as much as the U.S..<sup>5</sup> In order to meet China's demand for tasty meat products without exacerbating the numerous and well-documented impacts of animal agriculture on the environment and public health,<sup>6</sup> new and innovative approaches for producing meat are needed.



One such innovative approach is to make meat entirely out of plants. The production of high-quality plant-based meat requires understanding the biochemical composition and three-dimensional structure of meat, and replicating those qualities using plant-based ingredients and novel manufacturing techniques. Markets around the world are at very different stages in terms of developing and adopting this new category of plant-based alternatives to animal products. In the U.S., commercially available products such as **Beyond Sausage** and the **Impossible Burger** have demonstrated that plant-based biomimicry can provide the flavor, texture, and overall experience associated with eating meat with a high degree of fidelity and consumer satisfaction. In China, a variety of mock meat products have long been available because many of the country's adherents of Buddhism eat a partly or fully vegetarian diet. However, this industry has not yet begun producing "2.0" plant-based meats - products that are attractive not only to vegetarians, but also to meat eaters.

Unlike in some cuisines such as Western, traditionally animal meat is not as overwhelmingly center-of-the-plate in Chinese food culture. As an example of cultural difference, in Chinese cuisine, tofu is not treated as a meat substitute as in the West, but rather an important, versatile mainstream ingredient in its own right. As for plant-based meat substitutes, "mock meat" or "vegetarian meat", were first recorded in the Tang dynasty one thousand years ago if not earlier.<sup>7</sup> Many of today's leading plant-based meat companies were established as recently as the turn of the 21st century. Notably, since Chinese plant-based meats were born out of the Buddhist tradition and have primarily served the vegetarian inclinations of some of the estimated 245 million national followers,<sup>8</sup> replication of the taste and texture of meat was never pushed past a relatively basic level. In fact, being too similar to real meat could be deemed non-religious.

## Section 1: Introduction

At the same time, the rapid growth of a middle-class population with shifting consumer values has created a favorable market for plant-based meat in China. While increasing income is often linked to increased demand and consumption of meat,<sup>9</sup> increasing affluence also leads to increased concern with factors such as health and sustainability when buying food.<sup>10</sup> Even without true 2.0 plant-based products in circulation, annual sales of plant-based meat in China have seen consistent year-on-year growth rates of around 15% since 2014.

In the U.S., plant-based meat's commercial success was preceded by that of plant-based milk, which began to gain popularity in the early 2000s.<sup>11</sup> Since the investment landscape in China into the plant-based meat 2.0 category is in its infancy, in the investment section of this report we look to adjacent categories such as plant-based milk and snacks to gain insights on the trajectory of plant-based meat industry in China.

While many are interested in the sheer size of China's consumer market, China is also a major producer and processor of plant-based raw materials, particularly soybean. As of 2016, China had the capacity to process approximately half the global supply of textured soy protein and over half of global soy protein isolate. China also has an oversupply of domestic, non-GMO soybean that underpins the Chinese government's policy push to grow the soybean processing industry and soy-based food product category. We also seek to demystify the regulatory approval process for plant-based food products in China, particularly novel ingredients.

Synthesizing data from sources including CEVSN and Bits x Bites, The Good Food Institute has produced this first-of-its-kind report to serve as a benchmark for the emerging category of plant-based meat in China. We hope this information will inform future investments in plant-based meat and, more generally, the plant-based food industry in China. We look forward to acting as a resource for companies and investors in this category as it continues to develop in the coming years.

# Section 1: Introduction

## Definition of Plant-Based Meat

For the purposes of this report, GFI is using the term “plant-based meat” to refer to plant-based products that aim to be direct replacements for animal meat by mimicking the taste, texture, and look of animal meat, and are marketed as doing such. This definition encompasses traditional vegetarian meat commonly known as “mock meat” or “vegetarian meat” (Chinese: “fanghun” or “surou”), examples including vegetarian chicken, duck, sausage, meatball and much more. This definition does not include general soy products not explicitly branded as meat replacements, such as tofu and bean curd varieties, as these food products have much wider applications in the Chinese food culture. Please note that, although they are not biologically classified as plants, fungi and algae-based products are included in our definition of plant-based meat.



## Geographic Scope

This report covers mainland China only. For the purpose of this report and the data collected and analysed, Hong Kong, Macau, and Taiwan are not included.

## Section 2: Companies

Domestic Chinese plant-based meat players are primarily medium-size private companies. The overall market is fairly decentralized with no near-monopolizing players. Most brands have market shares of less than 3%, with a wide ecosystem of small scale players making up the long tail. The larger plant-based meat players come to influence smaller brands in the market, and innovate gradually in areas like taste and texture, product range and marketing.

Though none of these brands would be considered well-known in mainstream society, there are a few relatively bigger plant-based meat focused companies such as Whole Perfect Food (Chinese: Qishan) or Godly (Chinese: Gongdelin). These bigger players also tend to have a longstanding foodservice presence - from supplying Buddhist temples or dedicated restaurants to catering banquets - in order for specialized chefs to showcase delicious and entertaining plant-based meat dining experiences. They have had small but growing ecommerce exposure and focus on B2B, relying on distributors to handle national B2C channels due to the diversity of tastes and cuisines across China.

**Table 1: Top 10 Chinese Plant-based Meat Brands (2018)**

Company	Est.	Production Bases	Main Brands	Example Products	Overview
<b>Chongqing Tianrun Food Technology Co., Ltd</b>	2002	Chongqing municipality	Yi Sheng Yuan 一生缘	Vegetarian Beef 	Current marketing network covers more than 30 central cities in the country, and even Japan, New Zealand and Southeast Asia.
<b>Chongqing Qishuang Group Co.,Ltd</b>	2001	Chongqing municipality	Qi Shuang 奇爽	Vegetarian "Hand Tear" Meat (Chinese: "shousi") 	Qishuang Group has numerous brands under its name, including Qi Fen Xiang, Lobaby, and Sisiroko. Lobaby stores are particularly widespread in the Chongqing area.
<b>Fuzhou Vegetarian World Food Co., Ltd.</b>	2001	Fuzhou (Fujian province)	Sotia 素天下	Vegetarian Seafood (Cod, Abalone, Sea Cucumber) 	Their three main product ranges - "konjac", "soy protein" and "edible fungi" - include together more than 60 popular foods.
<b>Jingxiang Fungi Eco Technology Holding Co., Ltd</b>	2013	Jian (Jiangxi Province)	Jing Xiang 井祥	Vegetarian Shredded Meat Sausage 	Produces much fungi, herbs, and other health products and green ecological products. Distribution network covers more than 20 provinces and cities in China.

## Section 2: Companies

Company	Est.	Production Bases	Main Brands	Example Products	Overview
<b>Maanshan Huangchi Food Co., Ltd</b>	1979	Maanshan (Anhui province)	Jin Cai Di 金菜地	Vegetarian Duck 	Produces sweet snacks, sauces, pickled vegetables and more product categories with a variety of localized flavors.
<b>Shandong Wuxianzhai Food Co., Ltd</b>	2000	Linyi (Shandong province)	Wu Xian Zhai 无贤斋	Vegetarian Beef, Duck 	Has over 40 product varieties, and a long list of certifications including ISO 9001 quality management, ISO 22000 Food Safety, export record, Halal and more.
<b>Shanghai Godly Food Co., Ltd</b>	1922	Shanghai, Zhejiang province	Godly 功德林	Vegetarian Duck, Chicken 	Especially strong presence in Shanghai and surrounding areas. Among the 70 or so Chinese vegetarian chain stores across the country, about 40 are independent stores that exclusively distribute Gongdelin products.
<b>Shenzhen Qishan Food Co., Ltd</b>	1993	Shenzhen, Ganzhou, Nanjing	Whole Perfect Food 齐善	Vegetarian Sausage, Lamb Skewer 	Has nearly 300 specialty stores nationwide, plus overseas distributors in Canada, Singapore, Hong Kong and more. In August 2018, Qishan passed the strict Wal-Mart supplier qualification review, to begin working with Wal-Mart on creating new plant-based meat products for the Chinese market.
<b>Sichuan Huiji Holding Co., Ltd</b>	2001	Chengdu (Sichuan province)	Huiji 徽记	Vegetarian Beef Jerky 	A specialty snack foods manufacturer with a few brands in China, including their eponymous "Huiji" as well as "Haobashi".
<b>Zuming Bean Products Co., Ltd</b>	2000	Zhejiang Province	Zu Ming 祖名	Vegetarian Duck 	Mainly sells through fresh markets, supermarkets, wholesale distributors, and direct sales channels covering major cities. Present in large supermarket chains such as Darunfa, Carrefour and Wal-Mart; exports to regions such as the U.S., Canada, Australia and Southeast Asia.

\* List is alphabetized, based on CEVSN estimates of 2018 total sales volumes (for Qishuang and Jincaidi, including some animal products in addition to plant-based meats), and not including any non-Chinese companies.

## Section 3: Investments



### Overview

The past ten years have seen increasing investment in the plant-based food and beverage category. The number of notable deals in 2018 alone equals the sum of notable deals in the past nine years (Table 2). This trend began with plant-based beverages and more recently started to include plant-based snacks. Deal count has not reached a sufficient level to enable detailed size and growth comparisons in type of transaction (e.g. early stage or A round, pre-exit or exit) or investors (e.g. angel, venture capital, private equity). In this section we analyse three emerging investment trends, namely, plant-based snacks, plant-based beverages, and tech-enhanced protein alternatives.

## Section 3: Investments

**Table 2: Significant Investment Activities in the Plant-Based Food and Beverage Industry (2009-2018)**

Year	Target Company	Brand Name	Primary Product	Deal Size (USD)	Type of Activity	Investor/Acquirer/ Partner
2011	Xiamen Yinlu Holdings Company Limited	Yinlu	Plant-based protein beverage (primary ingredient: peanut)	Not disclosed	Acquisition	Nestle
2014	WhiteWave Foods Company <sup>3</sup>	Silk, Alpro, Provamel etc.	Plant-based milk	7.5 million	Joint Venture	Mengniu Dairy Co
2015	Xiamen Culiangwang Beverage Technology Company	China Green <sup>4</sup>	Plant-based protein beverage (primary ingredient: mungbean, red bean, walnut)	400 million	Acquisition	Coca Cola China
2016	Beijing Zaomi Technology Co Ltd	Veg Planet <sup>7</sup>	Plant-based diet social media platform	400,000	Angel Investment	Intune Capital, U.T. Ventures
2016	Oatly AB	Oatly <sup>5</sup>	Plant-based milk (primary ingredient: oat)	Not disclosed	Joint Venture	China Resources
2018	Hebei Yangyuan Zhuhai Beverage Holding Co Ltd	Yangyuan <sup>6</sup>	Plant-based protein beverage (primary ingredient: walnut)	Approx. 630 million	IPO	—
2018	Haocan (Beijing) Food Service Management Co Ltd	Bengong PavoMea <sup>1</sup>	Snack (primary ingredient: chickpea)	7.4 million	A Round Investment	Lightspeed China Partners, 36kr Fund, Unity Ventures, Eagles Fund
2018	Chizhai Food Technology Development (Beijing) Co Ltd	Guzi Guzi <sup>2</sup>	Snack (primary ingredient: mushroom)	Over 1.5 million	Pre-A Investment	Ruchuan Capital, Midas Capital, QM Angel Investment
2018	InnovoPro	InnovoPro <sup>8</sup>	Plant-based protein ingredient (primary ingredient: chickpea)	4 million	A Round Investment	Bits x Bites, Ran Tuttnauer, Yara Ventures, ID Capital Pte Ltd.
2018	Future Meat Technologies	Future Meat <sup>9</sup>	Cell-based meat	2.2 million	Seed Round Investment	Tyson Ventures, Bits x Bites, etc.

Source: GFI adaptation of Bits x Bites analysis of investment activities involving plant-based food and/or beverage companies with a China connection, meaning either the target company is based in China and/or selling products in China, or the investor/partner is based in China.

Note: The concept of “plant-based protein beverage” in China is different from “protein shake” in Western markets. Plant-based protein beverage has become a popular product category in China in recent years, but is not perceived or marketed as “milk/dairy alternative” as non-dairy e.g. soy milk has been a staple drink in Chinese culture, many decades before dairy milk developed into the industry it is today. Products that are labelled as plant-based protein beverage include almond, walnut, peanut milk (or milk drink).

## Section 3: Investments

### Investment Trends

#### The Emerging Category of Plant-Based Snacking

As a whole, China's snack category is growing quickly, predicted to grow at 20% a year to reach a market value of US \$444 billion by 2020.<sup>12</sup> The market today is largely fragmented, creating an opening for new brands that satisfy a combined consumer craving for health, convenience, and innovations in ingredients and product formats. New plant-based snack brands are emerging as a result to give consumers new options "to snack without guilt." These investments provide a glimpse into the Chinese plant ingredient innovations surfacing amongst early-stage companies today.

PavoMea is a chickpea snack brand founded by a former Pepsico China executive. By aggressively pursuing online and offline retail distribution, PavoMea raised three rounds of funding within 2017-2018 with investors including Eagles Fund and Unity Ventures. (Table 2, note 1)

Mushroom snack brand Guzi Guzi introduced a range of crisps made by processing mushrooms at a low temperature to make them crispy and aromatic. It received pre-A funding in 2018 from Midas Capital, QM Angel Investment, and Ruchuan Capital. (Table 2, note 2)

Most of the plant-based snacks attracting investor interest in China are not direct substitutes for animal-based products. However, snacks are rapidly becoming a "fourth meal" in China. They even replace parts of some meals. In this sense, the growth of the plant-based snack sector allows plants to play a bigger role in the Chinese diet.



## Section 3: Investments

### Corporations Investing in Plant-based Protein Beverages

The protein beverage space has seen no early-stage investment, yet retail shelves are stocked with a constant rotation of new plant-based beverage options. To expand product choices and generate consumer excitement, food and beverage corporations have rapidly turned plant-based beverages into a highly competitive field. In fact, most major food brands in China now have a plant-based beverage strategy. Some, such as juice giant Huiyuan and snack conglomerates Dali Foods and Want Want China, have used internal R&D to launch new brands. Others have pursued partnerships with emerging companies.

In 2014, Mengniu Dairy Co and WhiteWave Foods entered a joint venture as a move to complement Mengniu's main dairy offerings. (See Table 2, note 3)

In 2015, in a Coca Cola China acquisition, Xiamen Culiangwang, a publicly listed plant-based beverage company, became part of the Coca Cola system. Xiamen Culiangwang is a maker of the China Green brand, which sells drinks using multi-grain ingredients including green beans, red beans, and walnuts. (See Table 2, note 4)

In 2016, China Resources, the diversified holding company behind Pacific Coffee and supermarket chain Olé, set up a joint venture to help bring Swedish oat drink brand Oatly to the Chinese market. (See Table 2, note 5)

These corporate moves are making plant-based drink options accessible at scale for customers across the country, from high-end retail environments like Olé to convenience stores in tier 1 to tier 3 cities. The market value of plant-based protein drinks increased sevenfold to US \$18.25 billion in 2016, from only US \$2.5 billion in 2007.<sup>13</sup> A rising attention to lactose intolerance may give the sector a further boost.

Some of these initiatives are part of a corporation's diversified product portfolio, others come from companies that are betting squarely on a plant-focused strategy. Fresh off a successful IPO in 2018, Yangyuan is a nut-based protein beverage brand founded in 1997. It has become the largest walnut beverage brand, with a mainstream customer base sold by its image of protein and brain health benefits. (Table 2, note 6)

The intense competition amongst incumbent food corporations raises the already high barrier for young companies that need to compete with the large companies' sophisticated distribution network in both top and lower-tier cities. On the other hand, it is accelerating the protein beverage marketplace rapidly with a growth rate of 20% per year. Corporates can also be willing partners for startups ready to scale up.

## Section 3: Investments

### Tech-Enabled Protein Alternative Startups Slower to Start but Catching Up

Technology startups are less active in China's protein alternative sector. A rarity is Veg Planet, a media platform targeting the country's vegetarian community and completing an angel round of RMB 2.66 million in 2016. (Table 2, note 7)

The types of innovations taking place elsewhere in the protein alternative technology space - such as cultured meat, yeast engineering, fermentation technology, and machine learning to discover new edible plants - are moving at a much more sluggish pace in comparison to other tech sectors in China.

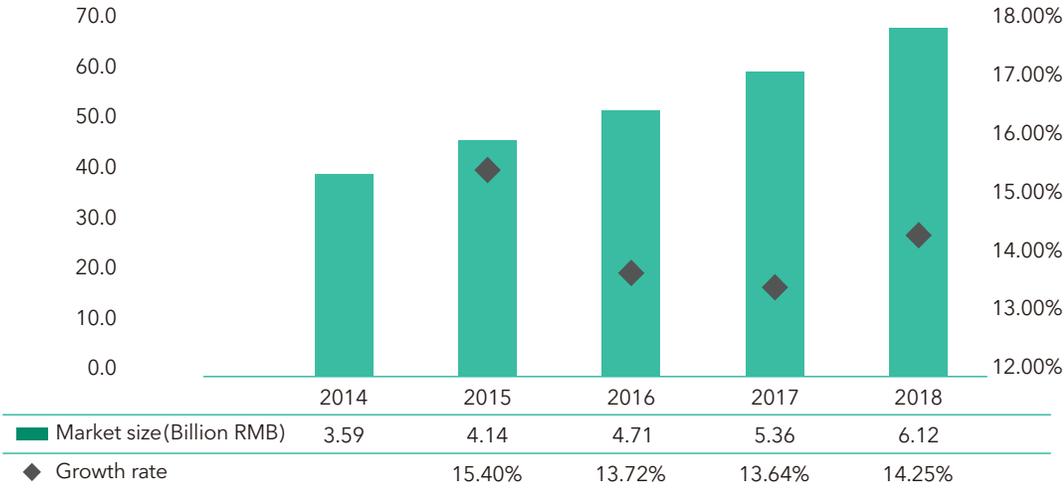
Chinese investors are beginning to back international startups to help commercialize and scale these types of technologies in the future Chinese market. China's first food tech venture capital firm, Bits x Bites, invested in two Israeli startups in this sector in 2018: cellular agriculture company Future Meat Technologies in a joint investment with US's Tyson Ventures (Table 2, note 9) and chickpea protein company InnovoPro. (Table 2, note 8)



# Section 4: Market Overview

In 2018, the market size of the domestic plant-based meat industry was about 6.1 billion yuan (910 million USD), reflecting a year-on-year increase of 14.2%. This growth rate has held very stable over the last five years, between 13.5-15.5%, despite China’s 2018 GDP growth rate of 6.6% being the slowest since 1990.<sup>14</sup> In comparison, in 2018 the US plant-based meat market stood at 684 million USD and exhibited an annual increase of 23%, against a backdrop of 2.2% annualized US GDP growth rate.<sup>15</sup>

**Figure 3: Plant-based Meat Production Volume and Growth Rate (2014-2018)**

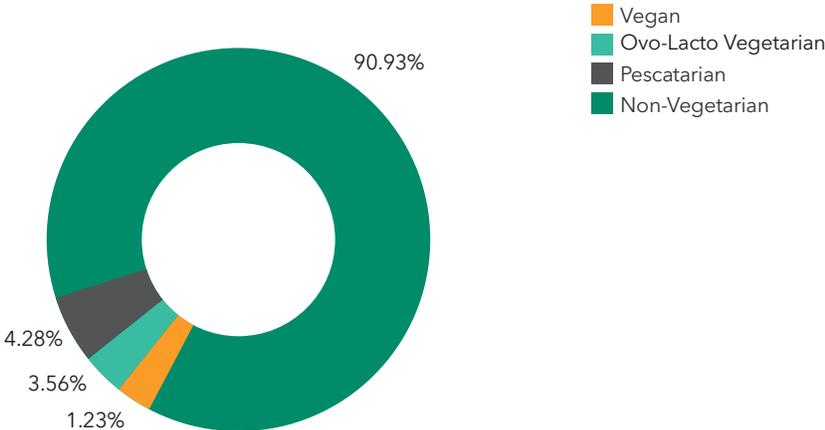


# Section 4: Market Overview

## Consumer Insights

A CEVSN consumer survey (Figure 4) found that while over 90% of the participants did not identify as vegan, ovo-lacto vegetarian, or pescatarian, 86.7% of the participants had experience consuming plant-based meat products. In addition, 13% of non-vegetarians were open to becoming vegetarian, motivated mainly by perceived health and weight loss benefits. Currently, there are around 50 million “vegetarians” in China, loosely defined and including every subcategory (e.g. ovo-lacto vegetarian, pescatarian, flexitarian) except vegan, for which there are currently no official statistics. Following the Buddhist tradition, many religious followers choose to abstain from consuming meat products twice a month (on the 1st and 15th of the lunar calendar), a consumption habit comparable to the Meatless Monday campaign more popular in the West, and Green Monday campaign in Hong Kong.

Figure 4: Composition of Consumers according to Dietary Habits (2017)

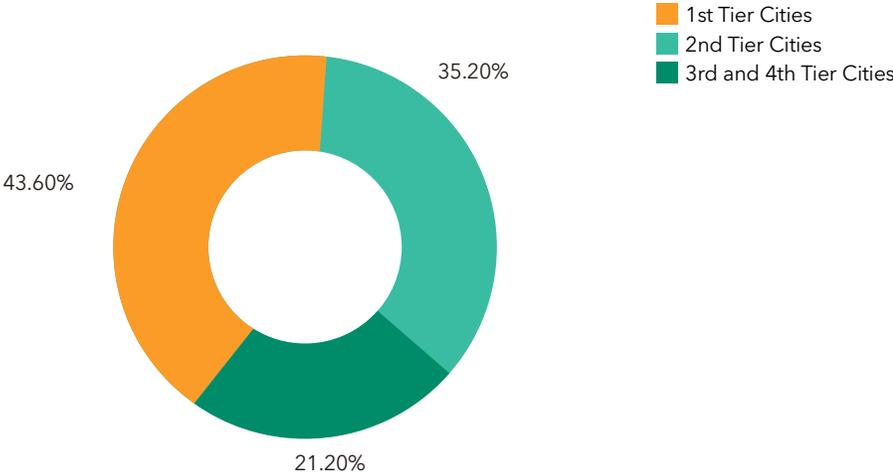


Note: CEVSN conducted a consumer survey on plant-based meat consumption, with 6,000 participants and 5,689 valid responses. Questions concerning annual consumption refer to the second half of 2017 plus the first half of 2018.

## Section 4: Market Overview

Plant-based meat consumers are mainly concentrated in the first-tier cities of Beijing, Shanghai, Guangzhou, and Shenzhen, accounting for 43.6% of overall sales in 2018.

Figure 5: Plant-based Meat Consumption by Region (2018)



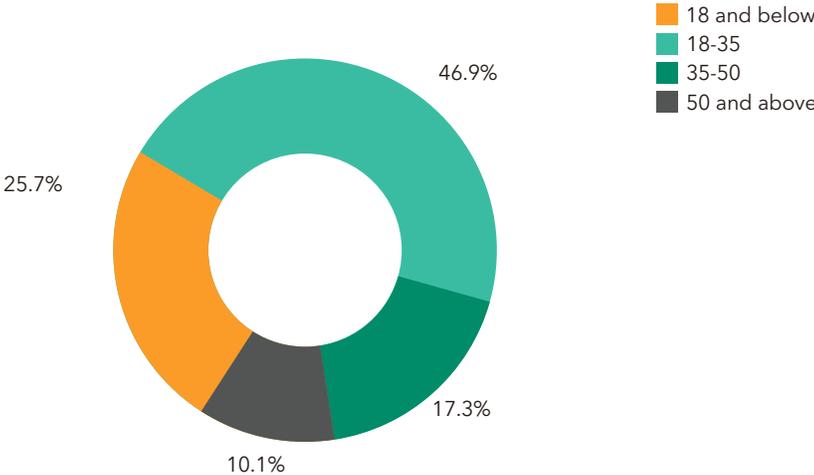
Note: China has over six hundred cities, which are typically divided into five or six “tiers” depending on factors like population, politics, and economic infrastructure. First-tier cities include Beijing, Shanghai, Guangzhou, and Shenzhen. Second-tier, or in some literature “new first tier” cities number around fifteen and include Hangzhou, Chongqing, Nanjing, Qingdao and others. Third tier cities number around thirty, fourth tier another seventy, and fifth tier another ninety.<sup>16</sup> In terms of population spread, approximately 4% of the Chinese population resides in first-tier cities - that is, Beijing, Shanghai, Guangzhou and Shenzhen.<sup>17</sup>

## Section 4: Market Overview

Nearly half (46.9%) of plant-based meat consumers are between 18 and 35 years old, and 25.7% are under 18.

Current domestic plant-based meat sales are primarily accounted for by snack food products, such as vegetarian beef jerky. These products emphasize tastiness and relative healthiness, and are mainly consumed by people under 35.

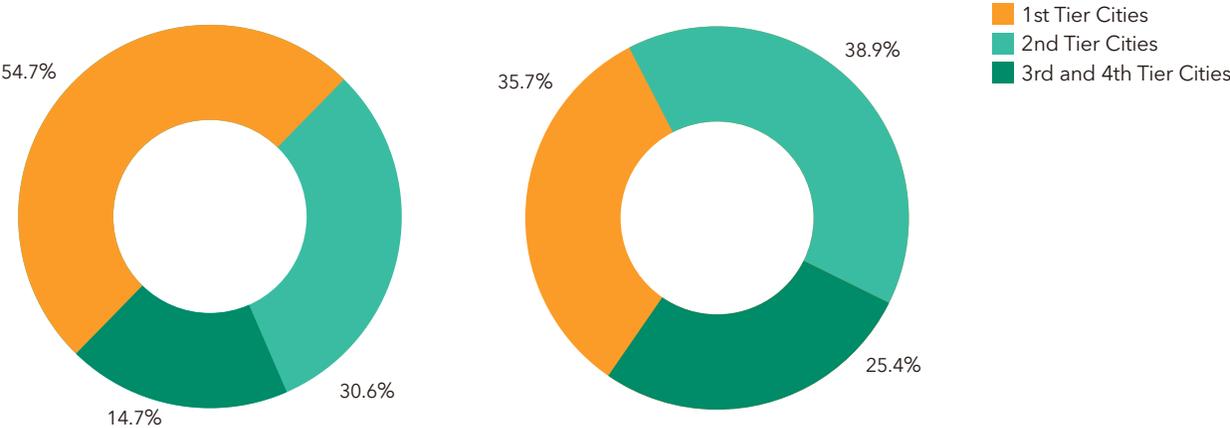
**Figure 6: Plant-based Meat Consumption by Age (2018)**



Online channels have become increasingly important for grocery and food sales - China is the biggest online grocery market by a significant margin, with a projected 31% CAGR over the next five years, the highest among the top ten markets.<sup>18</sup> We therefore also included online versus offline plant-based meat consumption data from 2018. As expected, higher online consumption is seen in first-tier cities: 54.7% of plant-based meat sales occurred online in Tier 1 cities, compared to 35.7% of plant-based meat sales occurring offline in Tier 1 cities.

# Section 4: Market Overview

Figure 7: Plant-based Meat Consumption by Online vs Offline Sales Channels (2018)



(a) Online Plant-based Meat Sales by Region (2018)

(b) Offline Plant-based Meat Sales by Region (2018)



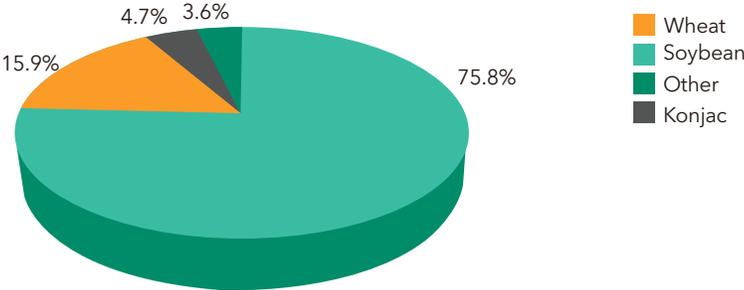
# Section 5: Industry Landscape

## Crops and Raw Materials

Common raw materials for plant-based food in China include soybean, konjac and edible fungi. In China konjac is often dried to produce konjac flour, which then can be used to make a variety of plant-based foods mimicking certain textures such as squid, shrimp, and animal fats. Edible fungi, such as shiitake mushroom, are typically processed by soaking, extrusion, or crushing and then used in products like vegetarian meat floss, jerky, brisket and more.

China produces more than 12 million tonnes of soybean, 400 thousand tonnes of konjac, 17 million tonnes of edible fungi per year. Soybean remains the primary raw material for plant-based meat products in China, making up 75.8% of the market.

Figure 8: Market Share of Plant-based Raw Materials (2018)



While soybean from the U.S. is a major import for China, accounting for more than 32 million tonnes in 2017 alone, imported soybean is used mainly for animal feed. Locally produced soybean is mostly for human consumption and export. Due to local regulatory constraints, soybean produced in China for consumer-facing end products is non-GMO.

## Section 5: Industry Landscape

It is also worth noting that China is a major exporter of processed protein. In 2013, China exported close to 130,000 tonnes of concentrated and synthetic proteins while importing only about 200 tonnes (Figure 9 and 10). As of 2016, China had the capacity to process as much as 79% of global soy protein isolate, 50% of global textured soy protein, and 23% of global soy protein concentrate.<sup>19</sup> As of 2017, there were seven pea producers in China with total processing capacity of 67,453 tonnes per year, rising to 146,313 tonnes per year by the end of 2019, according to expansion plans.<sup>20</sup> Pea costs generally several times more than soy, and nearly all the pea protein processed in China is a raw material intended for export. Allergies to soy-based products, or the perception of soy being an allergen, are also less common in the Chinese market.



## Section 5: Industry Landscape

Figure 9: Export of Concentrated and Synthetic Proteins (2011-2014)

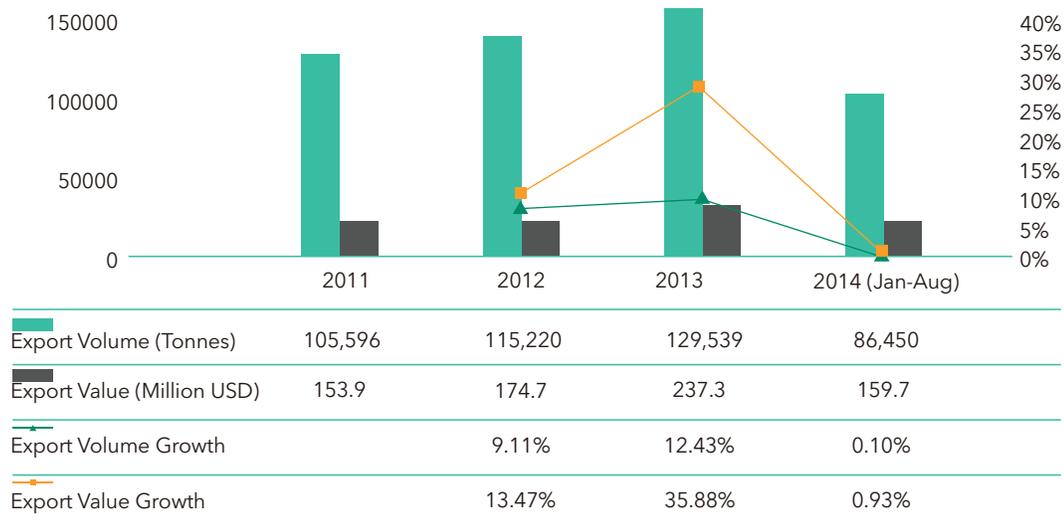
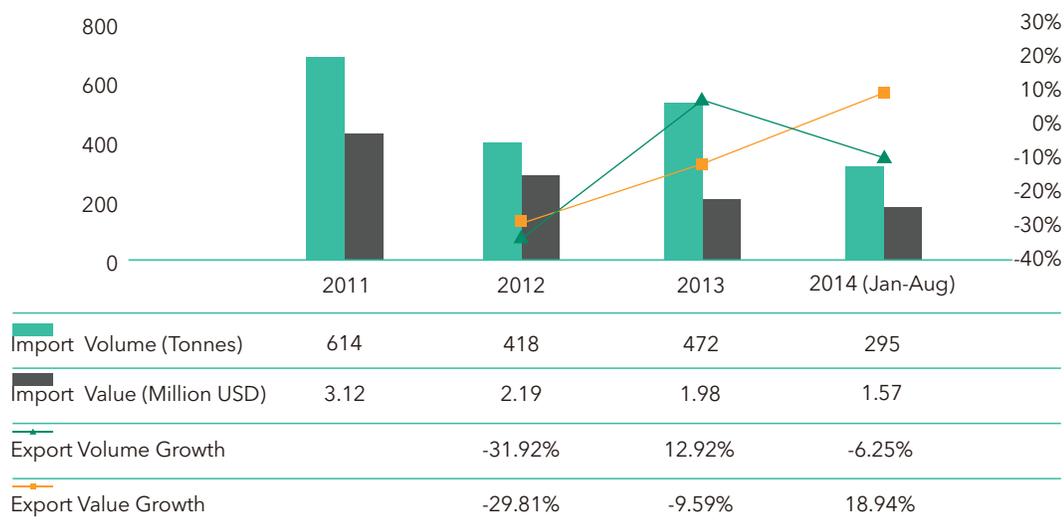


Figure 10: Import of Concentrated and Synthetic Proteins (2011-2014)

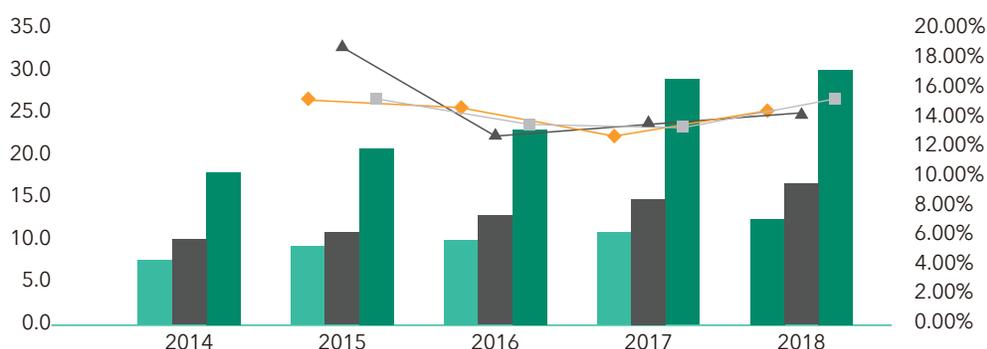


## Section 5: Industry Landscape

### Processing Technologies

Three main types of processing technologies are currently deployed in the plant-based meat industry in China - extruded protein, fibrous protein, and heat-induced gel protein. In terms of production volume, extrusion currently has double the volume of the other two processing methods, and all three methods have been growing at a relatively steady 12-15% rate in 2014-2018. As plant-based meat products become more mainstream and the target market expands beyond vegetarians, it is anticipated that consumers will demand more meat-like texture, which can be achieved through improvements in extrusion machinery and technologies.

Figure 11: Market Share and Growth Rate by Processing Technologies (2014-2018)



#### Extruded Protein

	2014	2015	2016	2017	2018
Market size (Billion RMB)	17.2	20.3	22.9	28.1	29.8
Growth rate		18.02%	12.81%	13.97%	14.18%

#### Fibrous Protein

Market size (Billion RMB)	7.1	8.2	9.4	10.5	12.1
Growth rate		15.49%	14.63%	12.77%	14.22%

#### Heated-induced Gel Protein

Market size (Billion RMB)	9.3	10.9	12.4	14.1	16.2
Growth rate		14.74%	13.76%	13.71%	14.89%

## Section 5: Industry Landscape

### Regulatory and Policy Overview

Food safety assurance is the focal point of regulatory supervision. Consumer concerns around food safety and health issues continue to loom large in media and public sentiment, fueled by recent decades by infamous local scandals, including melamine-tainted milk powder, gutter oil, and many other food-safety crises.<sup>21</sup> There remains high public distrust of national food supply chain practices and industry certifications. At the same time, China's purchasing power and consumer demand for internationally trendy as well as healthy and nutritious products is higher than ever. Across both retail and foodservice sectors, and beyond the food industry, favorably marketed imported products and Western concepts often enjoy relative exemption from the negative stigmas associated with nationally produced goods.

For novel food ingredients, the regulatory approval procedure is typically handled by the National Health Commission (NHC).<sup>22</sup> Novel food ingredients do not include genetically modified organisms (GMO), health foods, and food additives. Whether novel ingredients involve genetic modification (GM) or not is a particularly important factor given China's high sensitivity, socially and politically, to questions of safety, ethics, and environmental impacts concerning GMOs. Currently, GM food ingredients face severe protraction if not practically deadlocked regulatory approval pathways among the Ministry of Agriculture and Rural Affairs (MARA) and NHC. Imports of GM crops such as soybean and corn are allowed for industrial processing, but no commercial planting of GM crops for food use is allowed on Chinese soil. Some GM ingredient applications have been seeking approval for seven years or more.<sup>23</sup>

On the other hand, any plant-based entrants that seek to incorporate non-GM novel ingredients and additives can expect a relatively clearer approval process centered around safety assessments and justified domestic needs. Among the list of approved novel ingredients and additives, there are already a number of items relevant for plant-based products.

**Table 3: Approval of Novel Food Ingredients**

Classification	Governing Body	Procedural Key Steps	Typical Timeframe
Non-GMO food ingredient or additive	National Health Commission (NHC)	<ul style="list-style-type: none"> <li>• Application</li> <li>• Review by a bimonthly expert panel, local testing</li> <li>• Recommendation (approval, supplementation, rejection)</li> </ul>	1-2 years
GMO crop food ingredients (for domestic production)	Ministry of Agriculture and Rural Affairs (MARA)	<ul style="list-style-type: none"> <li>• Similar to NHC procedure, with less frequent (triannual) expert panel convention, and biosafety certificate awarded upon approval</li> </ul>	5-7 years

Source: GFI adaptation of Dentons Shanghai insights on Chinese regulatory approval for (plant-based) novel food ingredients.

Section 5: Industry Landscape



# References

1. 2018 Food & Health Survey. IFIC; 2018 May. Available: <https://foodinsight.org/wp-content/uploads/2018/05/2018-FHS-Report-FINAL.pdf>
2. Food Outlook - Biannual Report on Global Food Markets. FAO; 2018 Nov. Available: <http://www.db.zs-intern.de/uploads/1541755718-2018FAOOutlookNov.pdf>
3. World Population Prospects. United Nations; 2017. Available: [https://population.un.org/wpp/Publications/Files/WPP2017\\_Ke yFindings.pdf](https://population.un.org/wpp/Publications/Files/WPP2017_Ke yFindings.pdf)
4. Searchinger T, Waite R, Hanson C, Ranganathan J. Creating a Sustainable Food Future. World Resources Institute; 2018 Dec. Available: [https://wriorg.s3.amazonaws.com/s3fs-public/creating-sustainable-food-future\\_0.pdf?\\_ga=2.228276187.739362471.1551201834-1831649312.1550860628](https://wriorg.s3.amazonaws.com/s3fs-public/creating-sustainable-food-future_0.pdf?_ga=2.228276187.739362471.1551201834-1831649312.1550860628)
5. Ravenous for Meat, China faces a Climate Quandary. Marcello Rossi; 30 Jul 2018. Available: <https://undark.org/article/china-meat-consumption-climate-change/>
6. Godfray HCJ, Aveyard P, Garnett T, Hall JW, Key TJ, Lorimer J, et al. Meat consumption, health, and the environment. *Science*. 2018;361. doi:10.1126/science.aam5324
7. Soy Info Center: History of Meat Alternatives. Shurtleff W, Aoyagi A; 14 Dec 2014. Available: [www.soyinfocenter.com/books/179](http://www.soyinfocenter.com/books/179)
8. Life in Purgatory: Buddhism Is Growing in China, But Remains in Legal Limbo. Yang Siqi; 16 Mar 2016. Available: <http://time.com/4260593/china-buddhism-religion-religious-freedom/>
9. What will China's food demand be in 2025 and 2050? IIASA; 2011. Available: [www.china-food-security.org/indepth/id\\_7.htm](http://www.china-food-security.org/indepth/id_7.htm)
10. Green China: Chinese Consumers Demand Green Products. Daxue Consulting; 14 Nov 2018. Available: <https://daxueconsulting.com/green-china-consumer-demand/>
11. Watson E. "Plant-based" plays way better than "vegan" with most consumers, says Mattson. *FoodNavigator-USA*. 19 Apr 2018. Available: <https://www.foodnavigator-usa.com/Article/2018/04/19/Plant-based-plays-way-better-than-vegan-with-most-consumers-says-Mattson>
12. Snack Maker look to move Upmarket. Chai Hua, *China Daily*; 16 Jan 2019. Available: [www.chinadaily.com.cn/a/201901/16/WS5c3e757ba3106c65c34e4a9c.html](http://www.chinadaily.com.cn/a/201901/16/WS5c3e757ba3106c65c34e4a9c.html)
13. 2018 Protein Beverage Industry Analysis. *Forward-The Economist*. Available (Chinese only): [www.qianzhan.com/analyst/detail/220/180821-5caf6ca9.html](http://www.qianzhan.com/analyst/detail/220/180821-5caf6ca9.html)
14. China's economy grew 6.6% in 2018, the lowest pace in 28 years. Huileng Tan, *CNBC*; 20 Jan 2019. Available: [www.cnn.com/2019/01/21/china-2018-gdp-china-reports-economic-growth-for-fourth-quarter-year.html](http://www.cnn.com/2019/01/21/china-2018-gdp-china-reports-economic-growth-for-fourth-quarter-year.html)
15. China's economy grew 6.6% in 2018, the lowest pace in 28 years. Huileng Tan, *CNBC*; 20 Jan 2019. Available: [www.cnn.com/2019/01/21/china-2018-gdp-china-reports-economic-growth-for-fourth-quarter-year.html](http://www.cnn.com/2019/01/21/china-2018-gdp-china-reports-economic-growth-for-fourth-quarter-year.html)
16. China City Tiers - An Overview. Matt Slater, *China Checkup*; 31 May 2018. Available: [www.chinacheckup.com/blogs/articles/china-city-tiers](http://www.chinacheckup.com/blogs/articles/china-city-tiers)
17. Population of Cities in China (2019). *Geonames*; 2019. Available: <http://worldpopulationreview.com/countries/china-population/cities/>
18. Leading global online grocery markets to create a \$227bn growth opportunity by 2023. *IGD Research*; 29 October 2018. Available: [www.igd.com/articles/article-viewer/t/leading-global-online-grocery-markets-to-create-a-227bn-growth-opportunity-by-2023/i/20396h](http://www.igd.com/articles/article-viewer/t/leading-global-online-grocery-markets-to-create-a-227bn-growth-opportunity-by-2023/i/20396h)
19. Watson E. An estimated 70% of Beyond Burger fans are meat eaters, not vegans/vegetarians, says Beyond Meat. In: *FoodNavigator-USA* [Internet]. 12 Jan 2018 [cited 5 Aug 2018]. Available: <https://www.foodnavigator-usa.com/Article/2018/01/12/An-estimated-70-of-Beyond-Burger-fans-are-meat-eaters-not-vegans-vegetarians-says-Beyond-Meat>
20. Soya Proteins and Soya Protein Products. King Holding; 2016. Available: [www.donausoja.org/fileadmin/user\\_upload/DS\\_Congress/Congress\\_2016/Speaker\\_Presentations/11.45\\_Soya\\_Proteins\\_\\_\\_Soya\\_Protein\\_Products.pdf](http://www.donausoja.org/fileadmin/user_upload/DS_Congress/Congress_2016/Speaker_Presentations/11.45_Soya_Proteins___Soya_Protein_Products.pdf)
21. Market Research of Pea Protein Industry in China. Report Buyer; Feb 2018. Available: [www.reportbuyer.com/product/5365580/market-research-of-pea-protein-industry-in-china.html](http://www.reportbuyer.com/product/5365580/market-research-of-pea-protein-industry-in-china.html)
22. Top 10 Chinese Food Scandals. Peter Foster, *the Telegraph*; 27 Apr 2011. Available: [www.telegraph.co.uk/news/worldnews/asia/china/8476080/Top-10-Chinese-Food-Scandals.html](http://www.telegraph.co.uk/news/worldnews/asia/china/8476080/Top-10-Chinese-Food-Scandals.html)
23. Novel Ingredient Application Safety Assessment Procedure. National People's Congress of the People's Republic of China; 1 Jun 2016. Available (Chinese only): [www.npc.gov.cn/npc/zfjc/zfjcelys/2016-06/01/content\\_1990748.htm](http://www.npc.gov.cn/npc/zfjc/zfjcelys/2016-06/01/content_1990748.htm)
24. China approves first GMO crop imports from United States in 18 months. *Reuters*; 8 Jan 2019. Available: [www.scmp.com/economy/china-economy/article/2181137/china-approves-first-gmo-crop-imports-united-states-18-months](http://www.scmp.com/economy/china-economy/article/2181137/china-approves-first-gmo-crop-imports-united-states-18-months)

Interested in learning more about the future of meat? Check out our US counterpart report, *Plant-based Meat, Eggs, and Dairy: State of the Industry Report*, which includes a custom analysis of investments in plant-based food companies, an analysis of the current retail and foodservice market for plant-based food, and a regulatory update on issues such as labeling and approvals.



State of the Industry Report

# Plant-based Meat, Eggs, and Dairy



# THE GOOD FOOD INSTITUTE (GFI) IS ACCELERATING THE SHIFT TO A SUSTAINABLE, HEALTHY, AND JUST FOOD SYSTEM

GFI's mission is to harness the power of food innovation and markets to accelerate the transition of the global food system to plant-based and cell-based meat, eggs, and dairy. We are building a base of scientific knowledge, sparking innovation, engaging corporations, and influencing policy-makers through five key areas of work:

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