Protein: A Chinese Perspective
An on-line consumer survey conducted in China

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Executive summary
The global diet is changing, with an increased focus on plant-based protein sources. Much of the current understanding around the growing adoption of plant-based sources of protein is based on Western markets. Plant & Food Research, the Ministry for Primary Industries and Mintel Consulting partnered to conduct exploratory research in China to understand whether this trend is likely to gain momentum in this key market for New Zealand exports.

An online survey was carried out in Tier 1 and 2 cities across China in August 2017. Responses were collected from 2000 people.

Key findings from the survey include:

- Increasing affluence means Chinese consumers are trading up to healthier, higher integrity options.
- The main reasons for reducing meat intake is weight management and better general health maintenance.
- More than 60% of Chinese consumers intend to eat more fruit & vegetables, though consumers do not perceive these to deliver protein.
- 39% are eduucing their meat intake, which is coming mostly from pork, now in decline for 3 years. Dairy, fish/seafood and beef, though, are on the rise.
- Those reducing their meat intake are substituting with vegetables and tofu/mock meats.
- A sudden shift towards solely plant-based diets is not expected in this market owing to the entrenched eating culture of balance (huncai/sucai).
- 42% of respondents seek foods that are better for the environment – meat production is viewed as worse for the environment than dairy production.
- Fear of fraudulent products is very high – credentials and assurances that signal authenticity and food safety are strong purchase motivators.
Background
In order to understand the possible disruption to New Zealand primary industries an investigation was undertaken in the US and China, two of our key trading markets. Focusing on these markets allows the comparison of market trends and consumer attitudes towards protein consumption in an already affluent developed market (US) versus one which is still emerging in terms of overall affluence (China).

The Ministry of Primary Industries and Plant & Food Research collaborated to undertake the research and develop a combined report (linked in the Appendices of this report).

Plant & Food Research has a policy of releasing information that may be useful to New Zealand industry. In that spirit, this document contains the tabulated raw data from our on-line survey conducted in China. There is additional content to provide context, and the data is interrogated and discussed to a topline level.
Global situation

World demand for animal-derived protein is expected to double by 2050 (FAO).

This is being driven by:
- Increasing population (9 billion by 2050)
- Emerging economies, increased affluence
- Increasing urbanisation
- Recognition of protein’s role in a healthy diet
- Increased protein needs associated with aging population.

- Maintaining sufficient supply to keep track of this increased demand, using existing methods, is not sustainable.

- There is increased global interest in plant-based sources of protein in the diet as a means to support a healthier life-style as well as addressing growing concern over environmental sustainability.

- Animal-based protein production accounted for over 60% of New Zealand’s total 2016/2017 primary export revenue.

- Future facing – what could the impact be for New Zealand primary industries?

Reference: Opportunities in Plant-Based Foods – PROTEIn (2017) Sutton et al
Is the current New Zealand model sustainable?

- There is increasing discussion regarding the sustainability limits of meat and dairy production in New Zealand.

- Consideration is turning to the role of diversification of protein sources to include plant sources, and how this might contribute to New Zealand's offering of premium future foods.

- Moves to tax carbon emission from agriculture are likely to reduce profitability of livestock farming, whilst lower emissions of plant-based food production systems mean their profitability will be less affected.

- Crops that require fewer inputs than dairy or meat could be integrated into crop rotations to reduce the future environmental impact of New Zealand’s annual land use cycle and export food production.

Reference: Opportunities in Plant-Based Foods – PROTEIN (2017) Sutton et al
Our position in an evolving market

Future possibilities for New Zealand

• To take advantage of consumer trends towards plant-based foods and “flexitarian” lifestyles, there are opportunities for New Zealand to expand and develop plant-based protein sources.

• One of the challenges for plant protein ingredients isolated from single crops remains their “incomplete” essential amino acid content, which in turn has the potential to affect potential returns to producers and growers.

• While soy and lupin are the two highest protein producers on an as-harvested basis, they are also challenging to grow in New Zealand because of their GM status and climatic requirements respectively.

• Plant crops that show significant potential as sources of high quality protein for ingredient and food production in New Zealand include alfalfa, amaranth, cereals, kiwifruit seeds, oilseeds, potato, tree nuts, and wrinkled peas.

Reference: Opportunities in Plant-Based Foods – PROTEIN (2017) Sutton et al
Our position in an evolving market

Use existing expertise to develop premium products

- The majority of plant proteins used in the New Zealand food industry are currently manufactured overseas.

- Many of the requirements for isolating and manufacturing plant proteins are similar to those for dairy proteins. The challenge is to extract and apply the engineering expertise and manufacturing capabilities currently held within our dairy industry to develop new opportunities in plant-based proteins.

- Many existing plant protein foods are of differing sensory quality than their animal-based equivalents. Thus remains a significant opportunity to develop new food technologies and functionalities for plant-based protein foods with higher consumer acceptability. Coupled with functional and nutritional attributes to meet specific market needs, this would allow for premium positioning which suits New Zealand’s globally niche food manufacturing sector.

Reference: Opportunities in Plant-Based Foods – PROTEIN (2017) Sutton et al
Our position in an evolving market

We’ve led the thinking on total utilisation

- New Zealand pioneered the value-add from dairy waste streams by producing whey.

- Materials that could be used to produce plant proteins are themselves “by-products”. Although there are significant challenges to extracting protein from these materials, the sheer volume of waste streams makes them attractive targets for further research and development of foods and bio-based materials.

- There is significant international competition and patented knowledge of production processes making it challenging for New Zealand to make its mark.

- To establish plant protein production industries in New Zealand, we need to use our research capabilities to establish our own “trade secret” processes and protocols for premium plant-based protein foods.

Reference: Opportunities in Plant-Based Foods – PROTEIN (2017) Sutton et al
Our position in an evolving market

We already have the technical capability

- New Zealand has capability in protein research, materials isolation and engineering, and food product development and sensory science.

- The main gap in our capability for developing a plant-based protein food industry exists at the larger industrial scale, where equipment/plants suitable for tonne-scale extraction and purification of plant proteins and co-products are limited.

China was New Zealand’s largest export destination for all primary industries in 2017, importing 9.2 billion dollars worth of product.

We need to build our understanding of protein consumption and dietary attitudes in this market in order to prepare for any future shifts in consumer behaviour.

Reference: Opportunities in Plant-Based Foods – PROTEIN (2017) Sutton et al
Protein in Context
Protein in context

- Protein is an important macronutrient in our diet. It is essential for building and maintaining bones, muscles, cartilage, skin and blood. Unlike fats and carbohydrates, the body does not store protein, so it must be regularly consumed.

- Proteins are found in both plant- and animal-based food; however:
  - foods that contain all nine essential amino acids are described as **complete protein sources**. These tend to be animal-sourced protein such as meat, poultry, eggs, dairy, and fish.
  - foods that do not contain all nine essential amino acids are described as **incomplete protein sources**. These tend to include most vegetable sources.

- A diet combining different plant-based foods can provide all of the essential amino acids without requiring protein sourced from animal products.

- Chinese consumers attribute a diverse range of benefits to protein; from providing energy, aiding in growth and repair, to assisting in weight management.
Global protein consumption

- Overall, plant sources of protein dominate global daily consumption at a rate of 57%, while meat and dairy contribute significantly less on a daily basis at 18% and 10% respectively.

- Per capita availability of animal-based protein has grown faster than plant-based protein over the past 50 years.

- The world population is set to increase to 8.1 billion by 2025, 95% of which will be in developing countries.

- According to economic theorem, with growing wealth comes growing consumption of meat, at the expense of staple starchy foods. Thus we should expect not only a growing demand for animal protein demand to population growth but also due to growing affluence.

- Increasing wealth in developing countries will increase consumption rates of meat (7%) and dairy (20%) (FAO / OECD 2016).

### United States

*Developed economy, sophisticated & highly diversified*

- Highest rate of animal protein consumption; animal protein alone exceeds the recommended daily intake rate for total protein
- Emergence of plant protein products – gaining momentum

### China

*Emerging economy, resource intensive growth focussed*

- Predominantly protein is consumed from plant sources
- Long established use of plant protein products (while highest pork consumption rate in the world; this is matched by a similar level of daily ‘tofu’ consumption)
- Established eating culture where meat (huncai) and plant (sucai) dishes are present in meals together
New Zealand’s current position in the protein market

Meat and dairy accounted for 60% of New Zealand’s total 2016/2017 primary export revenue.

- 43% of our beef exports went to the US; 97% of those were grass-fed ground beef.
- Milk powder has been New Zealand’s largest export commodity to China since December 2008.
- There are over 14,000 commercial sheep, cattle and deer farms in New Zealand and 12,000 commercial dairy farms. Over 40,000 people are employed over the dairy industry in New Zealand.
- China was New Zealand’s largest export destination for all primary industries in 2017, importing a total of 9.2 billion dollars worth of products.
- China is the largest export market for New Zealand Seafood (31%), Dairy (25%) and Meat and Wool (21%).
- Euromonitor data indicates that Chinese imports of dairy products are expected to rise 50% between 2016 and 2026 due to increasing consumer demand and an inability to meet this demand with local production.

Reference: MPI Situation & Outlook Primary Industries June 2017
The Chinese Context
The Chinese Government revised its Healthy Eating Guidelines in 2016 and generated this Food Guide Pagoda graphic to provide Chinese people with guidance to maintain a healthy lifestyle and avoid disease.

- It includes 5 levels, representing the recommended proportion of the different food groups in the diet.

- Recommendations to drink plenty of water and to do physical activity are also included in the food guide.

**Messages**

- Eat a variety of foods, with cereals as the staple
- Balance eating and exercise to maintain a healthy body weight
- Consume plenty of vegetables, milk, and soybeans
- Consume an appropriate amount of fish, poultry, eggs, and lean meat
- Reduce salt and oil, and limit sugar and alcohol

The Chinese diet at a glance

• Plant-based protein products (tofu/bean curd, etc.) are a long established meal component in China they have been consumed widely for around 2000 years.

• There is a strongly established eating culture whereby plant (sucai) and animal (huncai) based dishes are considered the basic elements of any meal. They do not substitute for each other, they are complementary. As a consequence, vegetarianism and veganism is still very rare in this culture.

• Chinese consumers obtain most (c. 60%) of their daily protein from plant sources.

• China consumes less meat overall than more developed countries, yet it has one the highest consumption rates of pork (but this has shown decline over the last 3 years).
The Chinese consumer at a glance

- A Mintel lifestyle survey showed health and wellness goals consistently sit at the top of the life priorities list for Chinese consumers.

- 80% of consumers hoped to achieve a healthier diet in the next 12 months.

- The pressures associated with a rapidly growing economy are also reflected in the changes to priorities since 2014 (less family time, etc.).

- In our recent survey more than 50% of consumers indicated an intention to cook more at home, suggesting that they seek to take greater control of their health through more closely managing their meals at home.

  - This desire to cook more at home may also address some of the lost family time and work/life balance that has diminished since the last time the survey was conducted.
The Chinese consumer at a glance

• **Safety** and **food authenticity** are paramount in this market where food scandals have been rife. ‘Organic’ is perceived to signal food safety to consumers in this market, as consumers are aware of the rigour involved to gain this accreditation.

• Chinese consumers are open to **environmental** messaging, and there is a perception that meat production is more detrimental to the environment than dairy production.

• The incidence of on-pack environmental claims in this market has more than doubled since 2012 (Mintel GNPD).

• **Online sources** provide the majority of nutritional information to consumers with 57% receiving this information through social media. This may mean that their information is not always accurate.

• The recent PFR survey suggests that Chinese people are very **open to experimentation** with different types of food. While a willingness was shown to trial alternatives to traditional protein sources, insect protein proved a step too far, garnering the highest rate of rejection.

Reference: Mintel 2017 The Impact of Plant-based Protein Consumption in Asia
Approach
Methodology

August 2017

Online survey
• Administered by

China-wide
• Tier 1 & 2 cities
  23% Guangzhou
  20% Shanghai
  20% Beijing
  37% other cities

• N=2000
• Gender 50:50
• Aged 18+ (spread)
• College+ educated
• 85% full-time employed
• 65% married with kids

Survey length: about 10–15 mins
Survey focussed on:
• consumption behaviour (current and intended)
• attitudes towards different sources of protein
• Understanding/perceptions of different sources of protein
• Drivers of choice
• The survey prompted responses to 13 different protein sources (5 animal and 8 plant)

Full demographic breakdowns are included in the demographics section of this report
Product category names and (where applicable) examples used in the survey were defined in consultation with Chinese residents to ensure relevancy and ease of understanding.

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bean Curd/Soy/Mock Meats</td>
<td>including: tofu, wheat gluten, konjac, mock chicken/lamb</td>
</tr>
<tr>
<td>Beef, mutton &amp; lamb</td>
<td></td>
</tr>
<tr>
<td>Dairy products</td>
<td>including: cow, sheep &amp; goat milks, yoghurt drinks, dairy milk powders, cheeses, butter</td>
</tr>
<tr>
<td>Fish &amp; Seafood</td>
<td>lobster, mussels</td>
</tr>
<tr>
<td>Fruit</td>
<td></td>
</tr>
<tr>
<td>Legumes</td>
<td>including: beans, lentils</td>
</tr>
<tr>
<td>Nuts &amp; seeds</td>
<td>including: walnuts, almonds</td>
</tr>
<tr>
<td>Pasta and other grains</td>
<td>including: millet, quinoa, oats</td>
</tr>
<tr>
<td>Plant protein drinks</td>
<td>including: nut/grain/non-dairy milks</td>
</tr>
<tr>
<td>Pork</td>
<td></td>
</tr>
<tr>
<td>Poultry</td>
<td>including: chicken, duck</td>
</tr>
<tr>
<td>Rice &amp; Noodles</td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
</tr>
</tbody>
</table>
China Survey Results
Q1. Thinking about your eating habits over the past year, which of the following product types are you consuming more, less or about the same, vs. the previous year? (Base: Total n=2000 Chinese consumers)

### Q1. Eating More
- **Fruit**: 67.05% (66.1%)
- **Vegetables**: 47.7% (43.7%)
- **Dairy products (e.g., cow, sheep, goat milk, goats milk)**: 36.35%
- **Fish & Seafood (e.g., lobster, mussels)**: 32.75%
- **Nuts & seeds (e.g., walnuts, almonds)**: 32.65%
- **Legumes (e.g., beans, lentils)**: 30.15%
- **Plant protein drinks (e.g., nut, grain, non-dairy)**: 28.85%
- **Poultry (e.g., chicken, duck)**: 21.75%
- **Rice & Noodles**: 21.4%
- **Pasta and other grains (e.g., millet, quinoa, oats)**: 21.05%
- **Pork**: 20.45%

### Q1. Eating Less
- **Pork**: 34.25% (34.25%)
- **Poultry (e.g., chicken, duck)**: 28.2% (28.2%)
- **Beef, mutton & lamb**: 24.7% (24.7%)
- **Pasta and other grains (e.g., millet, quinoa, oats)**: 22.45% (22.45%)
- **Rice & Noodles**: 22.25% (22.25%)
- **Bean Curd/Soy/Mock Meats (e.g., tofu, tempeh)**: 20.15% (20.15%)
- **Nuts & seeds (e.g., walnuts, almonds)**: 19.75% (19.75%)
- **Legumes (e.g., beans, lentils)**: 19.1% (19.1%)
- **Plant protein drinks (e.g., nut, grain, non-dairy)**: 18.6% (18.6%)
- **Fish & Seafood (e.g., lobster, mussels)**: 18.15% (18.15%)
- **Dairy products (e.g., cow, sheep, goat milk, goats milk)**: 14.7% (14.7%)
- **Fruit**: 8.6% (8.6%)
- **Vegetables**: 7.65% (7.65%)

### Q1 About the Same
- **Rice & Noodles**: 55.65%
- **Legumes (e.g., beans, lentils)**: 49.95%
- **Poultry (e.g., chicken, duck)**: 48.15%
- **Pasta and other grains (e.g., millet, quinoa, oats)**: 46.6%
- **Plant protein drinks (e.g., nut, grain, non-dairy)**: 46.35%
- **Bean Curd/Soy/Mock Meats (e.g., tofu, tempeh)**: 45.4%
- **Pork**: 44.3%
- **Nuts & seeds (e.g., walnuts, almonds)**: 41.75%
- **Beef, mutton & lamb**: 39.6%
- **Fish & Seafood (e.g., lobster, mussels)**: 36.3%
- **Dairy products (e.g., cow, sheep, goat milk, goats milk)**: 35.6%
- **Vegetables**: 25.1%
- **Fruit**: 23.35%

### Q1. I do not eat this product
- **Pasta and other grains (e.g., millet, quinoa, oats)**: 9.9%
- **Plant protein drinks (e.g., nut, grain, non-dairy)**: 4.9%
- **Beef, mutton & lamb**: 2.95%
- **Nuts & seeds (e.g., walnuts, almonds)**: 2.15%
- **Legumes (e.g., beans, lentils)**: 2.1%
- **Dairy products (e.g., cow, sheep, goat milk, goats milk)**: 2%
- **Poultry (e.g., chicken, duck)**: 1.9%
- **Bean Curd/Soy/Mock Meats (e.g., tofu, tempeh)**: 1.8%
- **Fish & Seafood (e.g., lobster, mussels)**: 1.8%
- **Vegetables**: 1.15%
- **Fruit**: 1%
- **Pork**: 1%
- **Rice & Noodles**: 0.7%
Combining all responses relating to meat* consumption, 39% of Chinese respondents surveyed are reducing the total amount of meat that they eat.

* pork + red meats + poultry

* 39% Reducing total meat consumption (ex fish/seafood)

However, looking at consumption of specific meats, this will mostly come from pork.

‘net change’ was derived from data on previous slide:
% eating more - % eating less = net change

Alternative Tabulation of Q1.
Change in consumption over last year (Base: Total n=2000 Chinese consumers)

Reported net change in consumption over the last year

- Fruit: 59%
- Vegetables: 59%
- Dairy Products: 33%
- Fish and Seafood: 26%
- Nuts and Seeds: 17%
- Bean Curd/Soy/Mock Meats: 13%
- Plant Protein Drinks: 12%
- Legumes: 10%
- Beef, Mutton Lamb: 8%
- Rice and Noodles: -1%
- Pasta and Other Gains: -1%
- Poultry: -7%
- Pork: -14%

* ‘meat reducers’ = all those ‘eating less’ &/or ‘I do eat this product’ at Q1 & Q3
Q1. Summary – Change in consumption over last year

• Consumption of fruit & veg has increased for most people (~60%) over the last 12 months, no doubt aligned with a desire to ‘have a healthier diet’, which was the top life goal of Chinese consumers in a Mintel survey.

• Consumers are eating more dairy and fish/seafood products than they were a year ago. Respondents had numerous positive health associations with these protein sources.

• Interestingly, plant-based tofu/bean curd, etc. and legumes had a similarly positive health profiles to fish/seafood, yet half as many people are increasing their intake of these plant-based options. The plant products had notably less association with either improving immunity or contributing taste and texture to a meal.

• In keeping with this pursuit of a healthy diet, consumers are reducing the amount of poultry, and even more so the amount of pork that they eat. Many consumers in this study associate pork with the negative health attributes of saturated fat, calories and cholesterol – considerably more than they do for other animal proteins.

• Data suggests that consumers will trade up to healthier and higher environmental and social integrity animal protein sources as increasing affluence allows; but they will still maintain a balance with plant-based components to each meal (huncai & sucai).
Q2. Thinking about the future, which of the following do you plan to do over the next 12 months? (Base: Total n=2000 Chinese consumers)

- **Eat more fruits/vegetables**: 66.25%
- **Cook more at home**: 55.55%
- **Eat less salt**: 49.15%
- **Choose food options that are better for the environment**: 41.8%
- **Choose low-calorie food**: 41.6%
- **Eat less meat**: 36%
- **Eat less processed foods**: 35.4%
- **Eat less saturated fats**: 32.05%
- **Eat less refined sugar**: 29.25%
- **Eat less carbs**: 22.3%
- **Follow a vegan/vegetarian diet**: 14.8%
- **Eat more meat**: 10.6%
- **Eat less products containing gluten**: 8.7%
- **Eat less dairy**: 8.05%
- **None of the above**: 3.4%

**NB: prompted list**

Desire for healthier lifestyle, reducing meat intake - replace with plants.

Impact of Govt guidelines in 2016?

As a means to take greater control of their healthier diet aspirations...and address other life goals (work/life balance)?

Data suggests this will be mainly pork & poultry as consumption of fish/seafood and red meats is increasing.

In EU market this is being driven by younger consumers (Mintel).
Q3. Thinking about your current diet, how often, if at all, do you consume each of the following product types? (Base: Total n=2000 Chinese consumers)
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Alternative Tabulation of Q3. Thinking about your current diet, how often, if at all, do you consume each of the following product types? (Base: Total n=2000 Chinese consumers)

Sorted by: mean frequency of consumption
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

To aid interpretation by readers the attributes on each of the following charts are separated into those that generally have more ‘positive’ (blue) or more ‘negative’ (grey) health associations. These grouping have no relation to nutritional content, they are consumer perceptions only.

Frequency counts for all attributes within a group (positive or negative) were added then averaged to give the group an overall frequency count, then presented as a proportion of positive / negative.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>% for each attribute added / 3</th>
<th>% for each attribute added / 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>High in calories</td>
<td>36.6%</td>
<td>11%</td>
</tr>
<tr>
<td>Source of protein</td>
<td>36.3%</td>
<td>10.9%</td>
</tr>
<tr>
<td>High in cholesterol</td>
<td>34.5%</td>
<td>10.3%</td>
</tr>
<tr>
<td>Provides long-lasting energy</td>
<td>31.9%</td>
<td>10.4%</td>
</tr>
<tr>
<td>Contains saturated fat</td>
<td>30.5%</td>
<td>9.4%</td>
</tr>
<tr>
<td>Adds flavour &amp; texture</td>
<td>25.7%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Keeps me feeling fuller for longer</td>
<td>25.6%</td>
<td></td>
</tr>
<tr>
<td>Helps improve immunity</td>
<td>16.1%</td>
<td></td>
</tr>
<tr>
<td>Easy to digest</td>
<td>11.1%</td>
<td></td>
</tr>
<tr>
<td>Source of vitamins and minerals</td>
<td>10.9%</td>
<td></td>
</tr>
<tr>
<td>Contains carbohydrates/carbs</td>
<td>10.4%</td>
<td></td>
</tr>
<tr>
<td>Source of calcium</td>
<td>10.3%</td>
<td></td>
</tr>
<tr>
<td>Source of fibre</td>
<td>9.4%</td>
<td></td>
</tr>
<tr>
<td>Source of protein</td>
<td>8.2%</td>
<td></td>
</tr>
<tr>
<td>Supports younger looking skin</td>
<td>9.4%</td>
<td></td>
</tr>
</tbody>
</table>
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

**Attributes associated with....Poultry**

- Source of protein: 40.0%
- Adds flavour & texture: 29.1%
- Provides long-lasting energy: 24.5%
- High in calories: 19.9%
- Contains saturated fat: 19.3%
- Keeps me feeling fuller for longer: 18.7%
- Helps improve immunity: 17.1%
- High in cholesterol: 16.2%
- Easy to digest: 15.7%
- Source of vitamins and minerals: 10.4%
- Source of calcium: 10.0%
- Contains carbohydrates/carbs: 9.5%
- Supports younger looking skin: 9.1%
- Source of fibre: 8.6%

**Attributes associated with....Fish & Seafood**

- Source of protein: 45.3%
- Adds flavour & texture: 32.2%
- Helps improve immunity: 28.5%
- Source of calcium: 24.9%
- Easy to digest: 23.1%
- Source of vitamins and minerals: 20.2%
- Provides long-lasting energy: 19.2%
- Supports younger looking skin: 17.4%
- Keeps me feeling fuller for longer: 13.5%
- Contains saturated fat: 12.6%
- Contains carbohydrates/carbs: 10.9%
- High in cholesterol: 10.9%
- Source of fibre: 8.9%
- High in calories: 8.7%
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

Attributes associated with...Vegetables:
- Source of vitamins and minerals: 52.0%
- Source of fibre: 51.5%
- Easy to digest: 38.1%
- Supports younger looking skin: 28.2%
- Adds flavour & texture: 26.6%
- Helps improve immunity: 25.8%
- Contains carbohydrates/carbs: 19.6%
- Provides long-lasting energy: 8.8%
- Source of calcium: 8.6%
- Keeps me feeling fuller for longer: 7.6%
- Source of protein: 6.3%
- Contains saturated fat: 4.4%
- High in cholesterol: 4.0%
- High in calories: 3.7%

Attributes associated with...Fruit:
- Source of vitamins and minerals: 55.3%
- Adds flavour & texture: 40.4%
- Supports younger looking skin: 37.8%
- Easy to digest: 37.0%
- Source of fibre: 34.5%
- Helps improve immunity: 27.6%
- Contains carbohydrates/carbs: 23.8%
- Provides long-lasting energy: 9.9%
- Keeps me feeling fuller for longer: 8.7%
- Source of calcium: 7.6%
- Source of protein: 5.9%
- Contains saturated fat: 4.2%
- High in calories: 4.2%
- High in cholesterol: 3.5%
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

### Attributes associated with Rice & Noodles

- Contains carbohydrates/carbs: 40.2%
- Provides long-lasting energy: 32.5%
- Keeps me feeling fuller for longer: 31.8%
- Easy to digest: 26.9%
- Adds flavour & texture: 16.4%
- Source of protein: 16.2%
- High in calories: 14.3%
- Source of vitamins and minerals: 13.9%
- Source of fibre: 11.5%
- Helps improve immunity: 11.3%
- Contains saturated fat: 9.0%
- Source of calcium: 7.4%
- Supports younger looking skin: 7.3%
- High in cholesterol: 3.6%

### Attributes associated with Pasta & other grains

- Contains carbohydrates/carbs: 27.9%
- Easy to digest: 21.9%
- Provides long-lasting energy: 21.0%
- Keeps me feeling fuller for longer: 20.8%
- Source of fibre: 20.3%
- Adds flavour & texture: 19.5%
- Source of vitamins and minerals: 17.9%
- Source of protein: 14.3%
- Helps improve immunity: 13.3%
- High in calories: 10.6%
- Supports younger looking skin: 9.5%
- Source of calcium: 8.6%
- Contains saturated fat: 8.2%
- High in cholesterol: 5.2%
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

### Attributes associated with.....Legumes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Positive Health Associations</th>
<th>Negative Health Associations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of protein</td>
<td>42.2%</td>
<td></td>
</tr>
<tr>
<td>Source of vitamins and minerals</td>
<td>22.8%</td>
<td></td>
</tr>
<tr>
<td>Helps improve immunity</td>
<td>20.0%</td>
<td></td>
</tr>
<tr>
<td>Source of calcium</td>
<td>20.0%</td>
<td></td>
</tr>
<tr>
<td>Source of fibre</td>
<td>19.0%</td>
<td></td>
</tr>
<tr>
<td>Adds flavour &amp; texture</td>
<td>18.4%</td>
<td></td>
</tr>
<tr>
<td>Contains carbohydrates/carbs</td>
<td>16.4%</td>
<td></td>
</tr>
<tr>
<td>Provides long-lasting energy</td>
<td>15.4%</td>
<td></td>
</tr>
<tr>
<td>Easy to digest</td>
<td>14.9%</td>
<td></td>
</tr>
<tr>
<td>Supports younger looking skin</td>
<td>13.4%</td>
<td></td>
</tr>
<tr>
<td>Keeps me feeling fuller for longer</td>
<td>13.3%</td>
<td></td>
</tr>
<tr>
<td>Contains saturated fat</td>
<td>13.1%</td>
<td></td>
</tr>
<tr>
<td>High in calories</td>
<td>9.0%</td>
<td></td>
</tr>
<tr>
<td>High in cholesterol</td>
<td>7.1%</td>
<td></td>
</tr>
</tbody>
</table>

### Attributes associated with.....Nuts & Seeds

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Positive Health Associations</th>
<th>Negative Health Associations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adds flavour &amp; texture</td>
<td>30.8%</td>
<td></td>
</tr>
<tr>
<td>Source of vitamins and minerals</td>
<td>27.9%</td>
<td></td>
</tr>
<tr>
<td>Helps improve immunity</td>
<td>25.7%</td>
<td></td>
</tr>
<tr>
<td>Source of protein</td>
<td>25.1%</td>
<td></td>
</tr>
<tr>
<td>Provides long-lasting energy</td>
<td>21.1%</td>
<td></td>
</tr>
<tr>
<td>Source of calcium</td>
<td>20.3%</td>
<td></td>
</tr>
<tr>
<td>High in calories</td>
<td>20.0%</td>
<td></td>
</tr>
<tr>
<td>Contains saturated fat</td>
<td>17.0%</td>
<td></td>
</tr>
<tr>
<td>Supports younger looking skin</td>
<td>16.5%</td>
<td></td>
</tr>
<tr>
<td>Keeps me feeling fuller for longer</td>
<td>14.4%</td>
<td></td>
</tr>
<tr>
<td>Source of fibre</td>
<td>13.1%</td>
<td></td>
</tr>
<tr>
<td>Contains carbohydrates/carbs</td>
<td>11.7%</td>
<td></td>
</tr>
<tr>
<td>Easy to digest</td>
<td>10.0%</td>
<td></td>
</tr>
<tr>
<td>High in cholesterol</td>
<td>9.7%</td>
<td></td>
</tr>
</tbody>
</table>
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

**Attributes associated with... Bean Curd, mock meat,**

- Source of protein: 42.8%
- Easy to digest: 26.4%
- Source of calcium: 25.6%
- Adds flavour & texture: 22.8%
- Helps improve immunity: 18.7%
- Source of vitamins and minerals: 17.3%
- Contains carbohydrates/carbs: 16.0%
- Supports younger looking skin: 15.5%
- Provides long-lasting energy: 15.1%
- Source of fibre: 13.2%
- Keeps me feeling fuller for longer: 12.0%
- Contains saturated fat: 10.8%
- High in calories: 7.9%
- High in cholesterol: 6.9%

**Attributes associated with... Plant Protein drinks,**

- Source of protein: 37.5%
- Adds flavour & texture: 26.1%
- Source of calcium: 23.0%
- Helps improve immunity: 22.1%
- Source of vitamins and minerals: 21.0%
- Easy to digest: 20.0%
- Contains carbohydrates/carbs: 18.0%
- Supports younger looking skin: 16.4%
- Provides long-lasting energy: 14.6%
- Source of fibre: 12.1%
- Contains saturated fat: 11.8%
- Keeps me feeling fuller for longer: 11.2%
- High in calories: 10.1%
- High in cholesterol: 6.3%
Comparison of perceived health profiles of food types included in the survey
(Base: Total n=2000 Chinese consumers; relates to responses to Q4)

- **Vegetables**: 86% positive associations, 14% negative associations
- **Fruit**: 87% positive associations
- **Bean Curd, etc.**: 71% positive associations, 29% negative associations
- **Pasta & Grains**: 69% positive associations, 31% negative associations
- **Plant Protein Drinks**: 68% positive associations, 32% negative associations
- **Legumes**: 67% positive associations, 33% negative associations
- **Nuts & Seeds**: 56% positive associations, 44% negative associations
- **Dairy**: 65% positive associations, 35% negative associations
- **Fish/Seafood**: 67% positive associations, 33% negative associations
- **Poultry**: 49% positive associations, 51% negative associations
- **Red Meat**: 56% positive associations, 44% negative associations
- **Pork**: 66% positive associations, 34% negative associations
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

**Associated with...High in calories**
- Pork: 36.6%
- Beef, Lamb, Mutton: 33.2%
- Nuts & Seeds: 20.0%
- Poultry: 19.9%
- Rice & Noodles: 14.3%
- Dairy products: 13.3%
- Pasta, grains: 10.6%
- Plant Protein drinks: 10.1%
- Legumes: 9.0%
- Fish & Seafood: 8.7%
- Bean curd, etc: 7.9%
- Fruit: 4.2%
- Vegetables: 3.7%

**Associated with...Contains saturated fat**
- Pork: 30.5%
- Beef, Lamb, Mutton: 20.2%
- Poultry: 19.3%
- Nuts & Seeds: 17.0%
- Dairy products: 15.5%
- Legumes: 13.1%
- Fish & Seafood: 12.6%
- Plant Protein drinks: 11.8%
- Bean curd, etc: 10.8%
- Rice & Noodles: 9.0%
- Pasta, grains: 8.2%
- Vegetables: 4.4%
- Fruit: 4.2%
Q4. Which of the following attributes, if any, do you associate with each of the following product types?  (Base: Total n=2000 Chinese consumers)
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

### Associated with...Contains carbohydrates

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice &amp; Noodles</td>
<td>40.2%</td>
</tr>
<tr>
<td>Pasta, grains</td>
<td>27.9%</td>
</tr>
<tr>
<td>Fruit</td>
<td>23.8%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>19.6%</td>
</tr>
<tr>
<td>Plant Protein drinks</td>
<td>18.0%</td>
</tr>
<tr>
<td>Legumes</td>
<td>16.4%</td>
</tr>
<tr>
<td>Bean curd, etc</td>
<td>16.0%</td>
</tr>
<tr>
<td>Dairy products</td>
<td>13.7%</td>
</tr>
<tr>
<td>Nuts &amp; Seeds</td>
<td>11.7%</td>
</tr>
<tr>
<td>Fish &amp; Seafood</td>
<td>10.9%</td>
</tr>
<tr>
<td>Pork</td>
<td>10.4%</td>
</tr>
<tr>
<td>Poultry</td>
<td>9.5%</td>
</tr>
<tr>
<td>Beef, Lamb, Mutton</td>
<td>8.5%</td>
</tr>
</tbody>
</table>

### Associated with...Source of calcium

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy products</td>
<td>42.4%</td>
</tr>
<tr>
<td>Bean curd, etc</td>
<td>25.6%</td>
</tr>
<tr>
<td>Fish &amp; Seafood</td>
<td>24.9%</td>
</tr>
<tr>
<td>Plant Protein drinks</td>
<td>23.0%</td>
</tr>
<tr>
<td>Nuts &amp; Seeds</td>
<td>20.3%</td>
</tr>
<tr>
<td>Legumes</td>
<td>20.0%</td>
</tr>
<tr>
<td>Beef, Lamb, Mutton</td>
<td>11.3%</td>
</tr>
<tr>
<td>Pork</td>
<td>10.3%</td>
</tr>
<tr>
<td>Poultry</td>
<td>10.0%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>8.6%</td>
</tr>
<tr>
<td>Pasta, grains</td>
<td>8.6%</td>
</tr>
<tr>
<td>Fruit</td>
<td>7.6%</td>
</tr>
<tr>
<td>Rice &amp; Noodles</td>
<td>7.4%</td>
</tr>
</tbody>
</table>
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

**Associated with...Easy to digest**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>38.1%</td>
</tr>
<tr>
<td>Fruit</td>
<td>37.0%</td>
</tr>
<tr>
<td>Rice &amp; Noodles</td>
<td>26.9%</td>
</tr>
<tr>
<td>Bean curd, etc</td>
<td>26.4%</td>
</tr>
<tr>
<td>Fish &amp; Seafood</td>
<td>23.1%</td>
</tr>
<tr>
<td>Dairy products</td>
<td>22.4%</td>
</tr>
<tr>
<td>Pasta, grains</td>
<td>21.9%</td>
</tr>
<tr>
<td>Plant Protein drinks</td>
<td>20.0%</td>
</tr>
<tr>
<td>Poultry</td>
<td>15.7%</td>
</tr>
<tr>
<td>Legumes</td>
<td>14.9%</td>
</tr>
<tr>
<td>Pork</td>
<td>11.1%</td>
</tr>
<tr>
<td>Nuts &amp; Seeds</td>
<td>10.0%</td>
</tr>
<tr>
<td>Beef, Lamb, Mutton</td>
<td>8.4%</td>
</tr>
</tbody>
</table>

**Associated with...Helps improve immunity**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy products</td>
<td>31.3%</td>
</tr>
<tr>
<td>Fish &amp; Seafood</td>
<td>28.5%</td>
</tr>
<tr>
<td>Fruit</td>
<td>27.6%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>25.8%</td>
</tr>
<tr>
<td>Nuts &amp; Seeds</td>
<td>25.7%</td>
</tr>
<tr>
<td>Beef, Lamb, Mutton</td>
<td>22.2%</td>
</tr>
<tr>
<td>Plant Protein drinks</td>
<td>22.1%</td>
</tr>
<tr>
<td>Legumes</td>
<td>20.0%</td>
</tr>
<tr>
<td>Bean curd, etc</td>
<td>18.7%</td>
</tr>
<tr>
<td>Poultry</td>
<td>17.1%</td>
</tr>
<tr>
<td>Pork</td>
<td>16.1%</td>
</tr>
<tr>
<td>Pasta, grains</td>
<td>13.3%</td>
</tr>
<tr>
<td>Rice &amp; Noodles</td>
<td>11.3%</td>
</tr>
</tbody>
</table>
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

**Associated with...Provides long-lasting energy**
- Beef, Lamb, Mutton: 37.8%
- Rice & Noodles: 32.5%
- Pork: 31.9%
- Poultry: 24.5%
- Nuts & Seeds: 21.1%
- Pasta, grains: 21.0%
- Fish & Seafood: 19.2%
- Dairy products: 18.8%
- Legumes: 15.4%
- Bean curd, etc: 15.1%
- Plant Protein drinks: 14.6%
- Fruit: 9.9%
- Vegetables: 8.8%

**Q4. Associated with...younger looking skin**
- Fruit: 37.8%
- Vegetables: 28.2%
- Dairy products: 19.9%
- Fish & Seafood: 17.4%
- Nuts & Seeds: 16.5%
- Plant Protein drinks: 16.4%
- Bean curd, etc: 15.5%
- Legumes: 13.4%
- Pasta, grains: 9.5%
- Pork: 9.4%
- Beef, Lamb, Mutton: 9.4%
- Poultry: 9.1%
- Rice & Noodles: 7.3%
Q5. Which statements do you associate with PROTEIN?
(Base: Total n=2000 Chinese consumers)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gives you an energy burst</td>
<td>48.3%</td>
</tr>
<tr>
<td>Gives sustained (long lasting)</td>
<td>44.1%</td>
</tr>
<tr>
<td>Helps children develop and grow</td>
<td>40.8%</td>
</tr>
<tr>
<td>Can help replace muscle</td>
<td>40.7%</td>
</tr>
<tr>
<td>Aids recovery from exercise</td>
<td>35.7%</td>
</tr>
<tr>
<td>To help me look &amp; feel younger</td>
<td>35.6%</td>
</tr>
<tr>
<td>Assists with building muscle</td>
<td>31.6%</td>
</tr>
<tr>
<td>Helps you feel fuller for longer</td>
<td>28.9%</td>
</tr>
<tr>
<td>Helps you manage your weight</td>
<td>26.5%</td>
</tr>
<tr>
<td>Helps you to snack less</td>
<td>23.1%</td>
</tr>
<tr>
<td>Helps you to burn more calories</td>
<td>22.3%</td>
</tr>
<tr>
<td>I do not really</td>
<td>1.7%</td>
</tr>
<tr>
<td>None of these</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

*NB: prompted list*
Q6. Thinking about your daily diet, which (if any) of the following changes are you making currently? (Base: Total n=2000 Chinese consumers)

- Cooking more at home: 57.7%
- Choosing low calorie food: 45.5%
- Reducing or avoiding Salt: 45.3%
- Reducing or avoiding Processed Foods: 41.6%
- Reducing or avoiding Refined sugar: 37.3%
- Reducing or avoiding Saturated fats: 34.1%
- Reducing or avoiding Carbohydrates/Carbs: 23.6%
- Following a vegan/vegetarian diet: 16.7%
- Reducing or avoiding Gluten: 13.7%
- None of the above: 3.6%

NB: prompted list
Q7. WHY are you considering reducing, or have already reduced the amount of meat that you currently eat? (Base n=775, all those ‘eating less’ meat at Q1 &/or Q2)

Reasons for reducing meat intake

- Eating too much is bad for my health: 63.5%
- To manage my weight: 56.7%
- Eating less meat is better for the environment: 40.0%
- I have concerns over food safety and authenticity: 35.6%
- Vegetarian/meat-free foods are more nutritious: 25.3%
- To help me look & feel younger: 25.2%
- Government Guidelines recommend eating less meat: 18.3%
- I have concerns over animal welfare: 17.4%
- I don't really like the taste of meat: 13.2%
- It is expensive: 9.4%
- Convenience: 9.0%
- Celebrity endorsements: 4.7%
- Other, please specify: 0.0%

NB: prompted list
Q8. If you are specifically choosing a meat substitute product, which factors would be most important to you? (Base n=775, all those ‘eating less’ meat at Q1 &/or Q2)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low in fat</td>
<td>49.4%</td>
</tr>
<tr>
<td>Additive free</td>
<td>45.9%</td>
</tr>
<tr>
<td>High in protein</td>
<td>42.3%</td>
</tr>
<tr>
<td>Something to add excitement to meals</td>
<td>39.0%</td>
</tr>
<tr>
<td>Taste</td>
<td>38.3%</td>
</tr>
<tr>
<td>Low in salt &amp;/or sugar</td>
<td>38.3%</td>
</tr>
<tr>
<td>Good for environment</td>
<td>33.8%</td>
</tr>
<tr>
<td>Looks tasty</td>
<td>33.6%</td>
</tr>
<tr>
<td>Meat-like texture</td>
<td>33.4%</td>
</tr>
<tr>
<td>It fills me up</td>
<td>27.2%</td>
</tr>
<tr>
<td>Convenience</td>
<td>27.0%</td>
</tr>
<tr>
<td>Price</td>
<td>19.9%</td>
</tr>
<tr>
<td>Place of origin</td>
<td>15.4%</td>
</tr>
<tr>
<td>I would never choose a meat substitute</td>
<td>0.7%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

NB: prompted list
Q9. Why are you considering reducing, or have already reduced the amount of dairy that you eat? (Base: n=440 all those ‘eating less’ dairy at Q1 &/or Q2)

Q9. WHY are considering/already reduced dairy consumption?

- Eating too much is bad for my health: 31.1%
- Plant-based foods are lighter/easier to digest: 30.2%
- To manage my weight: 28.9%
- They contain a lot of fat: 28.0%
- To help with an existing health issue: 26.6%
- I have concerns over food safety and...: 26.4%
- Plant-based foods are more nutritious: 25.2%
- To help me look & feel younger: 22.7%
- I have concerns over animal welfare: 20.5%
- Reducing dairy consumption is better for the...: 20.2%
- Allergies and/or intolerances: 18.2%
- I don’t really like the taste of dairy products: 17.5%
- They’re expensive: 16.1%
- Celebrity endorsements: 11.6%
- Other, please specify: 0.5%

NB: prompted list
Q10. If you are specifically choosing a dairy substitute product, which factors would be most important to you? (Base: n=440 all those ‘eating less’ dairy at Q1 &/or Q2)

- Low in fat: 35.9%
- Additive free: 34.8%
- High in calcium: 32.3%
- High in protein: 28.6%
- Good for environment: 28.0%
- Looks tasty: 28.0%
- Taste: 28.0%
- Something to add excitement to meals: 27.7%
- Same texture as the dairy based products: 27.3%
- Low in salt &/or sugar: 27.1%
- Price: 24.3%
- Convenience: 22.1%
- Fills me up: 21.8%
- Place of origin: 20.9%
- I would never choose a dairy substitute: 0.9%
- Other, please specify: 0.2%

NB: prompted list
Q11. Would you substitute meat and/or dairy with other food types? (base n=882, all those saying ‘eating less’ or ‘do not eat’ meat & dairy at Q1 &/or Q2)

<table>
<thead>
<tr>
<th></th>
<th>No, 19.34%</th>
<th>Yes, 80.66%</th>
</tr>
</thead>
</table>

Q12. Which food types would you substitute for meat/dairy? (base n=882, all those saying ‘eating less’ or ‘do not eat’ meat & dairy at Q1 & Q2)

**Q12. Substitutes for meat?**

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>62.4%</td>
</tr>
<tr>
<td>Bean Curd/Soy/Mock Meats (i.e., tofu, wheat gluten,...)</td>
<td>61.5%</td>
</tr>
<tr>
<td>Dairy products (i.e., cow, sheep, goat milks, yoghurt drinks...)</td>
<td>58.5%</td>
</tr>
<tr>
<td>Eggs</td>
<td>54.5%</td>
</tr>
<tr>
<td>Legumes (i.e., beans, lentils)</td>
<td>46.8%</td>
</tr>
<tr>
<td>Fruit</td>
<td>42.2%</td>
</tr>
<tr>
<td>Rice &amp; Noodles</td>
<td>41.0%</td>
</tr>
<tr>
<td>Nuts &amp; seeds (i.e., walnuts, almonds)</td>
<td>40.0%</td>
</tr>
<tr>
<td>Plant Protein Drinks (e.g., nut milks, grain milks etc.)</td>
<td>35.3%</td>
</tr>
<tr>
<td>Pasta and other grains (millet, quinoa, oats)</td>
<td>33.0%</td>
</tr>
<tr>
<td>Fortified milk drinks/powders</td>
<td>22.9%</td>
</tr>
<tr>
<td>None of the above</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

**NB: prompted list**

**Q12. Substitutes for dairy?**

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Protein Drinks (e.g., nut milks, grain milks etc.)</td>
<td>52.8%</td>
</tr>
<tr>
<td>Fortified milk drinks/powders</td>
<td>49.3%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>48.4%</td>
</tr>
<tr>
<td>Fruit</td>
<td>43.6%</td>
</tr>
<tr>
<td>Nuts &amp; seeds (i.e., walnuts, almonds)</td>
<td>40.1%</td>
</tr>
<tr>
<td>Legumes (i.e., beans, lentils)</td>
<td>35.6%</td>
</tr>
<tr>
<td>Eggs</td>
<td>34.7%</td>
</tr>
<tr>
<td>Bean Curd/Soy/Mock Meats (i.e., tofu, wheat gluten,...)</td>
<td>28.4%</td>
</tr>
<tr>
<td>Pasta and other grains (millet, quinoa, oats)</td>
<td>25.9%</td>
</tr>
<tr>
<td>Rice &amp; Noodles</td>
<td>22.9%</td>
</tr>
<tr>
<td>None of the above</td>
<td>2.7%</td>
</tr>
</tbody>
</table>
Q13/Q14. Which of the following statements, if any, do you associate with each of the following product types assuming they are made in CHINA & NZ? (total base n=2000)

<table>
<thead>
<tr>
<th>Product Types</th>
<th>Ethical (ie free-range)</th>
<th>All natural (ie free from chemical pesticides &amp; fertilizers)</th>
<th>GMO free</th>
<th>Hormone free</th>
<th>No additives/preservatives</th>
<th>Environmentally friendly (ie sustainable production)</th>
<th>Kind to animals</th>
<th>High quality</th>
<th>None of the above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pork</td>
<td>22.3%</td>
<td>19.1%</td>
<td>26.8%</td>
<td>23.4%</td>
<td>20.9%</td>
<td>20.8%</td>
<td>17.8%</td>
<td>25.5%</td>
<td>13.6%</td>
</tr>
<tr>
<td>Beef, mutton &amp; lamb</td>
<td>23.5%</td>
<td>21.2%</td>
<td>24.8%</td>
<td>24.3%</td>
<td>21.8%</td>
<td>21.3%</td>
<td>20.5%</td>
<td>29.0%</td>
<td>10.8%</td>
</tr>
<tr>
<td>Poultry</td>
<td>27.4%</td>
<td>23.8%</td>
<td>22.4%</td>
<td>24.7%</td>
<td>26.2%</td>
<td>22.4%</td>
<td>18.8%</td>
<td>31.5%</td>
<td>18.8%</td>
</tr>
<tr>
<td>Fish &amp; Seafood</td>
<td>19.9%</td>
<td>24.6%</td>
<td>23.8%</td>
<td>22.2%</td>
<td>28.2%</td>
<td>22.4%</td>
<td>13.6%</td>
<td>30.2%</td>
<td>13.3%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>11.3%</td>
<td>39.4%</td>
<td>30.1%</td>
<td>24.7%</td>
<td>31.4%</td>
<td>33.9%</td>
<td>8.3%</td>
<td>25.9%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Fruit</td>
<td>11.3%</td>
<td>37.6%</td>
<td>29.2%</td>
<td>21.7%</td>
<td>29.2%</td>
<td>32.0%</td>
<td>6.9%</td>
<td>30.7%</td>
<td>12.2%</td>
</tr>
<tr>
<td>Rice &amp; Noodles</td>
<td>1.0%</td>
<td>25.6%</td>
<td>29.3%</td>
<td>20.8%</td>
<td>35.5%</td>
<td>32.0%</td>
<td>6.9%</td>
<td>31.7%</td>
<td>9.2%</td>
</tr>
<tr>
<td>Pasta and other grains</td>
<td>9.6%</td>
<td>25.7%</td>
<td>25.5%</td>
<td>22.0%</td>
<td>25.8%</td>
<td>27.0%</td>
<td>7.4%</td>
<td>32.3%</td>
<td>9.7%</td>
</tr>
<tr>
<td>Bean Curd / Soy / Mock Meats</td>
<td>10.6%</td>
<td>25.8%</td>
<td>28.6%</td>
<td>21.6%</td>
<td>27.2%</td>
<td>27.1%</td>
<td>8.6%</td>
<td>30.4%</td>
<td>16.0%</td>
</tr>
<tr>
<td>Legumes</td>
<td>10.5%</td>
<td>30.0%</td>
<td>31.7%</td>
<td>22.1%</td>
<td>27.2%</td>
<td>26.6%</td>
<td>7.6%</td>
<td>31.8%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Nuts &amp; seeds</td>
<td>10.1%</td>
<td>33.2%</td>
<td>35.6%</td>
<td>24.0%</td>
<td>32.6%</td>
<td>28.3%</td>
<td>7.5%</td>
<td>35.2%</td>
<td>12.6%</td>
</tr>
<tr>
<td>Dairy products</td>
<td>15.3%</td>
<td>24.8%</td>
<td>28.3%</td>
<td>21.8%</td>
<td>28.2%</td>
<td>28.3%</td>
<td>14.8%</td>
<td>34.7%</td>
<td>8.6%</td>
</tr>
<tr>
<td>Plant-based dairy alternatives</td>
<td>10.7%</td>
<td>24.8%</td>
<td>25.4%</td>
<td>24.3%</td>
<td>35.4%</td>
<td>26.8%</td>
<td>9.0%</td>
<td>33.5%</td>
<td>18.2%</td>
</tr>
</tbody>
</table>

China

New Zealand
Q15. To what extent do you agree or disagree with the following statements? (Base: Total n=2000 Chinese consumers)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree (%)</th>
<th>Neither (%)</th>
<th>Disagree (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat &amp; dairy products are the best source of many essential vitamins and minerals</td>
<td>79.4%</td>
<td>17.0%</td>
<td>3.7%</td>
</tr>
<tr>
<td>In making healthy food choices, nutritional content is more important to me than flavour</td>
<td>77.1%</td>
<td>16.7%</td>
<td>6.3%</td>
</tr>
<tr>
<td>I am willing to pay more for higher quality meat</td>
<td>76.9%</td>
<td>17.2%</td>
<td>5.9%</td>
</tr>
<tr>
<td>There is a lot of inspiration available for preparing meals that are vegetarian/meat-free nowadays</td>
<td>73.5%</td>
<td>22.0%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Meat reduction campaigns have made me more aware of the benefits of eating less meat</td>
<td>72.5%</td>
<td>21.4%</td>
<td>6.2%</td>
</tr>
<tr>
<td>Meals with less meat and more vegetables/beans/pulses appeal to me</td>
<td>72.1%</td>
<td>20.4%</td>
<td>7.6%</td>
</tr>
<tr>
<td>I have noticed a lot of publicity around ‘plant-based diets’ being better for you</td>
<td>71.2%</td>
<td>22.4%</td>
<td>6.5%</td>
</tr>
<tr>
<td>It’s getting easier to get the protein I need from vegetarian/meat-free foods nowadays</td>
<td>66.7%</td>
<td>26.5%</td>
<td>6.9%</td>
</tr>
<tr>
<td>The ingredients in processed meat substitutes concern me</td>
<td>66.1%</td>
<td>23.2%</td>
<td>10.8%</td>
</tr>
<tr>
<td>I cannot get all the nutrition I need from a strictly vegetarian/vegan lifestyle</td>
<td>63.3%</td>
<td>22.3%</td>
<td>14.5%</td>
</tr>
<tr>
<td>Meat substitutes which are similar to real meat appeal to me</td>
<td>61.4%</td>
<td>23.8%</td>
<td>14.8%</td>
</tr>
<tr>
<td>Completely plant-based products are more appealing to me than vegetarian products made with eggs/dairy</td>
<td>61.3%</td>
<td>26.6%</td>
<td>12.2%</td>
</tr>
<tr>
<td>A vegetarian/vegan lifestyle is fashionable</td>
<td>56.9%</td>
<td>30.0%</td>
<td>13.2%</td>
</tr>
<tr>
<td>Vegetarian/vegan foods are less tasty than those containing meat &amp; dairy</td>
<td>54.0%</td>
<td>28.4%</td>
<td>17.6%</td>
</tr>
<tr>
<td>Vegetarian/vegan foods will not fill me up</td>
<td>47.5%</td>
<td>28.5%</td>
<td>24.0%</td>
</tr>
</tbody>
</table>
Q16. Where do get your nutritional/dietary information from? (Base: Total n=2000 Chinese consumers)

<table>
<thead>
<tr>
<th>Source of Nutritional Info</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friends &amp; Family</td>
<td>54.9%</td>
</tr>
<tr>
<td>On-line searches</td>
<td>50.2%</td>
</tr>
<tr>
<td>Social Media/Blogs (weChat public accounts, Zhihu/knowledge</td>
<td>48.3%</td>
</tr>
<tr>
<td>sharing online communities)</td>
<td></td>
</tr>
<tr>
<td>Doctors &amp; Health professionals</td>
<td>45.7%</td>
</tr>
<tr>
<td>News and Current Affairs</td>
<td>43.8%</td>
</tr>
<tr>
<td>Advertising (i.e. TV, magazines, websites)</td>
<td>34.3%</td>
</tr>
<tr>
<td>Traditional Chinese Medicine Principles</td>
<td>26.5%</td>
</tr>
<tr>
<td>e-commerce sites (ie Taobao)</td>
<td>24.8%</td>
</tr>
<tr>
<td>None of the Above</td>
<td>1.3%</td>
</tr>
<tr>
<td>Other – (please specify)</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

These are the initial go-to sources before asking professionals. Thus the accuracy of the nutritional information may be questionable.
Q17. Which, if any, of the following products (that may or may not be available) are you interested in trying? (Base: Total n=2000 Chinese consumers)

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Have bought in the last 6months</th>
<th>Interested in trying</th>
<th>Not interested in trying</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mock Chicken/Lamb etc products made with wheat gluten</td>
<td>22.8%</td>
<td>59.8%</td>
<td>10.8%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Vegetarian Mock meats made from potato protein</td>
<td>20.45%</td>
<td>59.65%</td>
<td>13.4%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Vegetarian Mock meats made from pea protein</td>
<td>20.3%</td>
<td>59.35%</td>
<td>14.5%</td>
<td>5.85%</td>
</tr>
<tr>
<td>Vegetarian Mock meats made from mushroom/Mycoprotein</td>
<td>22.95%</td>
<td>57.1%</td>
<td>13.55%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Vegetables (frozen) from New Zealand</td>
<td>18.9%</td>
<td>56.2%</td>
<td>16.85%</td>
<td>8.05%</td>
</tr>
<tr>
<td>Mock Meat Sausage eg mock pork sausage</td>
<td>20.95%</td>
<td>54.35%</td>
<td>17.7%</td>
<td>7%</td>
</tr>
<tr>
<td>Fruit (frozen) from New Zealand</td>
<td>24.05%</td>
<td>54.15%</td>
<td>14.45%</td>
<td>7.35%</td>
</tr>
<tr>
<td>Dried Sausage with added vegetables</td>
<td>21.9%</td>
<td>53.4%</td>
<td>18.25%</td>
<td>6.45%</td>
</tr>
<tr>
<td>Mock Chicken/Lamb with soy</td>
<td>25.4%</td>
<td>53.25%</td>
<td>15.65%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Mock Meat snacks eg Mock beef jerky</td>
<td>27.35%</td>
<td>52.75%</td>
<td>14.1%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Fish/Chicken balls with added vegetables</td>
<td>26.35%</td>
<td>52.4%</td>
<td>15.5%</td>
<td>5.75%</td>
</tr>
<tr>
<td>Mock Chicken/Lamb etc products made with insect protein</td>
<td>16.75%</td>
<td>48.5%</td>
<td>26.85%</td>
<td>7.9%</td>
</tr>
</tbody>
</table>
Q18. Which, if any, of the following beverages (that may or may not be available) are you interested in trying? (Base: Total n=2000 Chinese consumers)

- **Milk Tea with soy**: 26.15% interested, 55.15% not interested, 13.1% unsure.
- **RTD Coffee with nut milk**: 28.6% interested, 54.9% not interested, 11.65% unsure.
- **Milk Tea with nut milk**: 31.65% interested, 53.8% not interested, 9.75% unsure.
- **Milk drink with added whey protein**: 26% interested, 53.45% not interested, 14.1% unsure.
- **Milk drink with added vegetables**: 30.25% interested, 53.3% not interested, 11.4% unsure.
- **Milk drink with oats**: 33.5% interested, 50.25% not interested, 11.6% unsure.
- **Milk drink with added insect protein**: 13.65% interested, 47.55% not interested, 29.45% unsure.
- **Milk drink with coconut**: 37.9% interested, 46.3% not interested, 11.45% unsure.
- **Milk drink with added fruit**: 43.7% interested, 42.1% not interested, 11.3% unsure.
Q19. How available are meat substitutes (i.e. tofu, mock meats) to you? (Base: Total n=2000 Chinese consumers)
Q19. How likely would you be to buy lab-grown meat (meat grown in a laboratory not from an animal)? (Base: Total n=2000 Chinese consumers)
China Survey Discussion
Chinese consumers recognise a diverse range of benefits from protein in their diet – most associate proteins with providing energy, and aiding in growth and repair. Some food types are more highly associated with providing protein than others.

![Graph showing associated benefits of protein sources](image-url)

Chinese consumers associate protein with:

- Gives you an energy burst: 48.3%
- Gives sustained (long lasting) energy: 44.1%
- Helps children develop and grow: 40.8%
- Can help replace muscle: 40.7%
- Aids recovery from exercise: 35.7%
- To help me look & feel younger: 35.6%
- Assists with building muscle: 31.6%
- Helps you feel fuller for longer: 28.9%
- Helps you manage your weight: 26.5%
- Helps you to snack less: 23.1%
- Helps you to burn more calories: 22.3%

Animal and plant sources ranked similarly highly for their association with protein delivery.
Consumers understand that many food sources (plant- & animal-based) contribute protein to their diet; however, some have better health credentials than others

**Fish/seafood** dominate the Chinese view of a healthy meat protein, with the most positive, and least negative health associations. They bring flavour and texture to a meal, improve immunity, contribute calcium and are easy to digest, as well as being a good source of vitamins and minerals.

**Dairy** products are viewed as having far fewer negative health associations than meat products (except fish), contributing calcium as well as having good immunity boosting properties.

While **pork** is perceived as a good source of protein, it is strongly associated with some negative attributes, namely calories, saturated fat and cholesterol, thus popularity is declining. Increasing affluence and awareness of health could be contributing to the move away from **pork** to other meats that are perceived as healthier.

**Bean curd and legumes** have positive health credentials, similar to dairy and fish; however, there is less intent to eat more of them. It appears that they simply do not deliver a comparatively positive sensory experience, and do not have the perceived link with immunity that the animal-based options do.

There is widespread intention to eat more **fruit and vegetables**, but a shared impression that while they provide the greatest source of vitamins and minerals they contribute very little protein (so must be consumed with protein-rich accompaniments).

8% of respondents intend to eat more **beef / lamb/mutton**; they had less association with saturated fat and cholesterol than pork, the most commonly consumed meat in China. **Beef** is now the most commonly asked for meat choice when eating out, and is widely considered to be of premium quality (Menu Insights 2015).
Health & wellness is important – but not enough to change purchasing sentiment alone

- We compared the animal and plant foods that consumers most associated with protein delivery (dairy, fish and tofu, legumes).

- Their perceived health profiles were very similar; however, consumer ‘intent to eat more’ was considerably less for the plant-based options.

- The animal-based options were each more associated with helping immunity and adding flavour & texture to meals than the tofu and legumes.

This appreciation that both animal and plant sources of protein deliver benefits (and have shortcomings) suggests that a sudden shift to solely plant-based protein based on health benefits cannot be assumed in the Chinese market.
A paradox: sensory experience vs nutritional content

- 77% of respondents said that ‘in making healthy food choices, nutritional content is more important to me than flavour’. However, legumes and bean curd, which were perceived to have similarly positive health profiles to fish and dairy products, generated far less ‘intent to eat more’ than the animal-based options.

- For those who would opt to replace meat with a meat substitute product (38% of those surveyed), the most important factors in this selection were that it be: low in fat, additive free and high in protein. However, this was closely followed by more sensorially focussed criteria: a substitute should add excitement and taste to my meal, it should look tasty and have a meat-like texture. 61% went further to say that ‘meat substitutes which are similar to real meat appeal to me’.

- It is suggested that with increasing affluence in this market, there will be less willingness to compromise, thus healthier options will be expected to deliver on sensory facets as well as nutritional credentials.
Consumer value drivers

Food safety concerns underpin all consumer drivers.

In China food safety is top-of-mind. In recent years there have been a number of food scandals where food made with fake or toxic ingredients has been exposed. These incidents have led to a heightened sense of suspicion around the origin and content of food products. Over a third of the people who were actively reducing their meat intake in this study indicated that they were doing so because of their ‘concerns over food safety and authenticity’ (and c. 25% for dairy). Mintel suggests an opportunity for organics – as they are perceived as safe because of the rigorous standards that they must adhere to for certification.

Two thirds of those surveyed said that ‘the ingredients in processed meat substitutes concern me’; yet a large proportion (c. 50%) of respondents showed an interest in experimenting with novel food and beverage concepts that offered to replace or blend animal-based ingredients with plant material. This dichotomy highlights the complexity of navigating these issues in this market.

Price not affecting purchasing sentiment.

Only 9% and 16% of respondents indicated high price as a driver to reduce dairy and meat consumption respectively.

This suggests that the higher prices demanded for animal protein is justified by the perceived benefits. In fact, over three quarters of those surveyed indicated that they are willing to pay more for higher quality meat.

Environmental concerns: an emerging & important driver.

Debate over the potential sustainability of animal-based agriculture has been a major element in the marketing of plant-based foods in Western markets, and Chinese consumers are showing signs that they are open to this messaging. Mintel GNPD data shows a doubling in the number of new food & beverage product launches with on-pack environmentally friendly claims since 2012.

42% of Chinese consumers we surveyed said that they were looking to choose foods that are better for the environment. This sentiment is particularly prevalent amongst those who are already reducing meat intake, with 40% of these consumers citing their reason for eating less meat as being that it’s better for the environment. Our survey group showed an intriguing difference of opinion on dairy sustainability, however, with only 20% believing eating less dairy has the same positive environmental outcome.
Fish and seafood dominate the Chinese view of healthy meat protein

• 26% of those surveyed were increasing the amount of fish/seafood that they ate. This is a future opportunity for growth; China is already New Zealand’s biggest recipient of fish/seafood.

• Above all other food groups investigated in the survey, fish/seafood is the most associated with delivering protein.

• Compared with other meats, fish/seafood is far less associated with the negative health attributes of calories, saturated fat and cholesterol. It is deemed lighter and more nutritious (contributing to improved immunity, calcium, vitamins, minerals and for supporting younger looking skin).

• In order to maintain and grow this category amongst Chinese consumers, relevant and clear messaging to reiterate the health benefits, quality, standards in safety, eco-credentials must accompany high quality product.
New Zealand already exports premium quality products to China. The origin of imported products is no longer a primary reason for purchase. In an increasingly selective market where competition is strong, it is key that messaging is clear and relevant.

• Chinese consumers have a clear association that meat contains calories, saturated fats and cholesterol, yet they still intend to eat it, albeit in smaller amounts of better quality; thus premium quality must be clearly signalled.

• Health & wellness is a key driver in this market, thus any credible health claims that can be attached to products should be.

• Increased response to environmental messaging also cues the need for a sustainability eco-story.

• In a country where food safety is a key concern, trust marks and quality accreditations, and even counterfeit proofing measures should be considered.

• Organic production measures & credentials are a very strong signal of food safety amongst these consumers.

Our data shows that Chinese consumers already associate New Zealand meats with sustainability, animal welfare and quality notably more than meats from China....we should be using this to our advantage!
China Survey
Demographics
Which city do you live in?

<table>
<thead>
<tr>
<th>City</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guangzhou</td>
<td>22.5%</td>
</tr>
<tr>
<td>Shanghai</td>
<td>20.35%</td>
</tr>
<tr>
<td>Beijing</td>
<td>19.45%</td>
</tr>
<tr>
<td>Others</td>
<td>10.85%</td>
</tr>
<tr>
<td>Shenzhen</td>
<td>5.9%</td>
</tr>
<tr>
<td>Chengdu</td>
<td>4.55%</td>
</tr>
<tr>
<td>Nanjing</td>
<td>4.4%</td>
</tr>
<tr>
<td>Hangzhou</td>
<td>2.7%</td>
</tr>
<tr>
<td>Shenyang</td>
<td>2.5%</td>
</tr>
<tr>
<td>Zhengzhou</td>
<td>1.25%</td>
</tr>
<tr>
<td>Weifang</td>
<td>1.05%</td>
</tr>
<tr>
<td>Quanzhou</td>
<td>0.95%</td>
</tr>
<tr>
<td>Harbin</td>
<td>0.85%</td>
</tr>
<tr>
<td>Jilin</td>
<td>0.65%</td>
</tr>
<tr>
<td>Guiyang</td>
<td>0.4%</td>
</tr>
<tr>
<td>Shaoxing</td>
<td>0.4%</td>
</tr>
<tr>
<td>Shantou</td>
<td>0.3%</td>
</tr>
<tr>
<td>Linyi</td>
<td>0.3%</td>
</tr>
<tr>
<td>Guilin</td>
<td>0.2%</td>
</tr>
<tr>
<td>Luoyang</td>
<td>0.15%</td>
</tr>
<tr>
<td>Zhuhai</td>
<td>0.15%</td>
</tr>
<tr>
<td>Pingxiang</td>
<td>0.1%</td>
</tr>
<tr>
<td>Yancheng</td>
<td>0.05%</td>
</tr>
</tbody>
</table>

N=2000, tier 1 & 2 cities only
Demographic breakdown

N = 2000

Gender

- Male: 50%
- Female: 50%

Household Income

- Low household income: 33.35%
- Middle household income: 33.35%
- High household income: 33.3%

Age

- 18-24 yrs: 20%
- 25-34 yrs: 20%
- 35-44 yrs: 20%
- 45-54 yrs: 20%
- 55-65 yrs: 20%

Education Level

- High school or below: 84.05%
- College/University: 7.5%
- Postgraduate or above: 8.45%
Demographic breakdown

Working Status
- I am employed full time: 85.25%
- I am employed part time: 6.6%
- I am self-employed: 6.5%
- I am currently not working: 1.45%

N = 2000

Marital Status
- Single: 0.55%
- Married: 76.2%
- Other: 23.25%

N = 2000

Employment Org type
- Civil servant in state-institution: 41.83%
- State-owned business: 15.59%
- Foreign enterprises: 24.8%
- Privately-owned business: 16.92%
- Others: 0.86%

N = 2000

Family Structure (married n=1535)
- Married without kids: 9.97%
- Married with one kid: 32.9%
- Married with more than one kid: 57.13%

N = 2000
Demographic breakdown

Children (under 18) in Household? (base n=1535)
- Yes: 67.1%
- No: 32.9%

No. of children aged under 18 (base n=1030)
- One: 85.15%
- Two or more: 14.85%

Age of under 18 children at home (base n=1030)
- 0-4 years old: 30.87%
- 5-9 years old: 29.42%
- 10-15 years old: 25.24%
- 16-18 years old: 22.82%
Appendices
Further information

The Evolution of Plant Protein – Assessing Consumer Response
Ministry for Primary Industries, Economic Intelligence Unit and Plant & Food Research, Consumer and Product Insights
May 2018
http://www.foodandbeverage.govt.nz/

Opportunities in Plant-Based Foods – PROTEIN
December 2017

CHINA: Future Protein Insight Edition #3
Plant & Food Research
May 2018
Report for:
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