Plant & Food RESEARCH
RANGAHAU AHUMĀRA KAI

Protein: A Chinese Perspective

An on-line consumer survey conducted in China

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Consumer & Product Insights

THE SCIENCE OF PREMIUM™

The New Zealand Institute for Plant & Food Research Limited

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Executive summary

Protein: A Chinese Perspective

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 educing 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

Why are we doing this?

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.

The Economic Intelligence Unit of the Ministry for Primary Industries (MPI) focuses on developing market insights and analysis for both private and public sectors related to all aspects of the primary industries.

The Consumer & Product Insights team at Plant & Food Research (PFR) conduct research into consumer perceptions and behaviours across markets of interest to New Zealand as a means to launch new products and understand different cultures.

Ministry for Primary Industries
Manatū Ahu Matua

Plant & Food RESEARCH
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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).

Source: GlobAgri model with source data from FAO (2015) and FAO (2011a). Width of bars is proportional to each region's population. Average daily protein requirement of 50 g/day is based on an average adult body weight of 62 kg (Walpole et al. 2012) and recommended protein intake of 0.8 g/kg body weight/day (Paul 1989). Individuals' energy requirements vary depending on age, gender, height, weight, pregnancy/lactation, and level of physical activity.

Reference: http://www.wri.org/sites/default/files/Shifting_Diets_for_a_Sustainable_Food_Future_1.pdf

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 Food Guide Pagoda

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

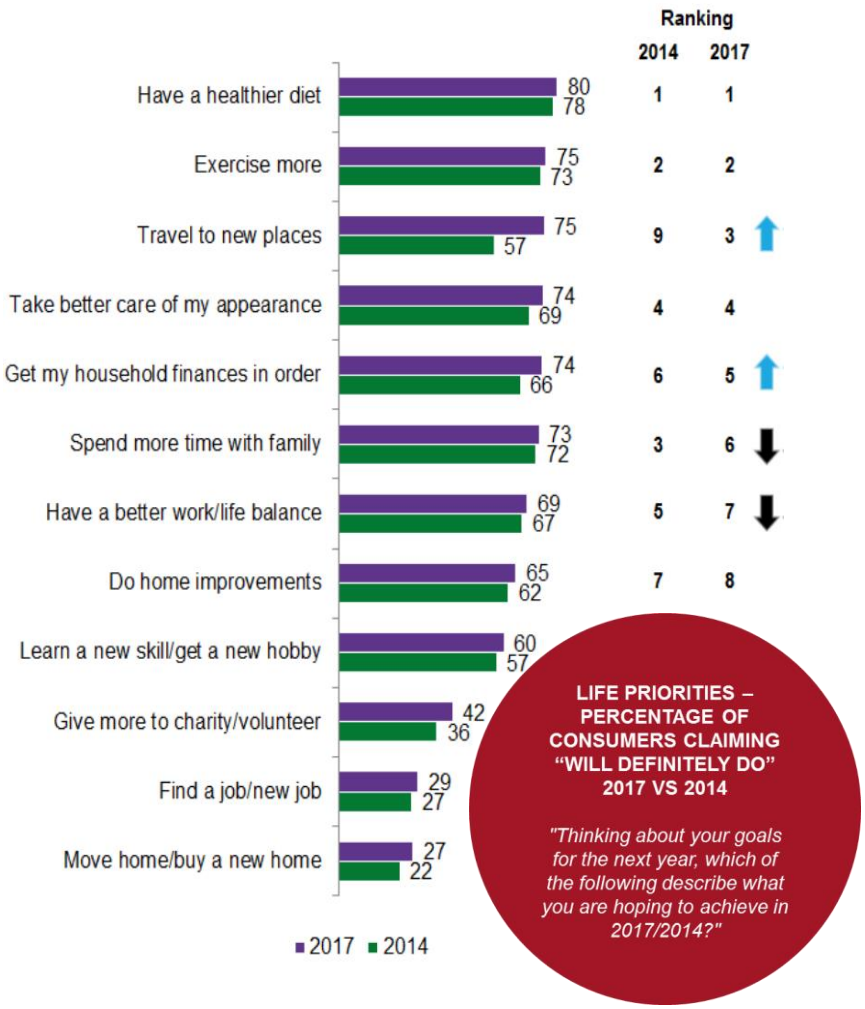
Reference: Chinese Nutrition Society (Chinese); FAO (English)
http://www.fao.org/nutrition/education/food-based-dietary-guidelines/regions/countries/china/en/

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[1]).

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.

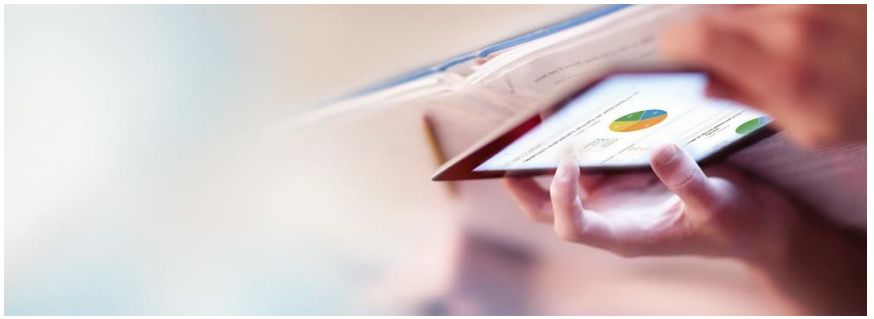


Life Priorities Base: 3,000 internet users aged 20-49 | Source: QQSurvey/Mintel

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 MINTEL

China-wide

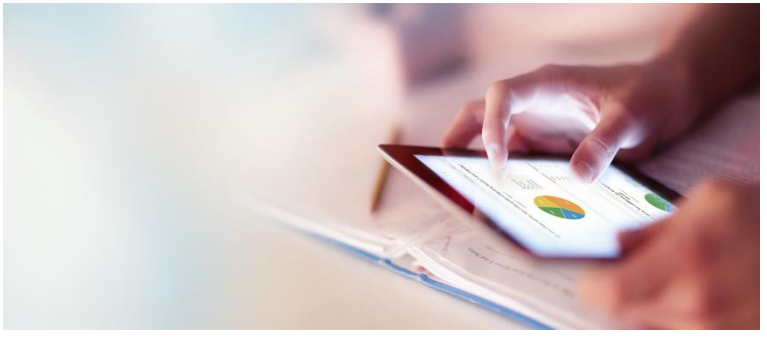
- Tier 1 & 2 cities
  - 23% Guangzhou
  - 20% Shanghai
  - 20% Beijing
  - 37% other cities

- **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

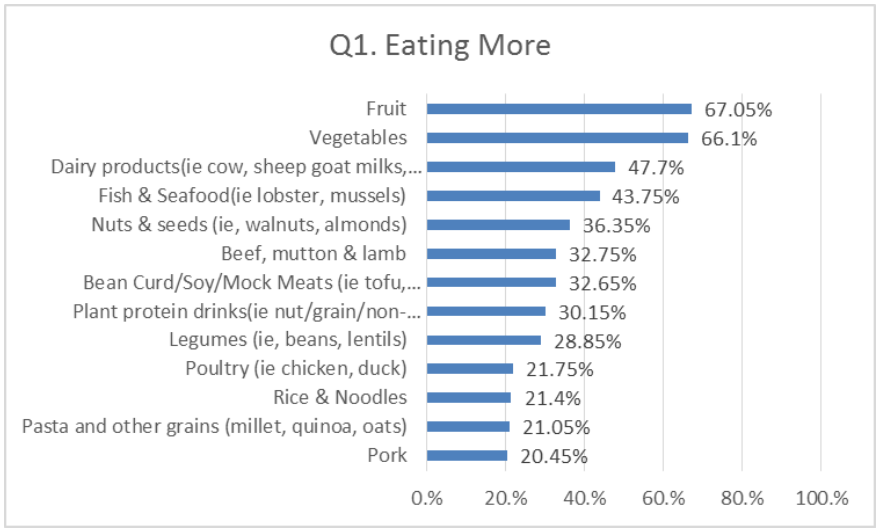
Full product category names

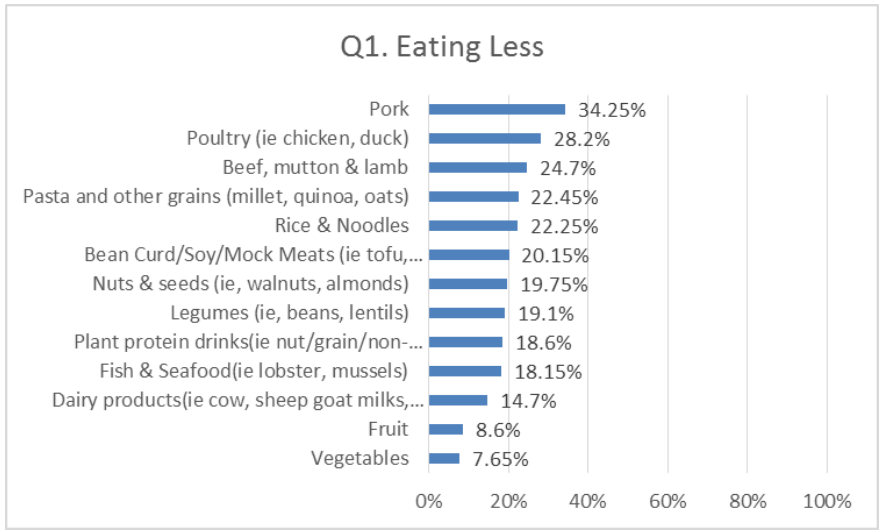
Product category names and (where applicable) examples used in the survey were defined in consultation with Chinese residents to ensure relevancy and ease of understanding.

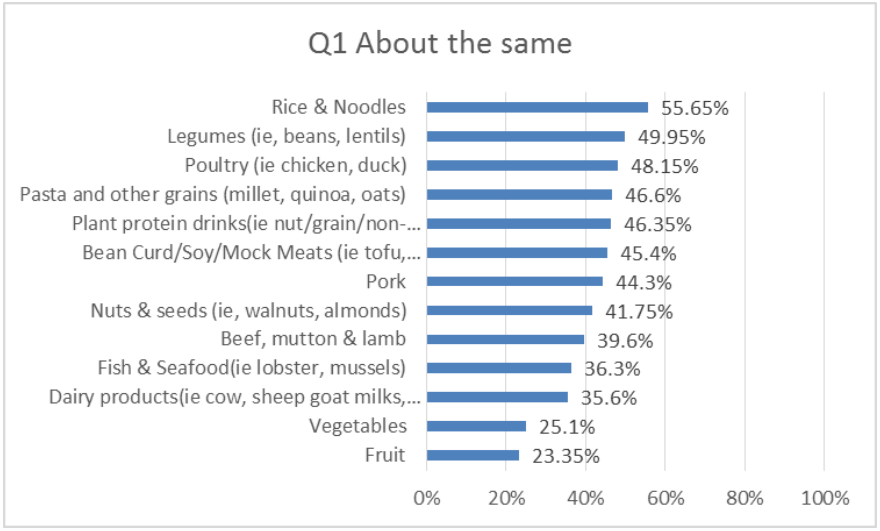
	examples
Bean Curd/Soy/Mock Meats	*including: tofu, wheat gluten, konjac, mock chicken/lamb*
Beef, mutton & lamb	
Dairy products	*including: cow, sheep & goat milks, yoghurt drinks, dairy milk powders, cheeses, butter*
Fish & Seafood	*lobster, mussels*
Fruit	
Legumes	*including: beans, lentils*
Nuts & seeds	*including: walnuts, almonds*
Pasta and other grains	*including: millet, quinoa, oats*
Plant protein drinks	*including: nut/grain/non-dairy milks*
Pork	
Poultry	*including: chicken, duck*
Rice & Noodles	
Vegetables	

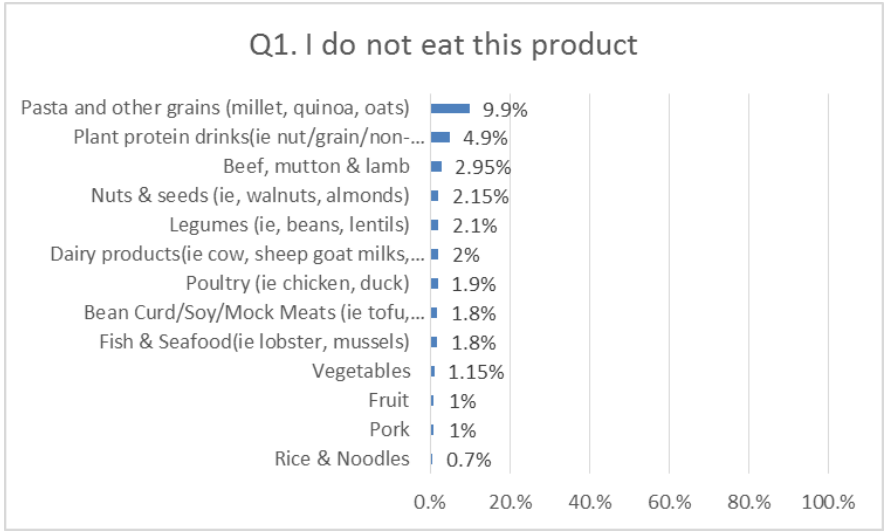
China Survey Results

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)









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

***39%**

Reducing total meat consumption
(ex fish/seafood)

…but mostly coming from pork

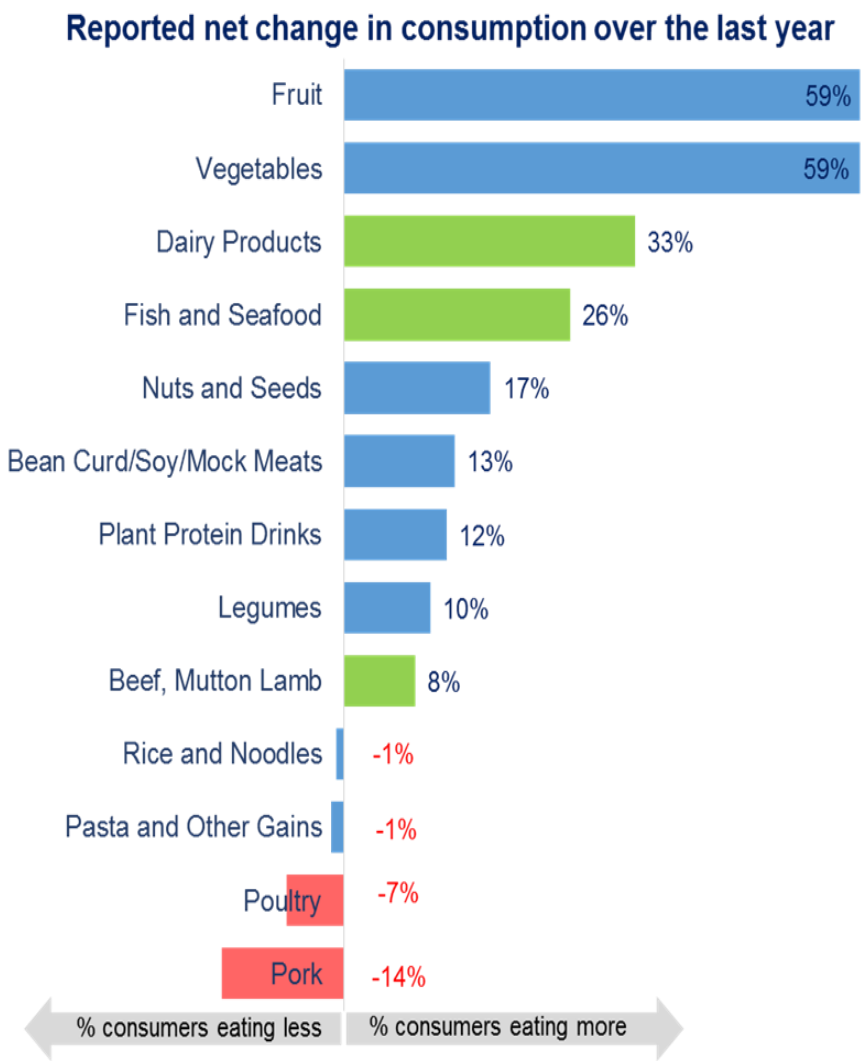
**'meat reducers' = all those 'eating less' &/or 'I do eat this product' at Q1 & Q3*

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*

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



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.

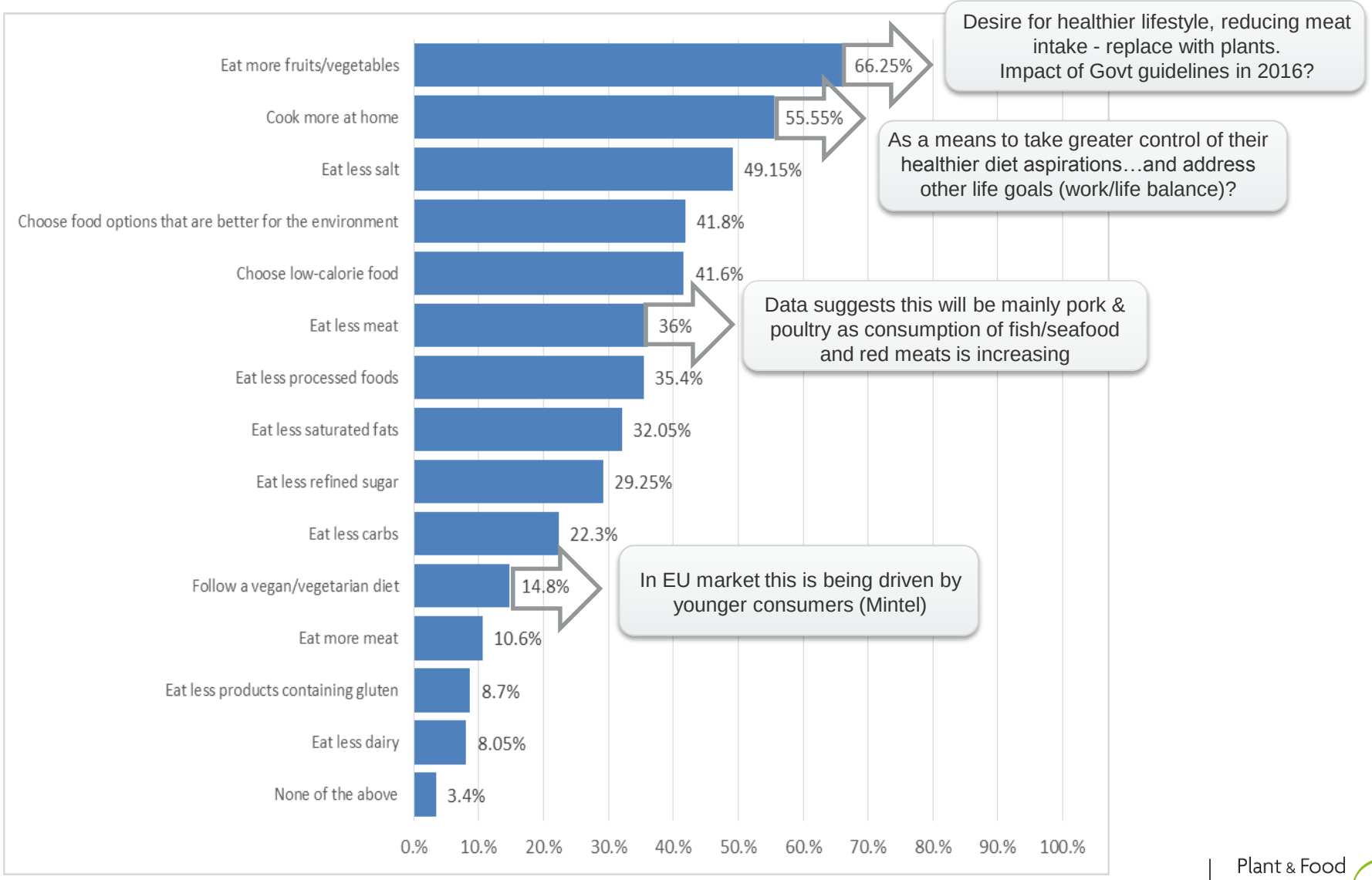
- Consumers are eating more **dairy** and **fish/seafood** products than they were a year ago. Respondents had numerous positive health associations with these protein sources.

- 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).

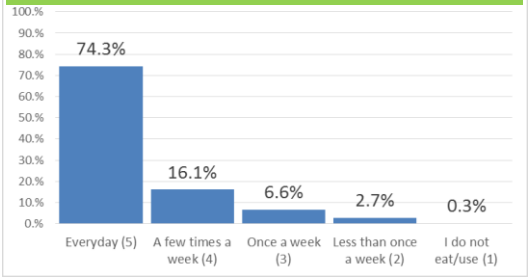
Q2. Thinking about the future, which of the following do you plan to do over the next 12 months? (Base: Total n=2000 Chinese consumers)



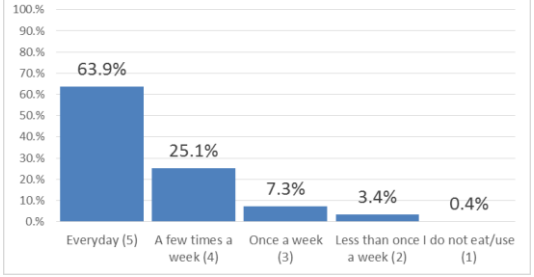
NB: prompted list

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)

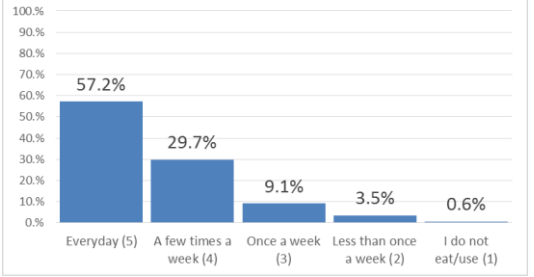
vegetables



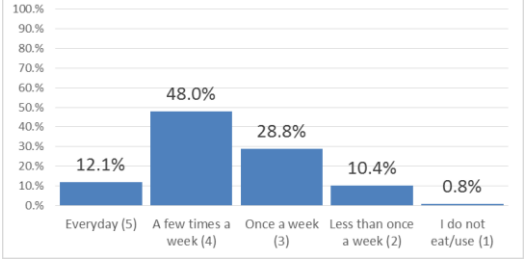
fruit



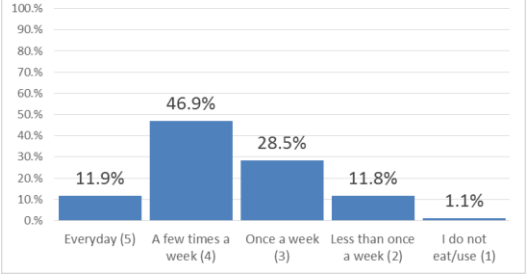
rice & noodles



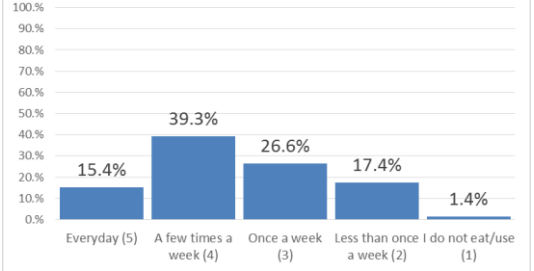
bean curd/soy/mock meats



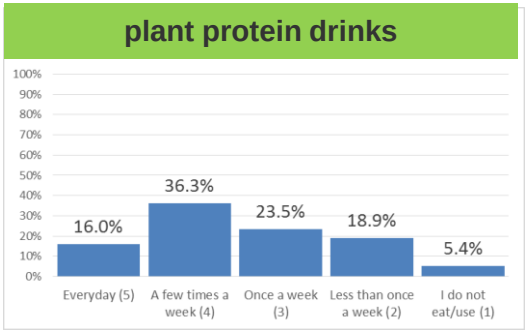
legumes



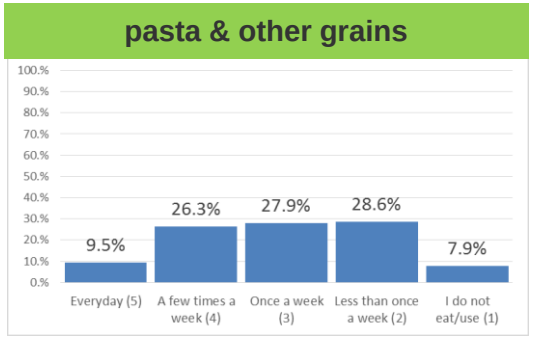
nuts & seeds



plant protein drinks



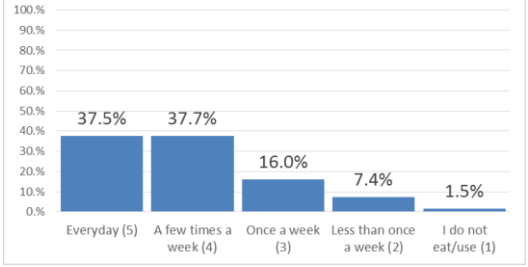
pasta & other grains



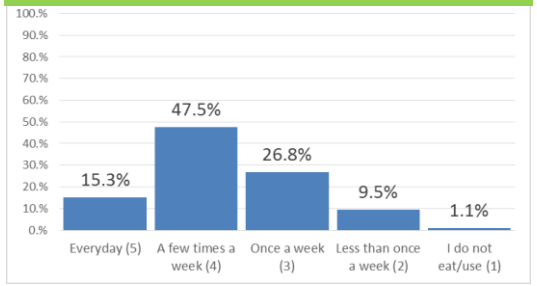
plant-based

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)

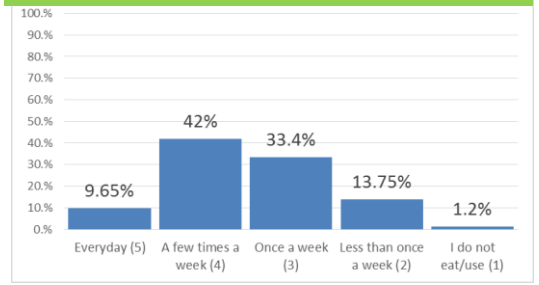
dairy



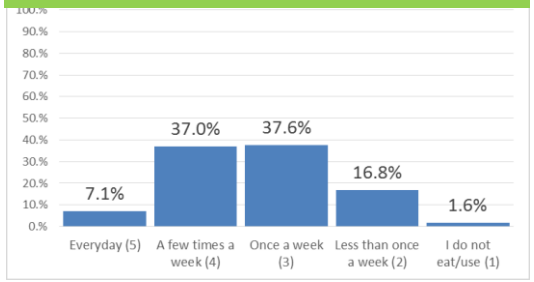
pork



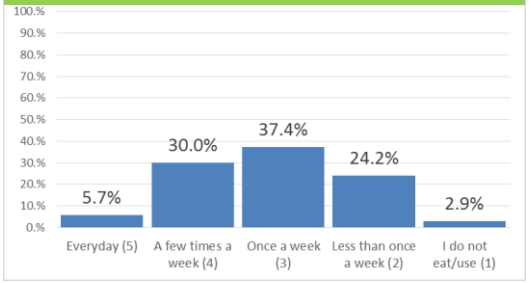
fish & seafood



poultry



beef, mutton, lamb

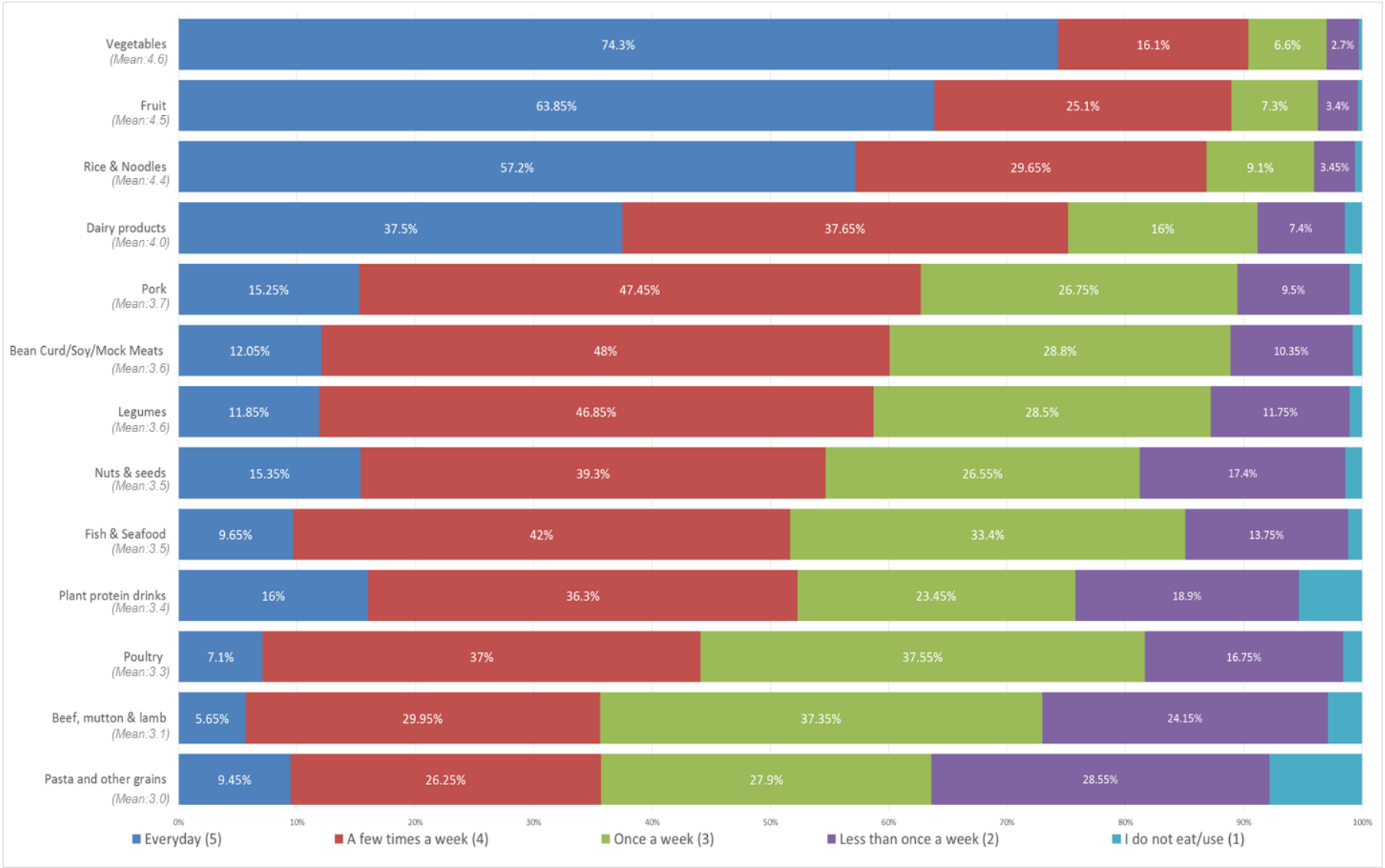


animal-based

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

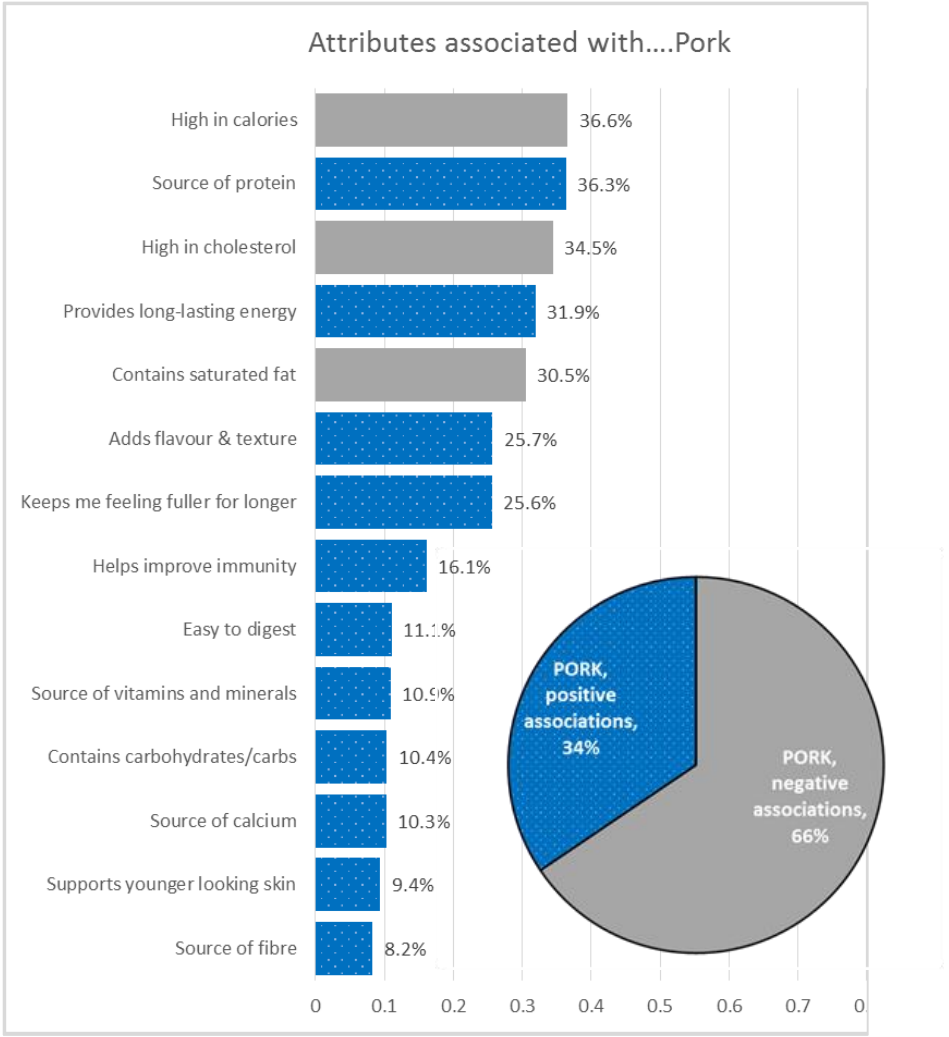


Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)

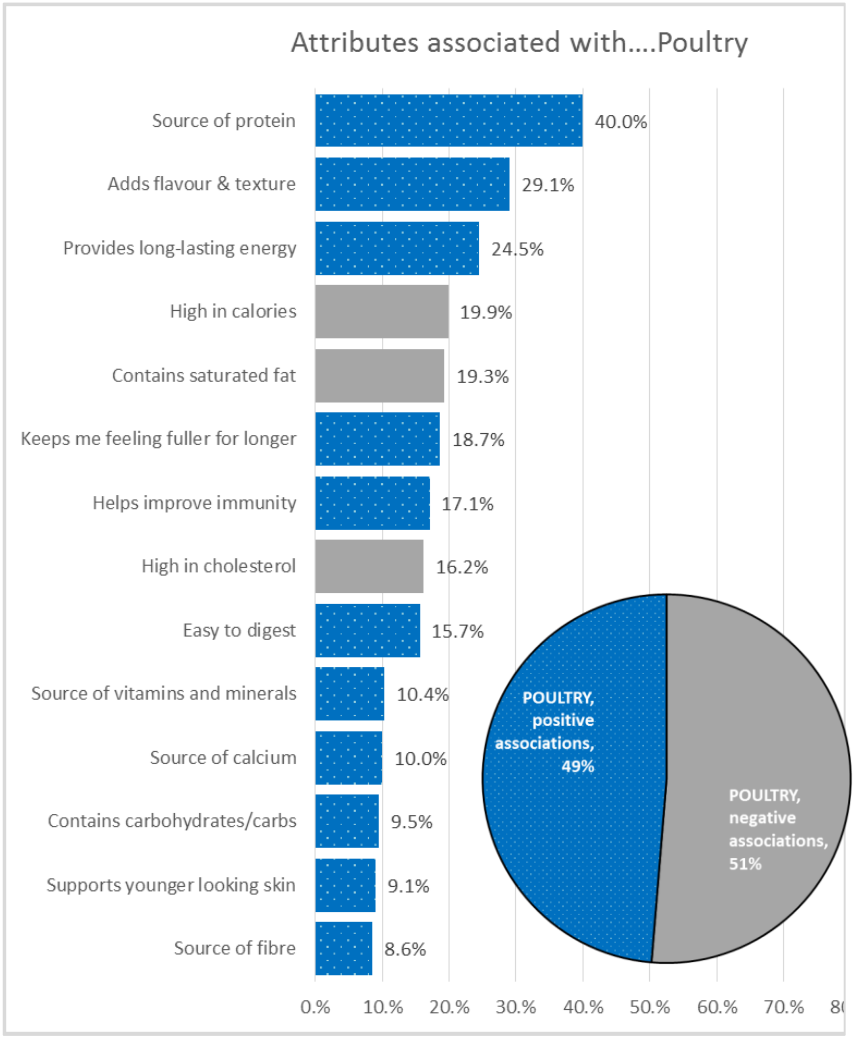
To aid interpretation by readers the attributes on each of the following charts are separated into those that generally have more 'positive' (blue) or more 'negative' (grey) health associations.
These grouping have no relation to nutritional content, they are consumer perceptions only.

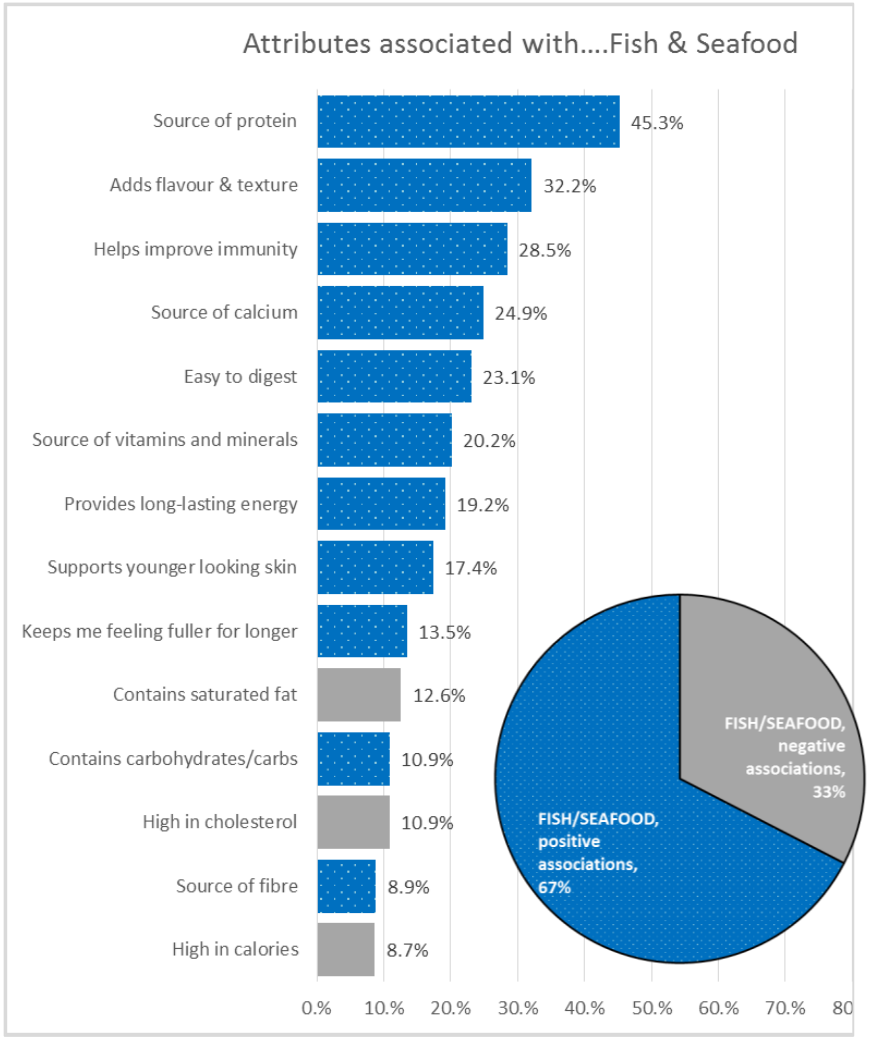
Frequency counts for all attributes within a group (positive or negative) were added then averaged to give the group an overall frequency count, then presented as a proportion of positive | negative.

High in calories	negative health credentials	*% for each attribute added / 3*
High in cholesterol		
Contains saturated fat		
Adds flavour & texture	positive health credentials	*% for each attribute added / 11*
Contains carbohydrates/carbs		
Easy to digest		
Helps improve immunity		
Keeps me feeling fuller for longer		
Provides long-lasting energy		
Source of calcium		
Source of fibre		
Source of protein		
Source of vitamins and minerals		
Supports younger looking skin		



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

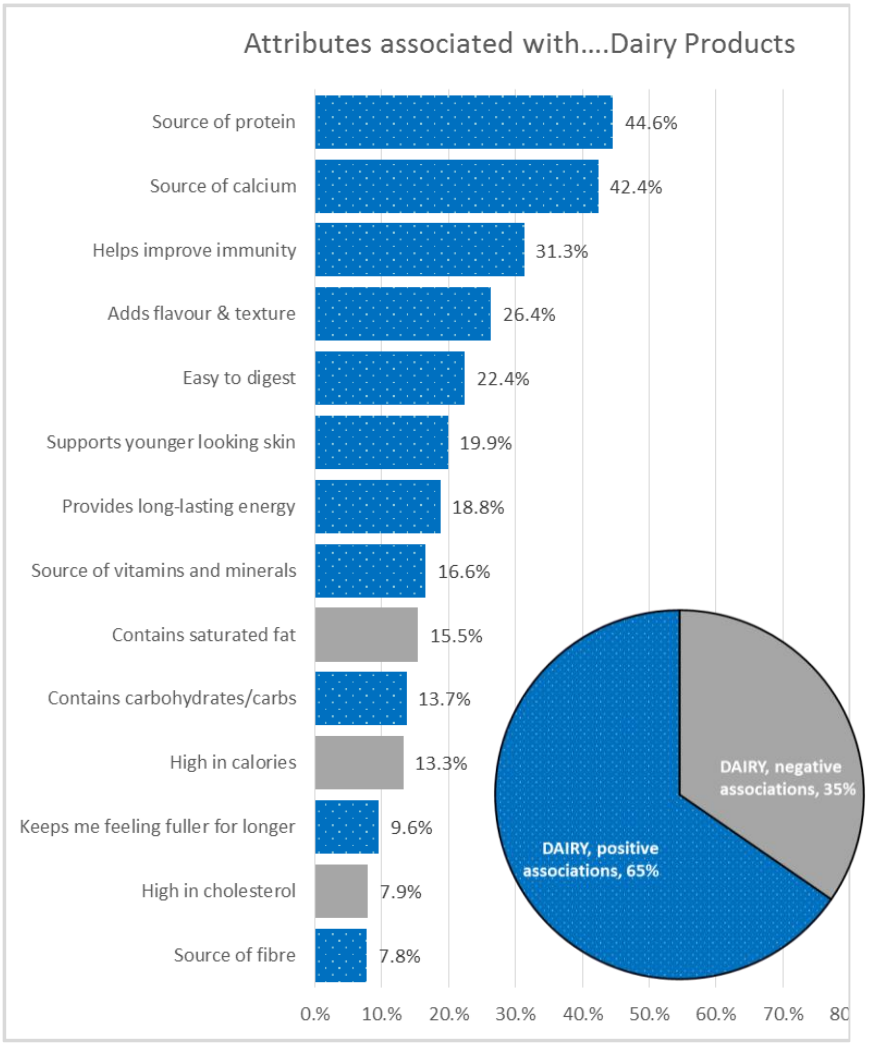


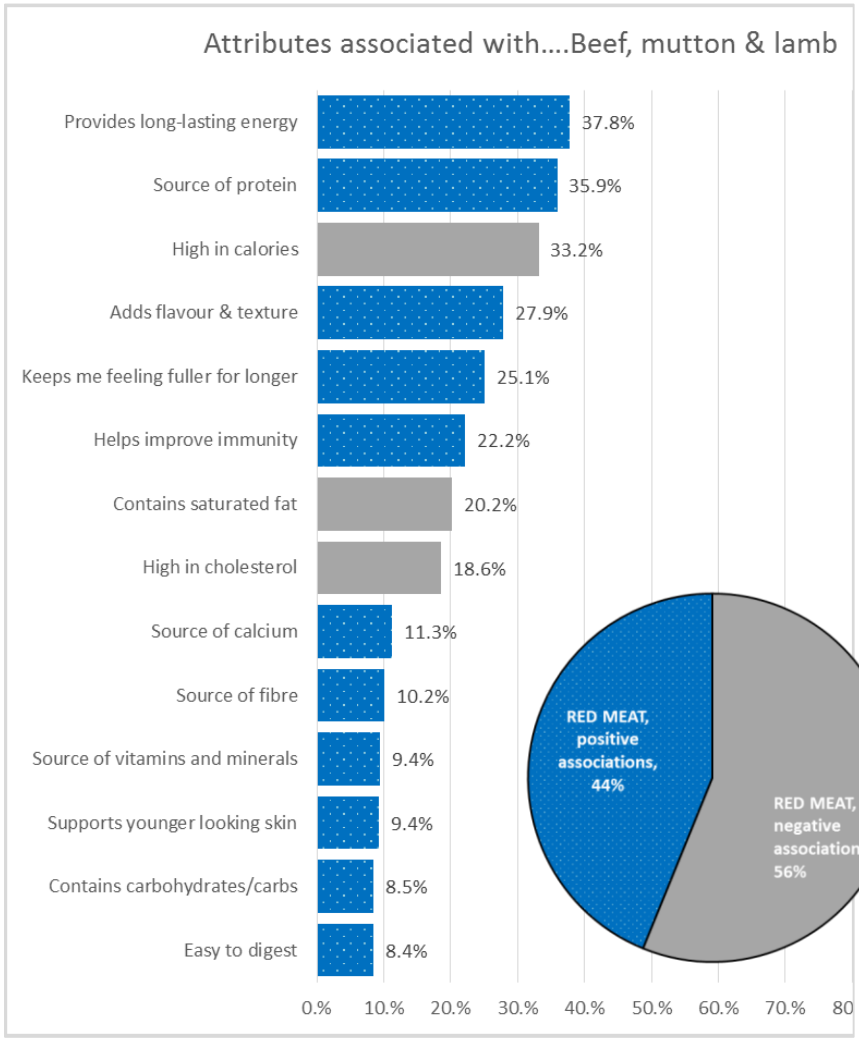


negative health associations

positive health 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)

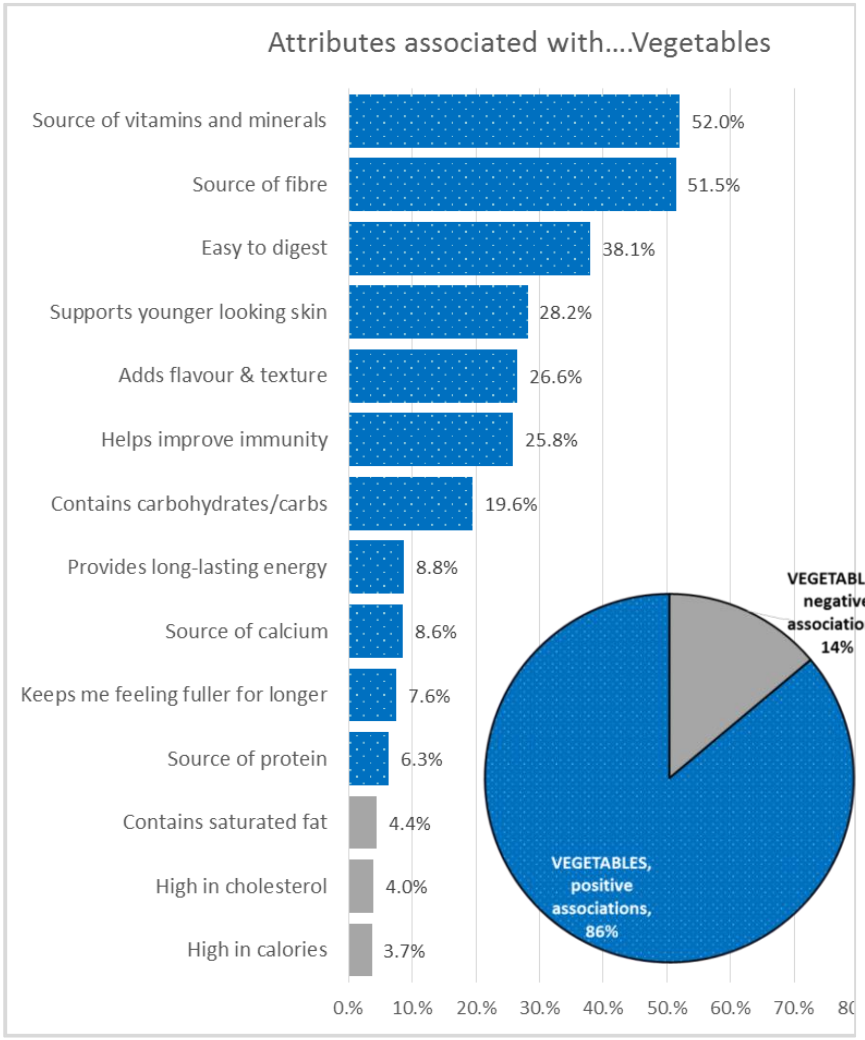


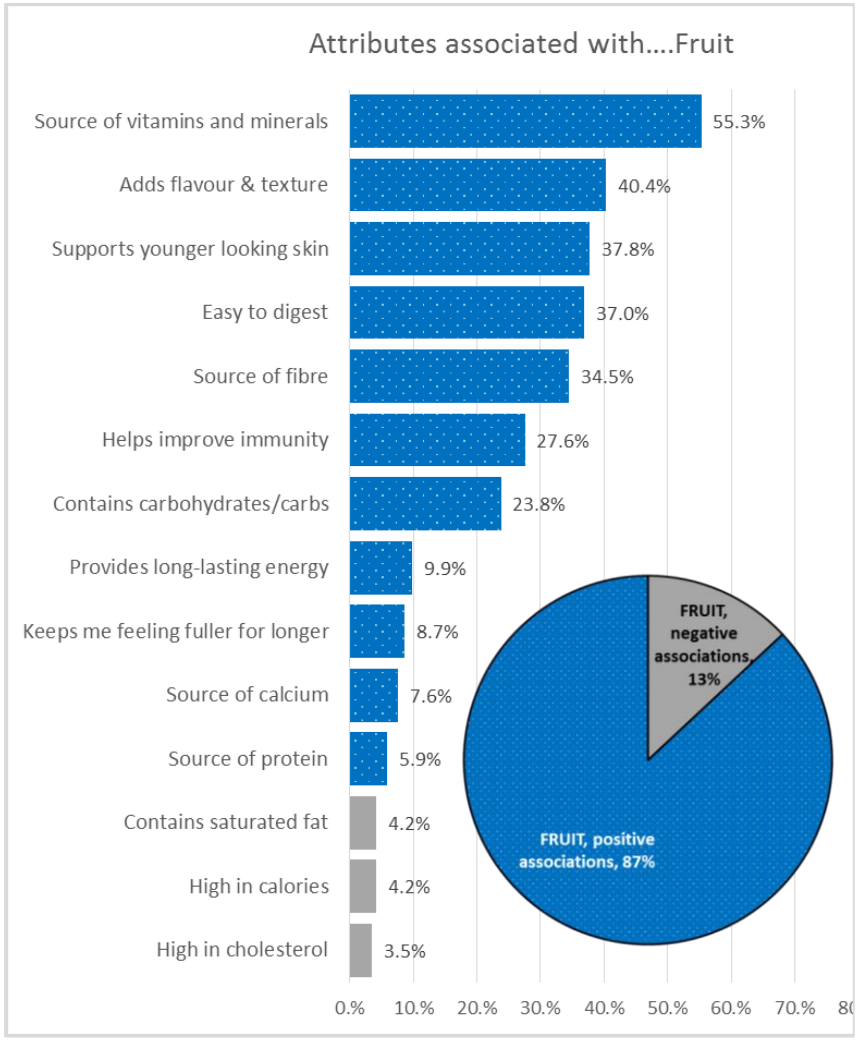


negative health associations

positive health 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)

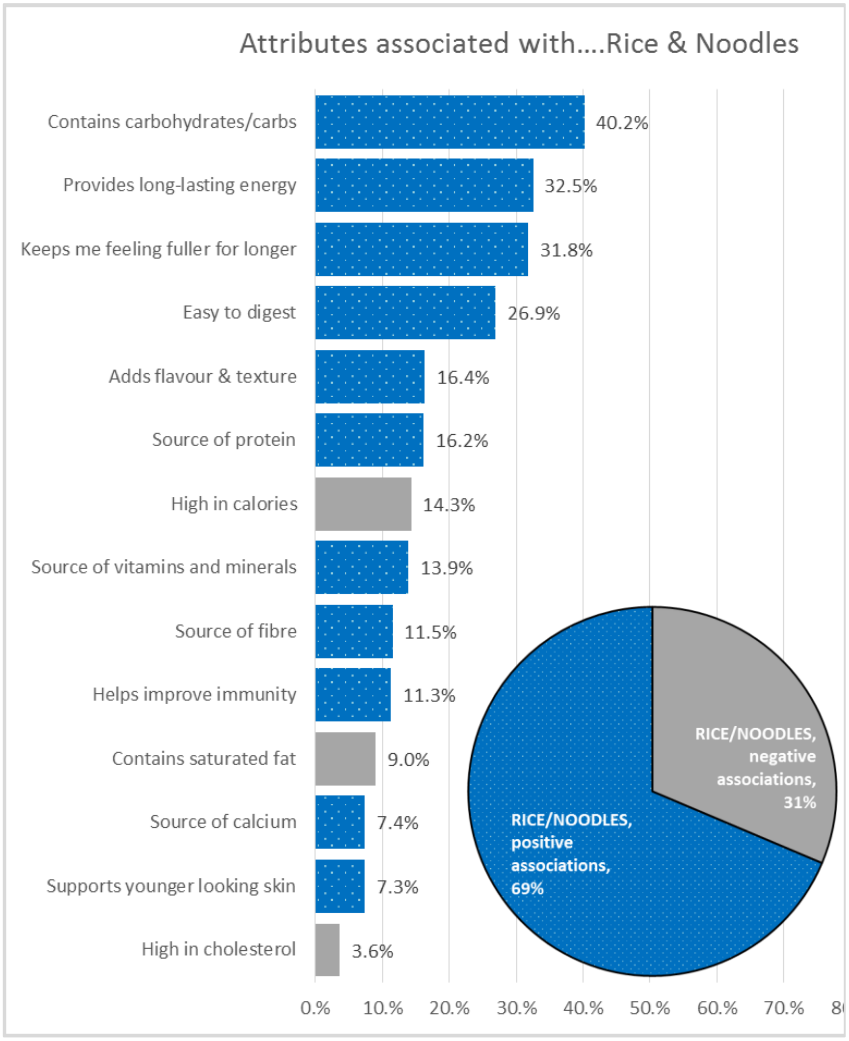


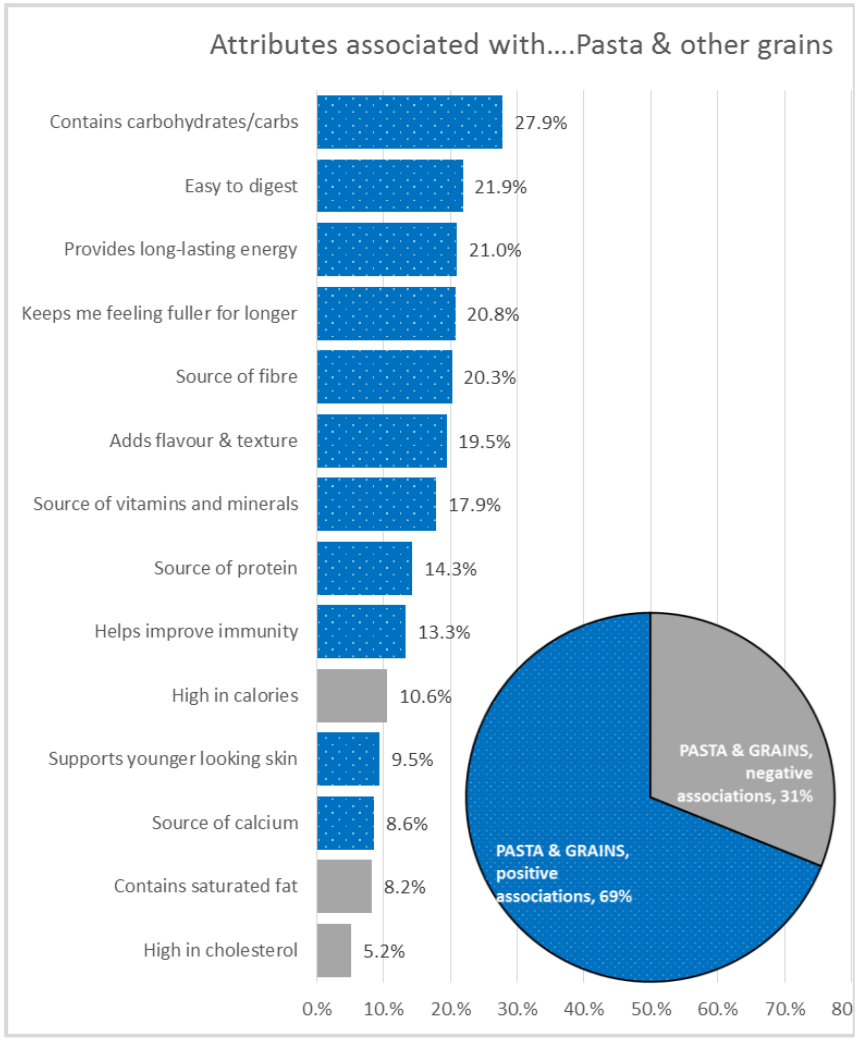


negative health associations

positive health 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)

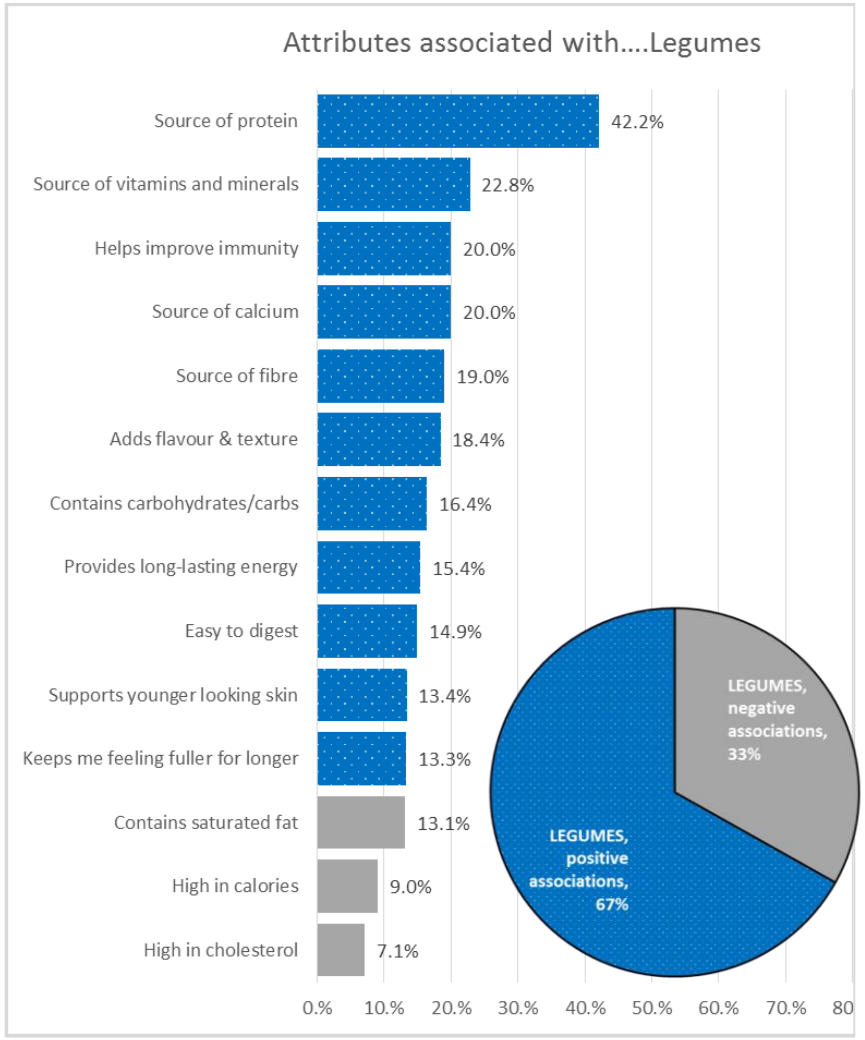


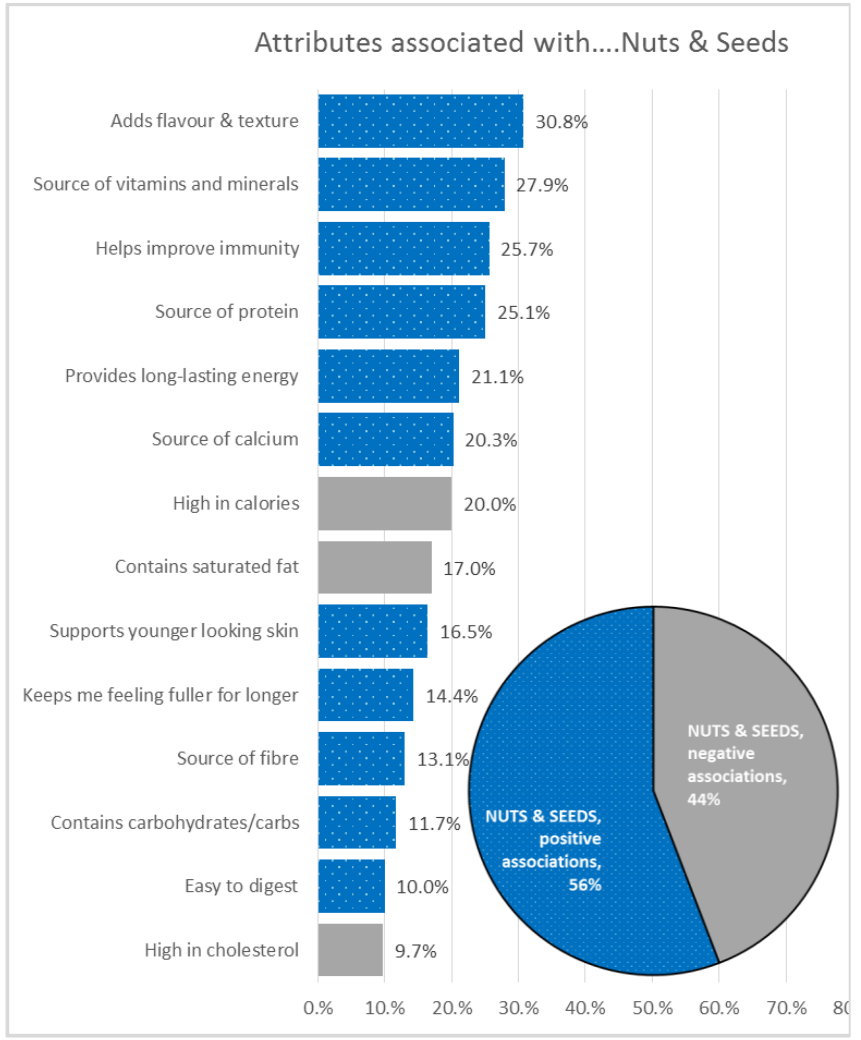


negative health associations

positive health 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)

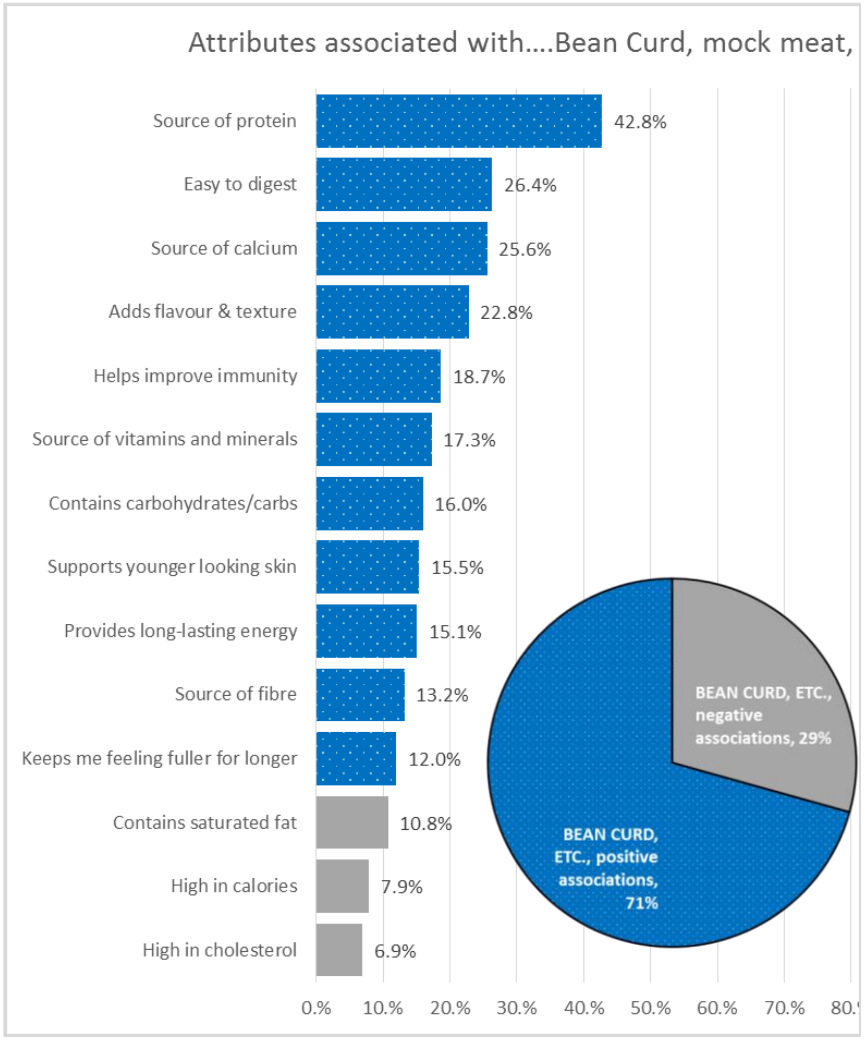


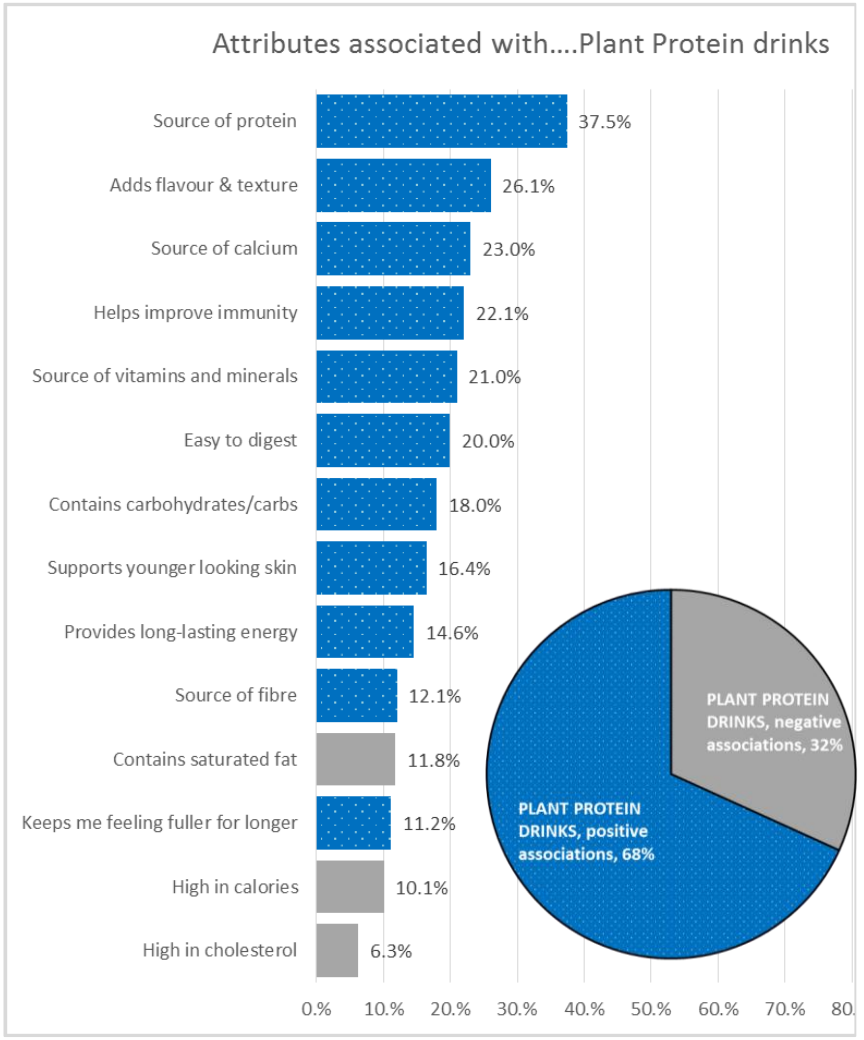


negative health associations

positive health 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)



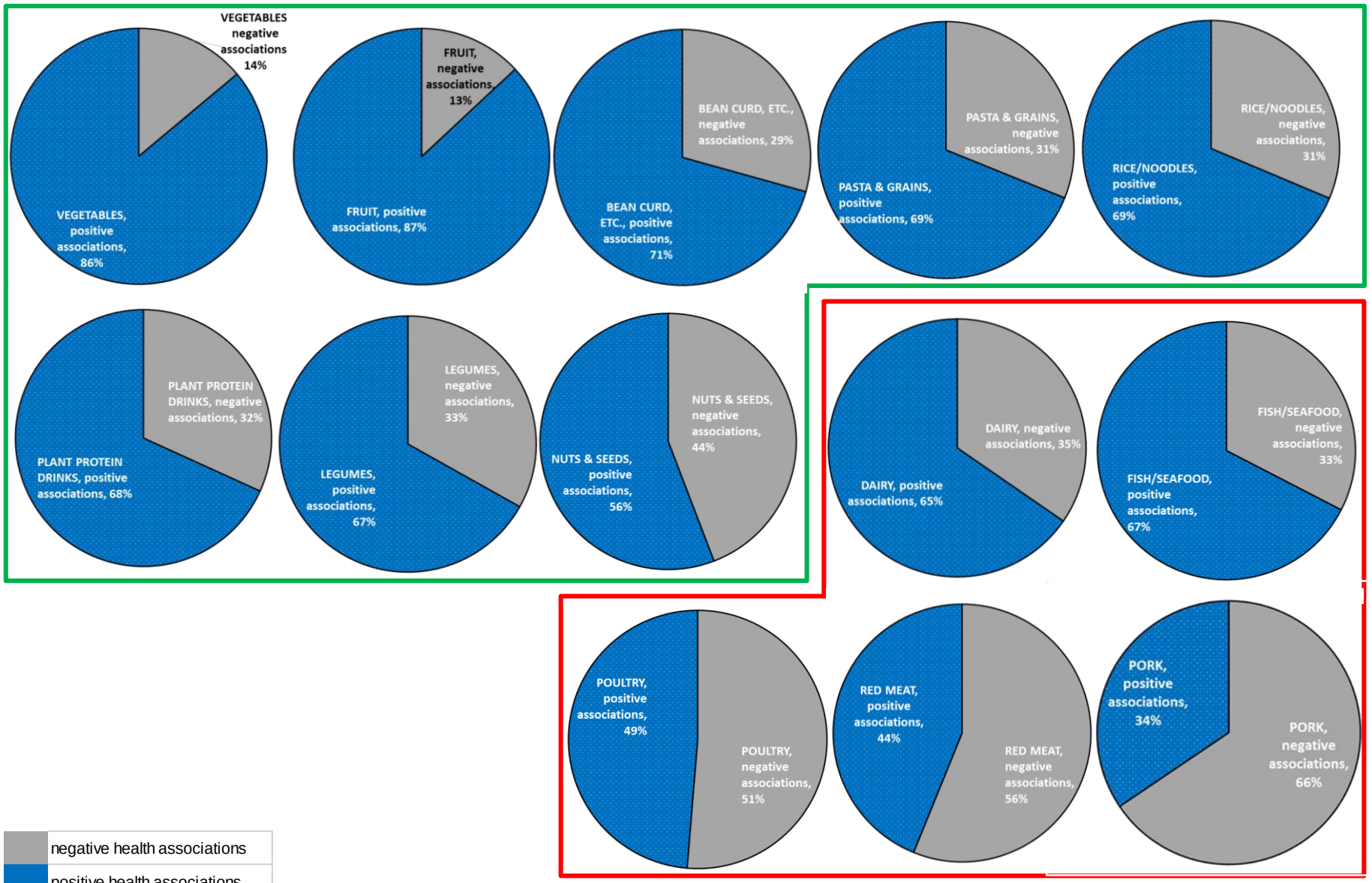


negative health associations

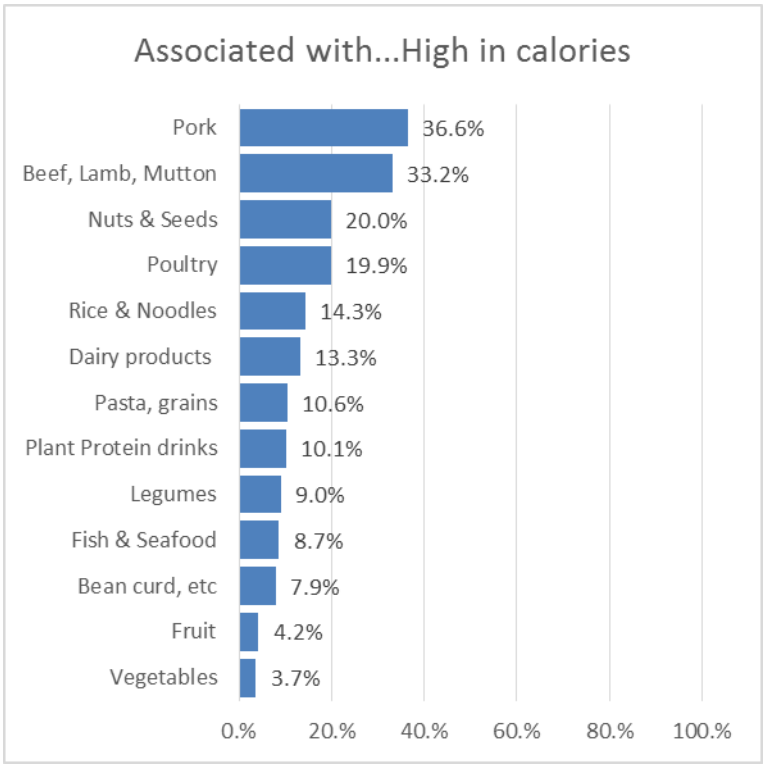
positive health associations

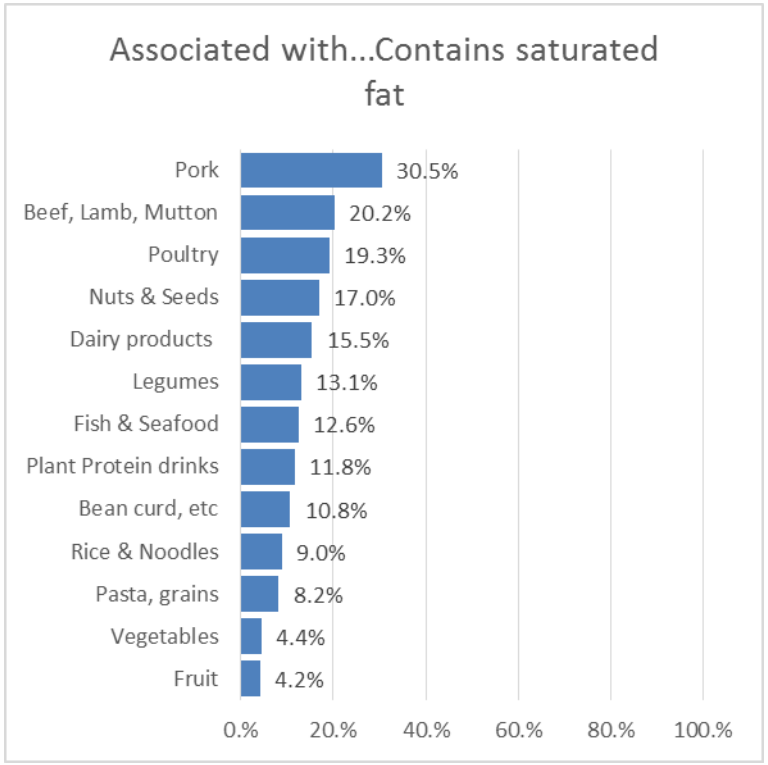
Comparison of perceived health profiles of food types included in the survey

(Base: Total n=2000 Chinese consumers; relates to responses to Q4)

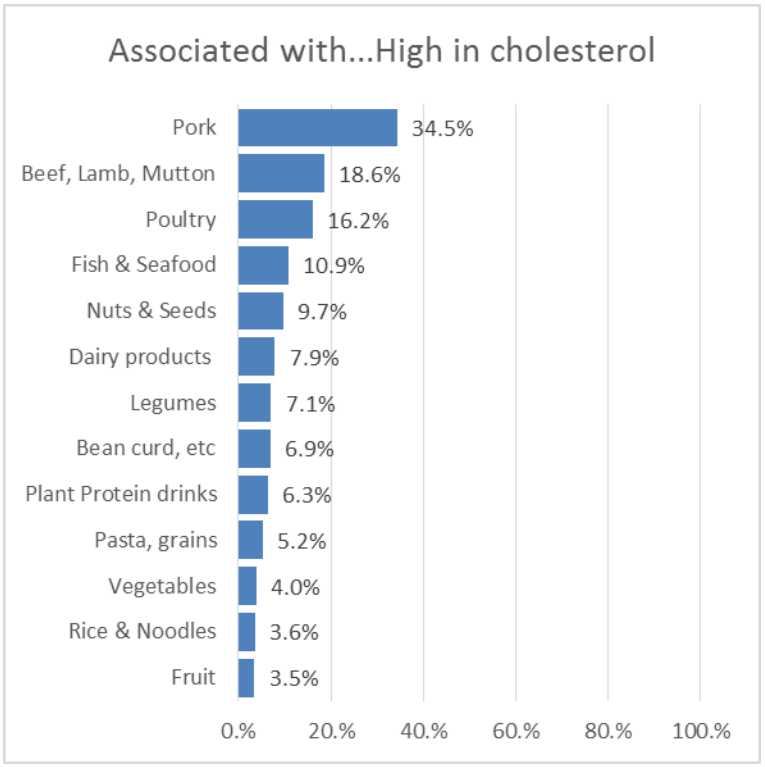


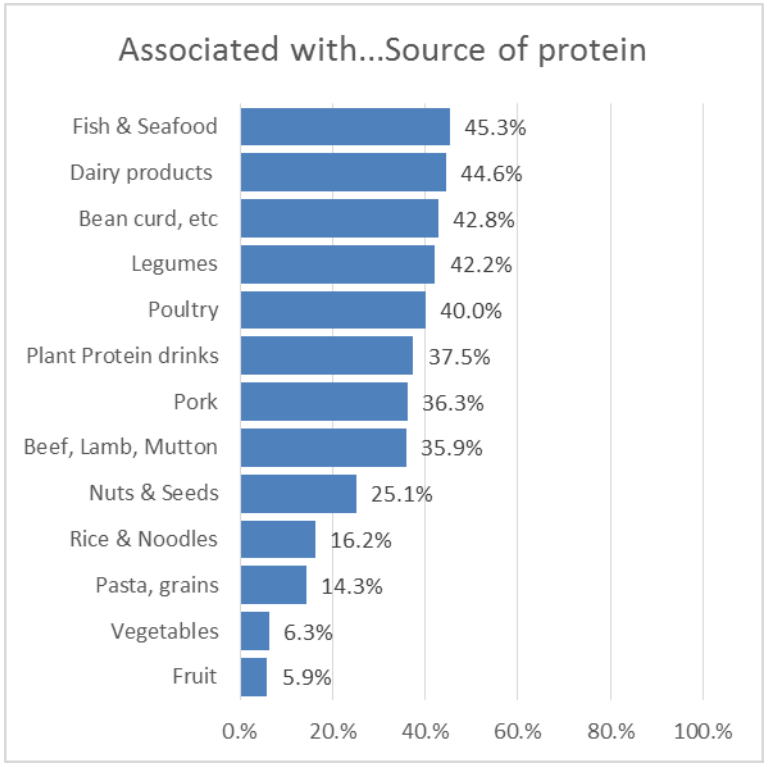
Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)





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





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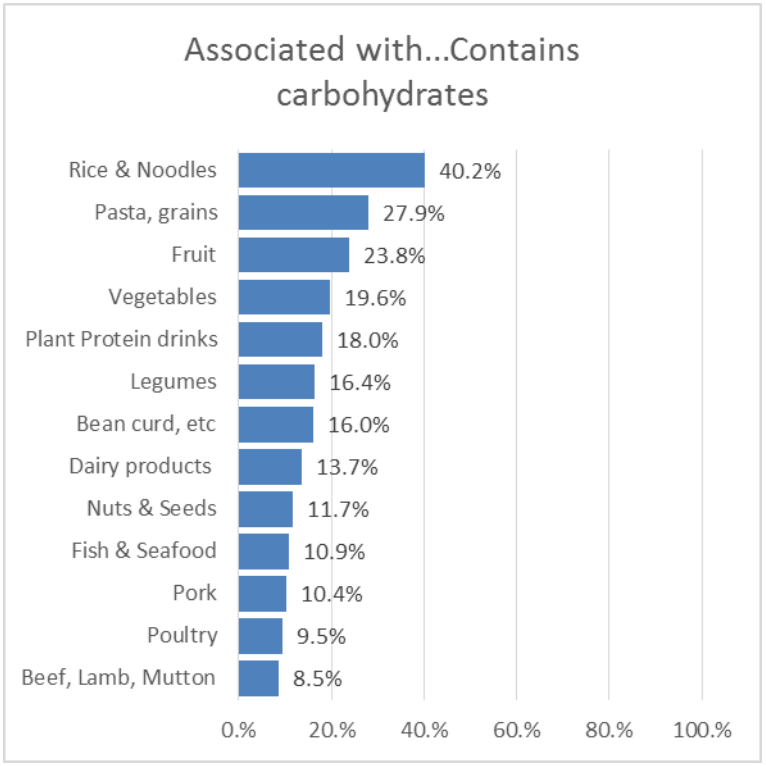

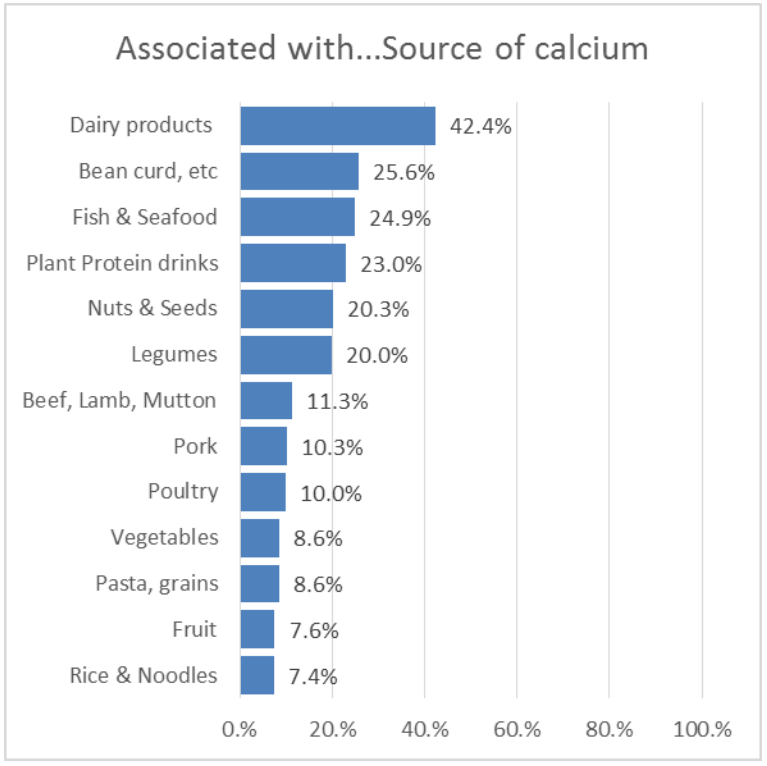

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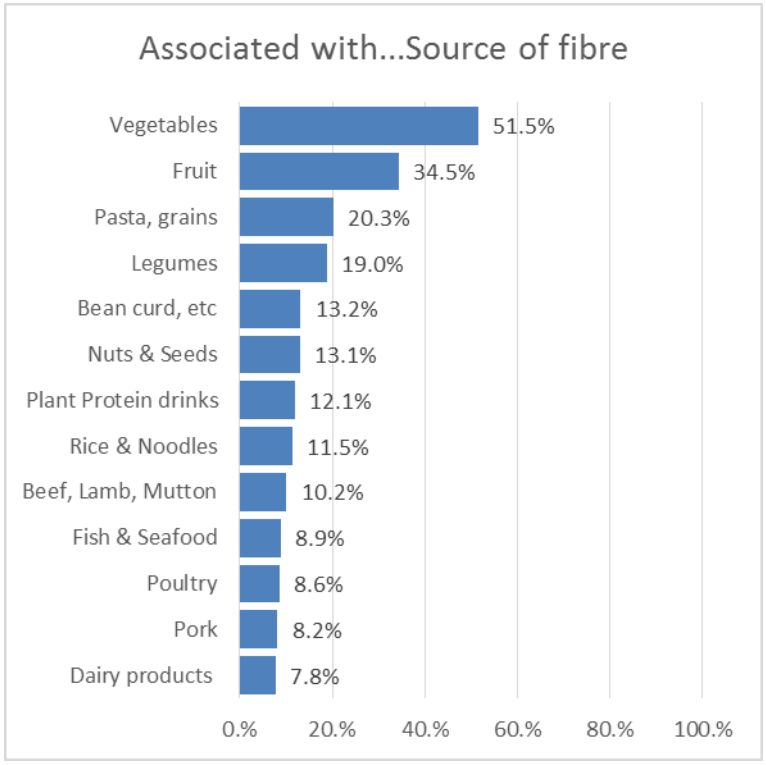
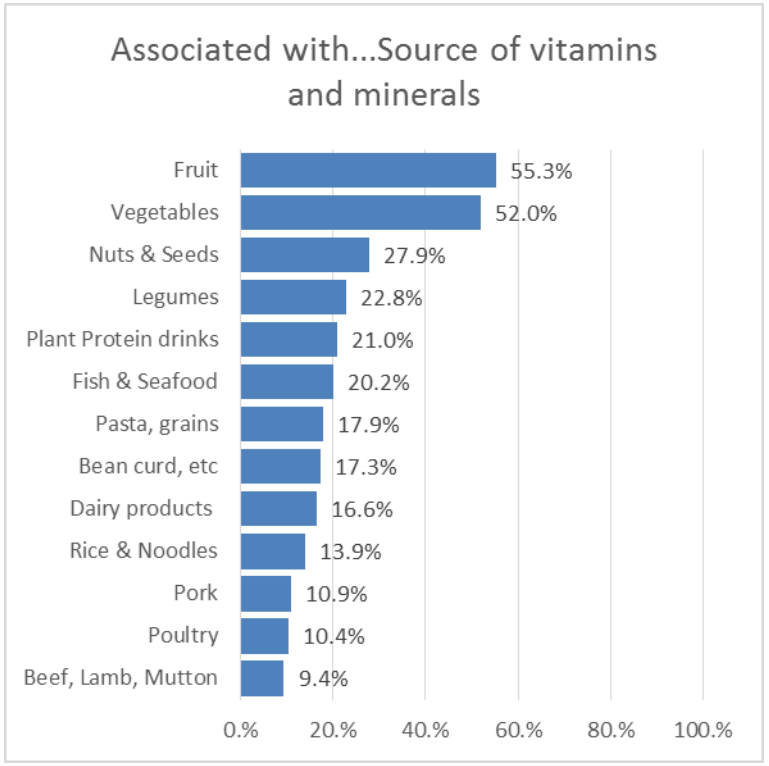
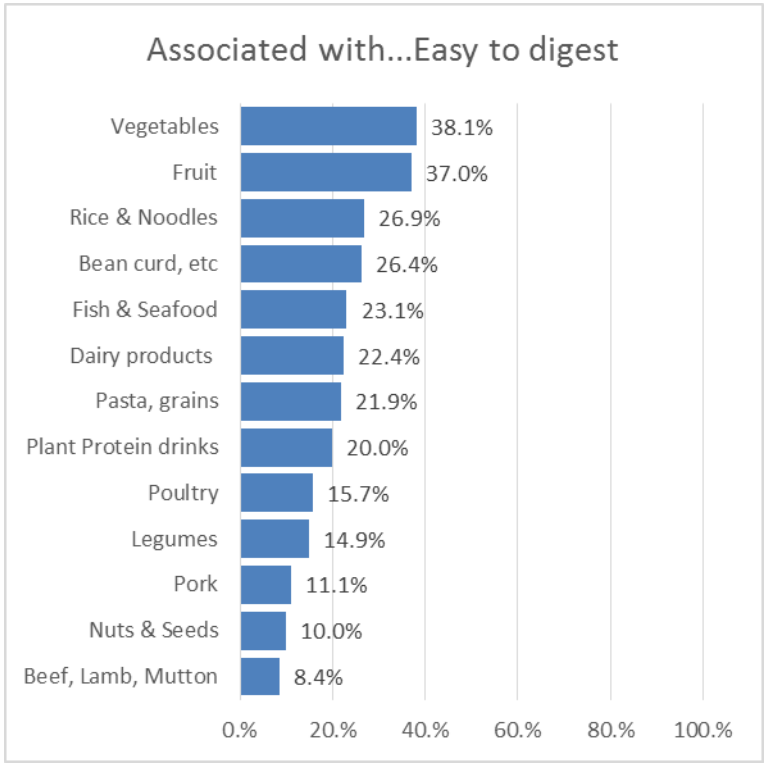
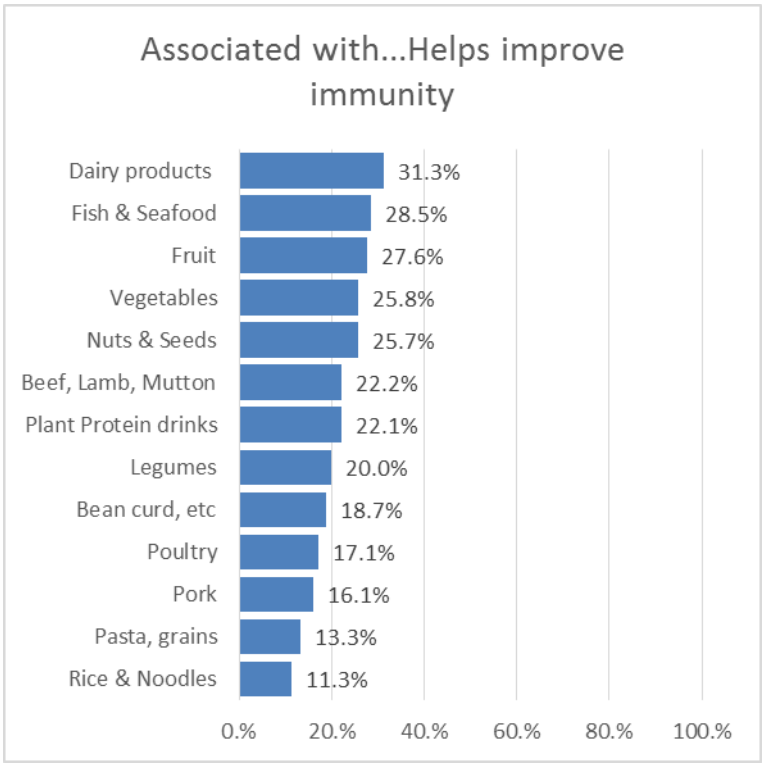




Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)





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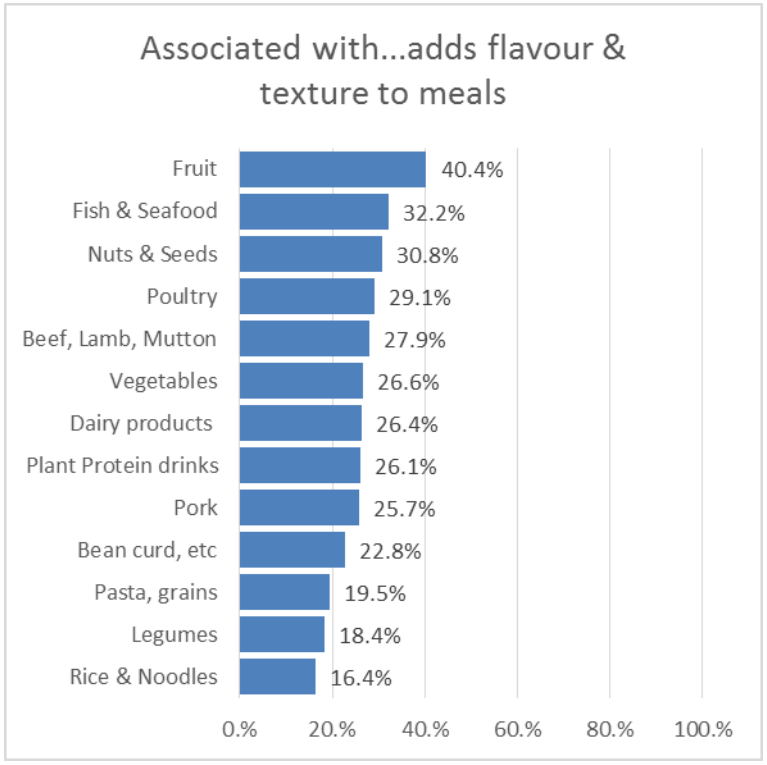
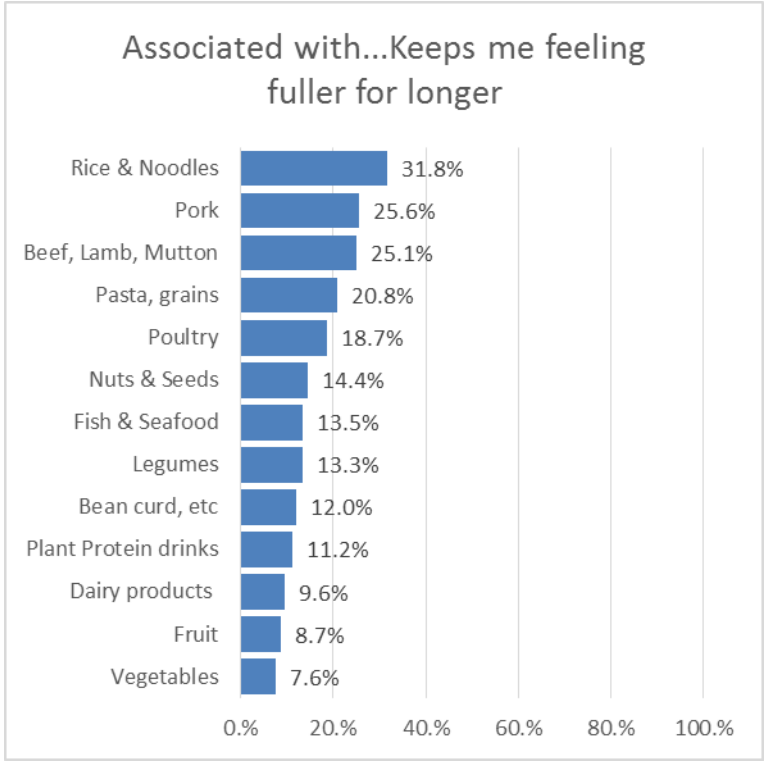
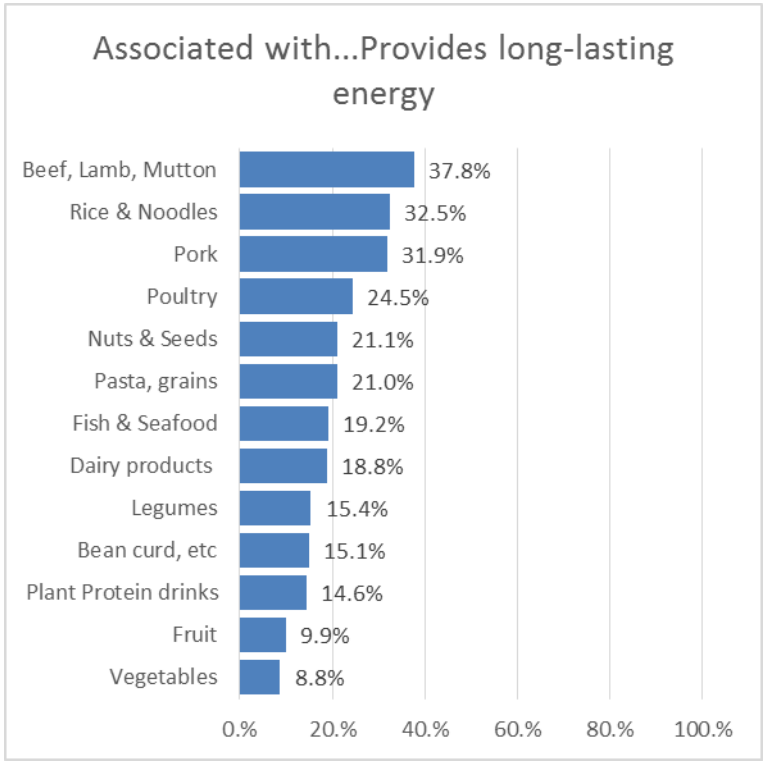
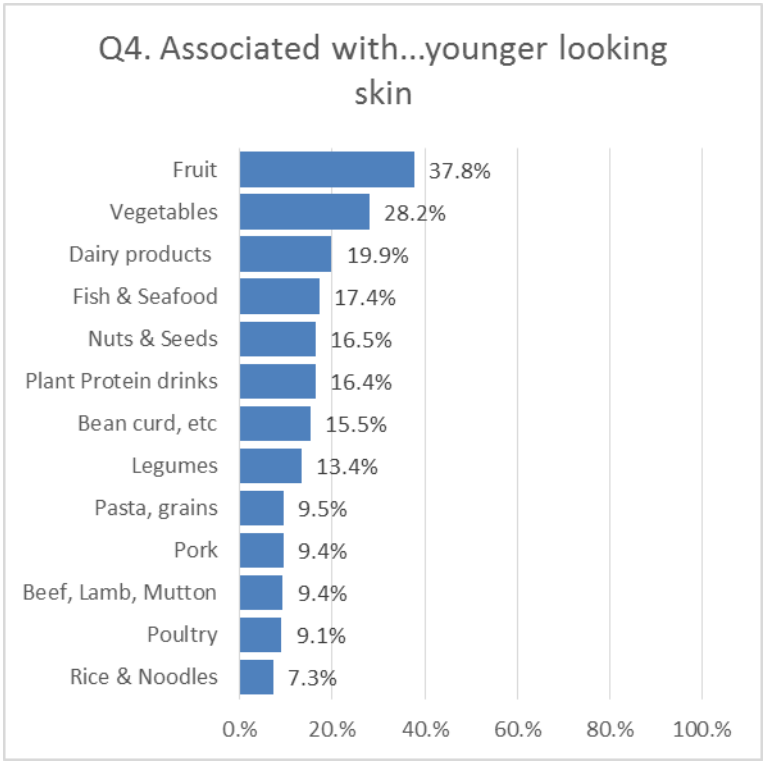


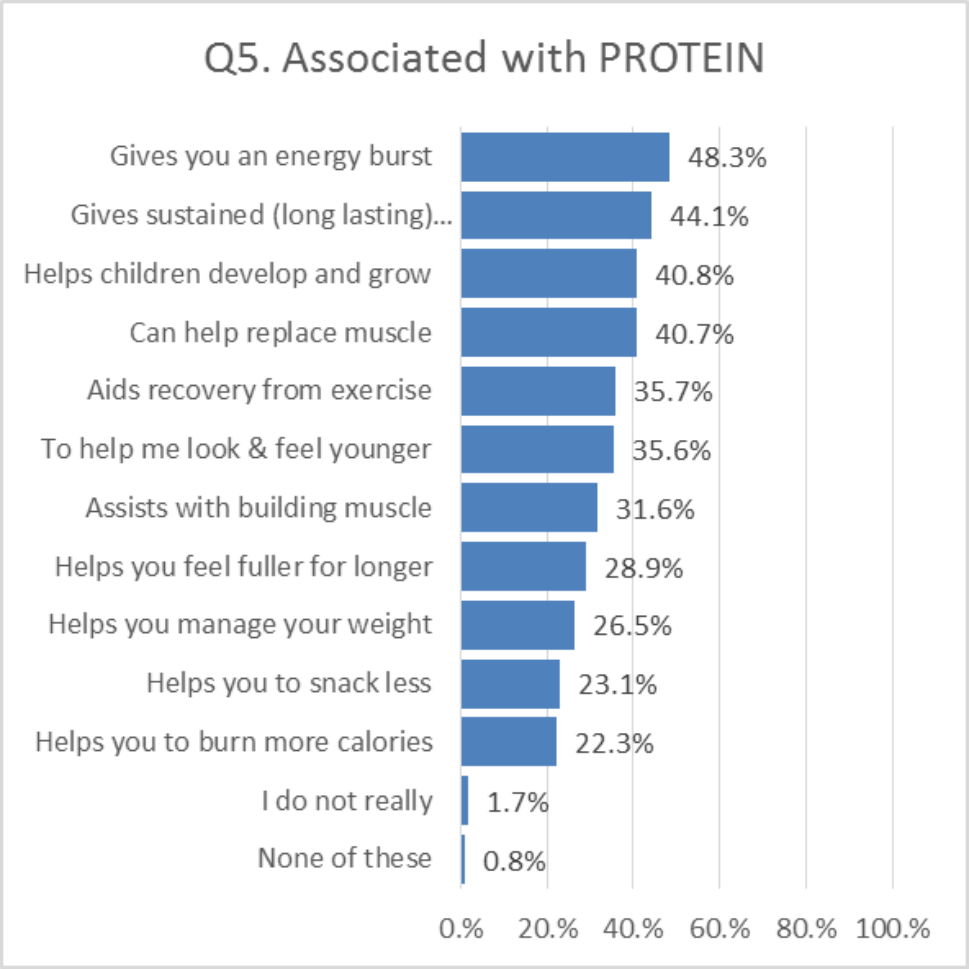


Q4. Which of the following attributes, if any, do you associate with each of the following product types? (Base: Total n=2000 Chinese consumers)



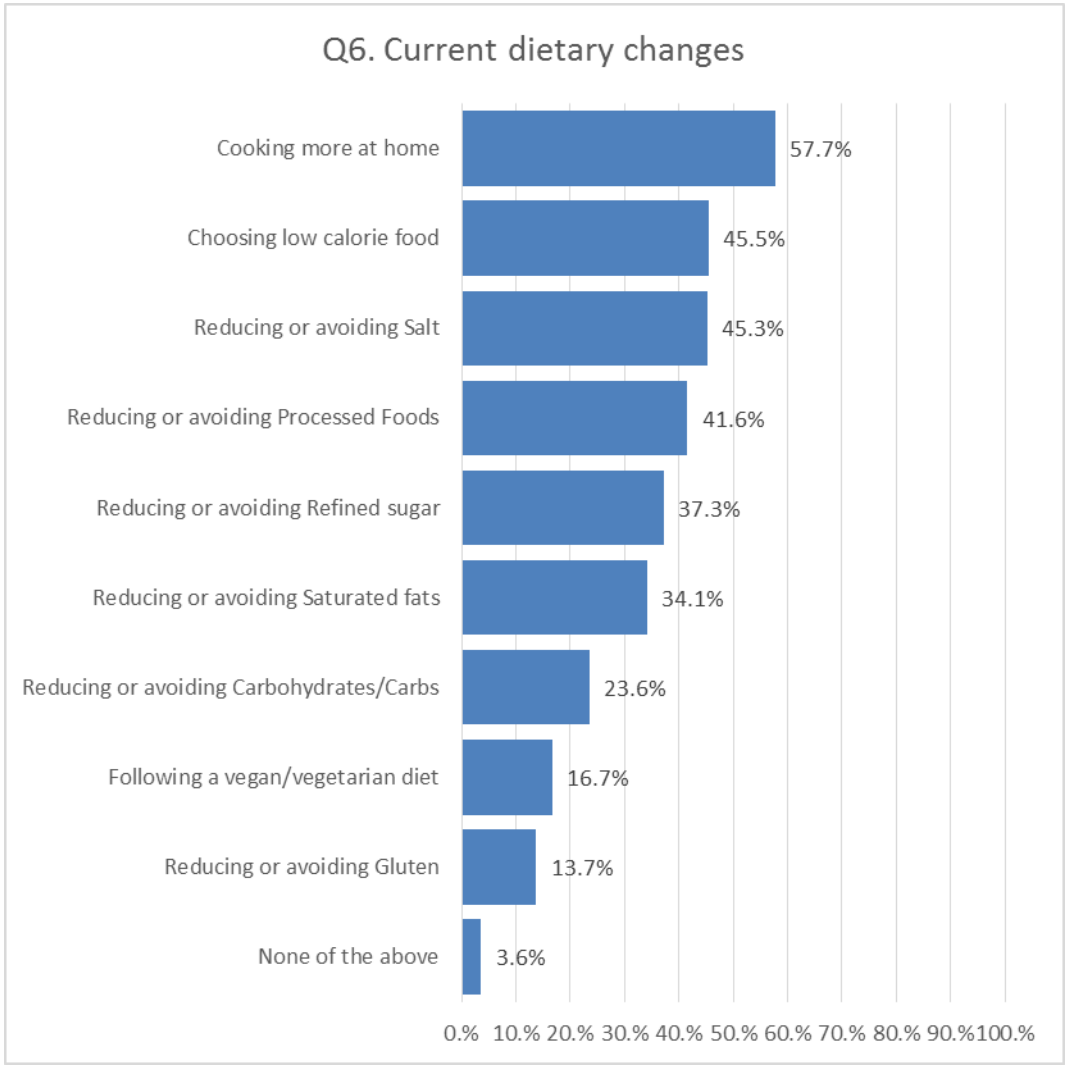


Q5. Which statements do you associate with PROTEIN?
(Base: Total n=2000 Chinese consumers)



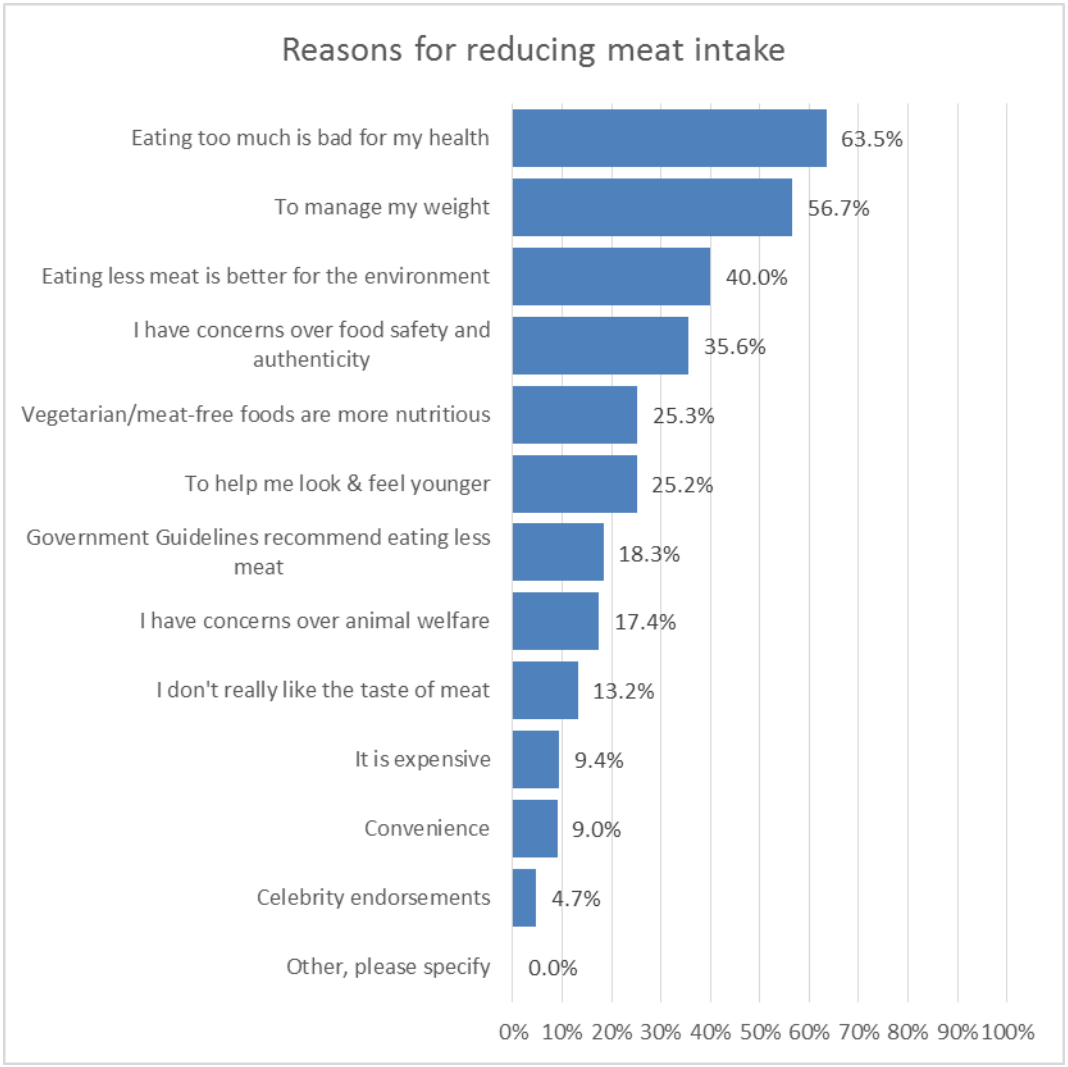
NB: prompted list

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



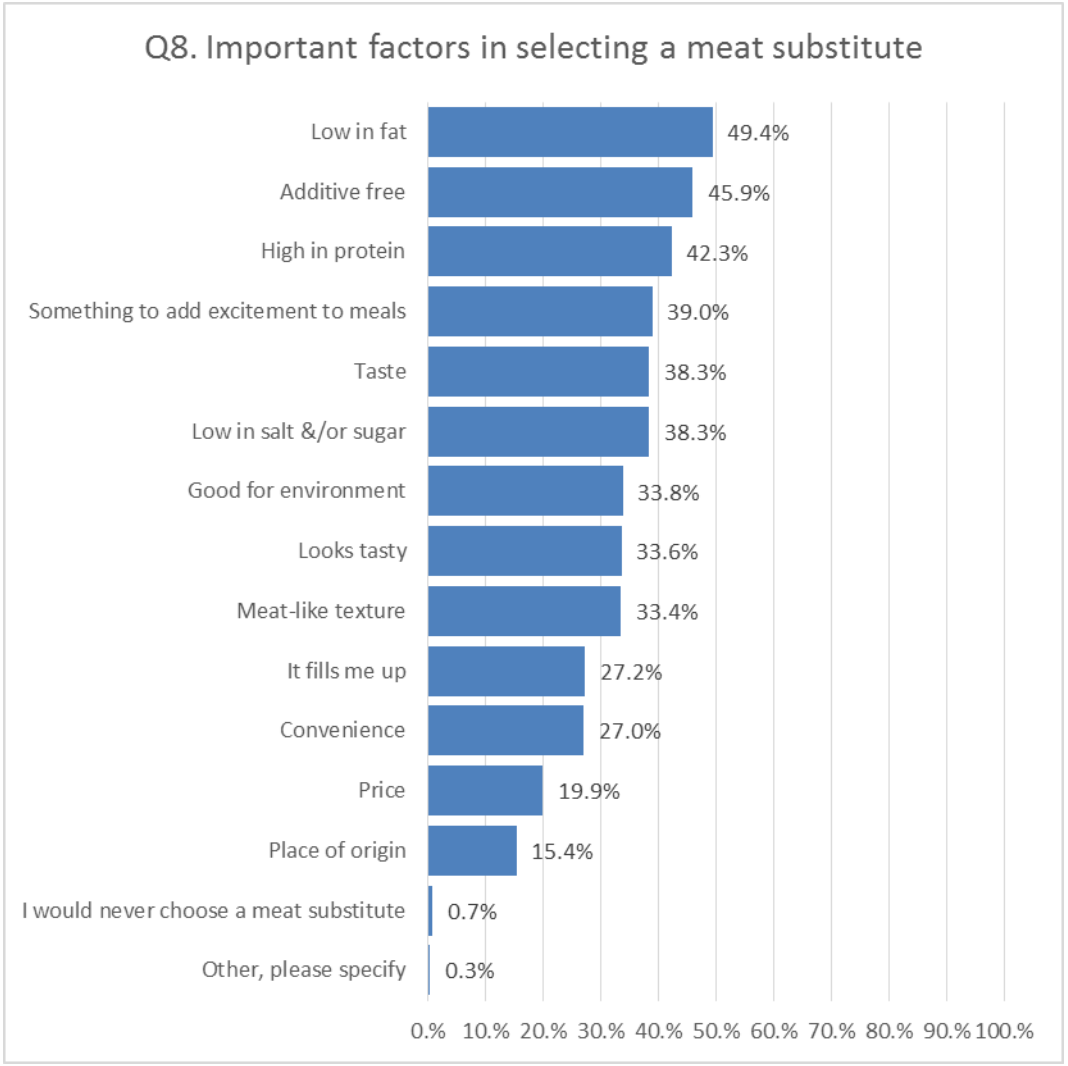
NB: prompted list

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)



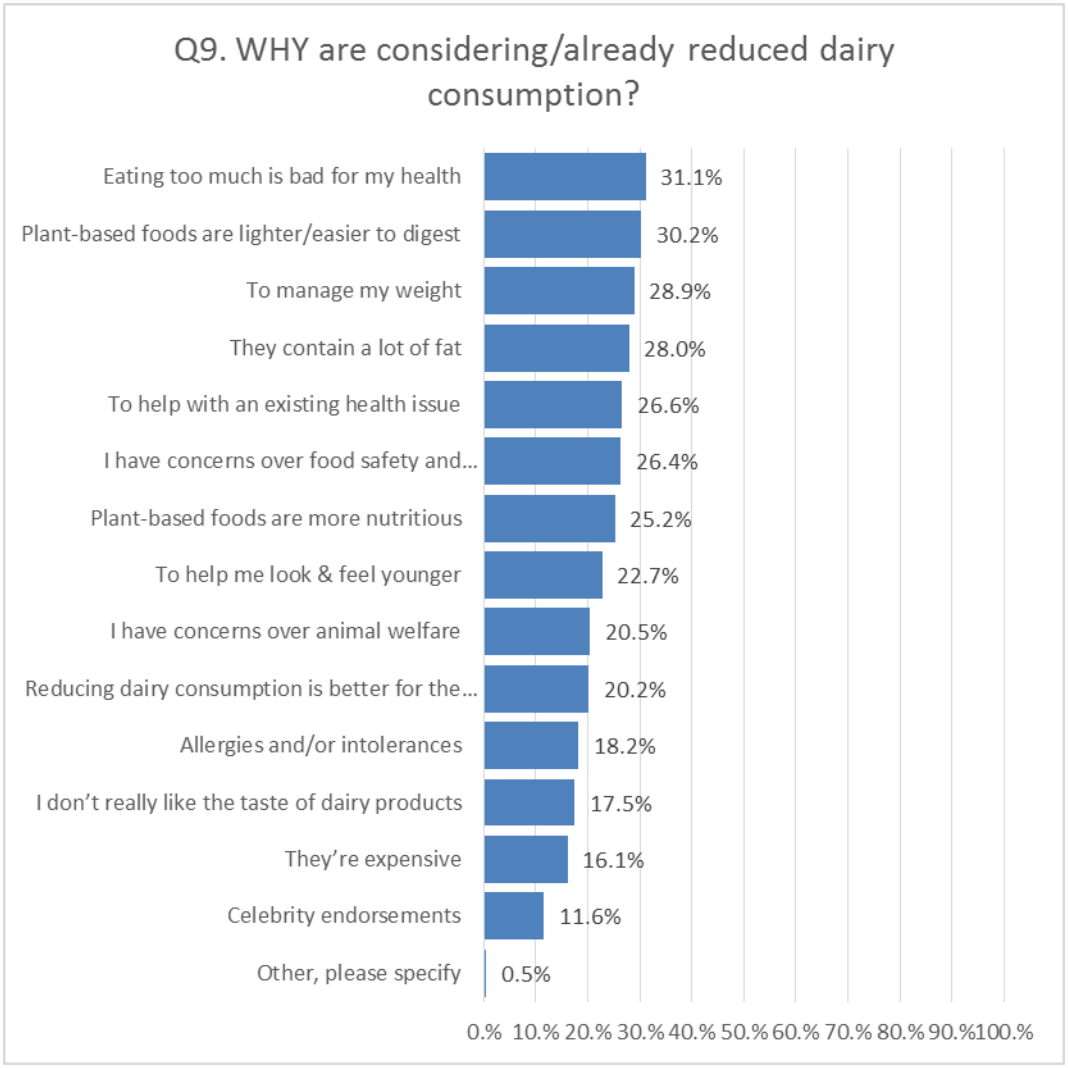
NB: prompted list

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)



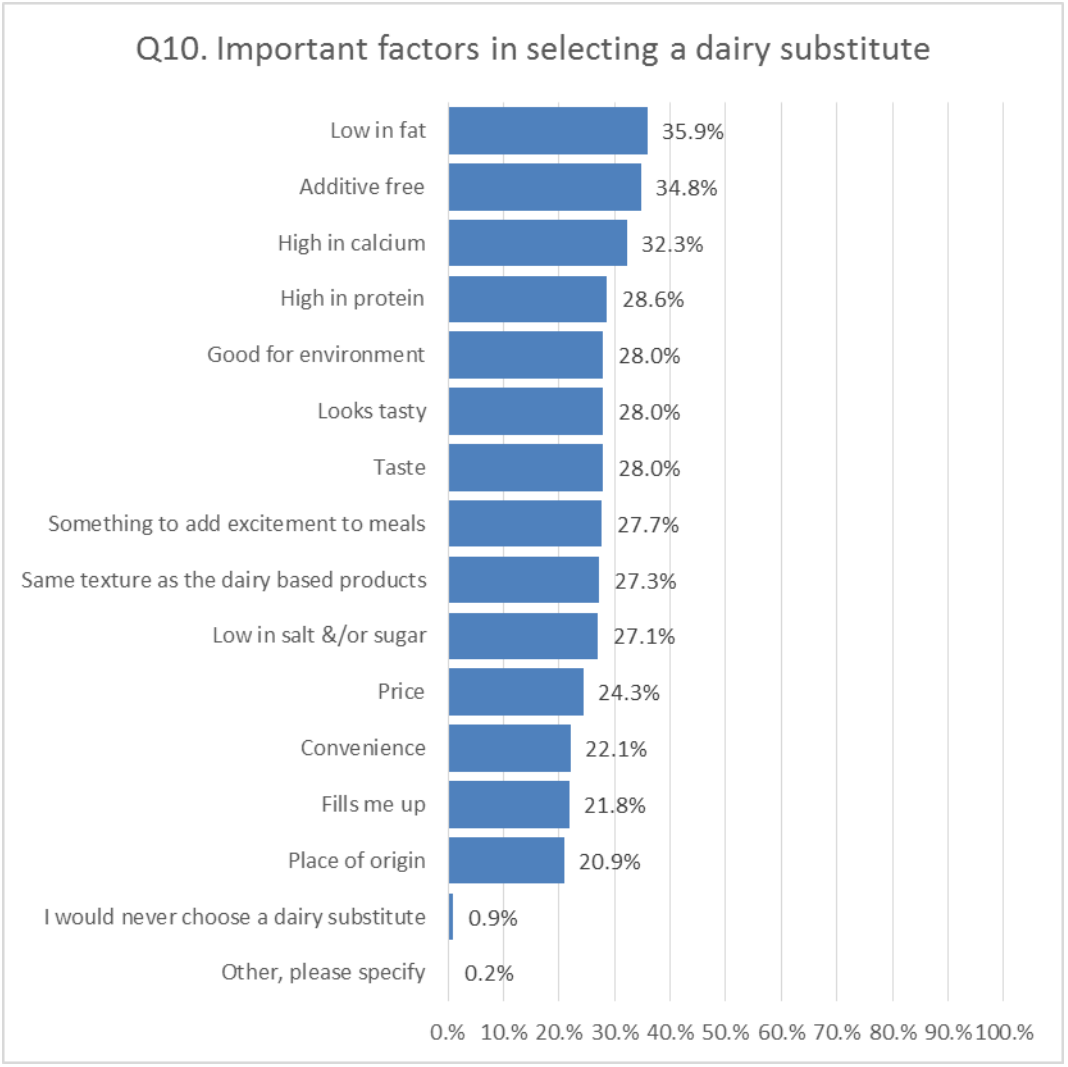
NB: prompted list

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)



NB: prompted list

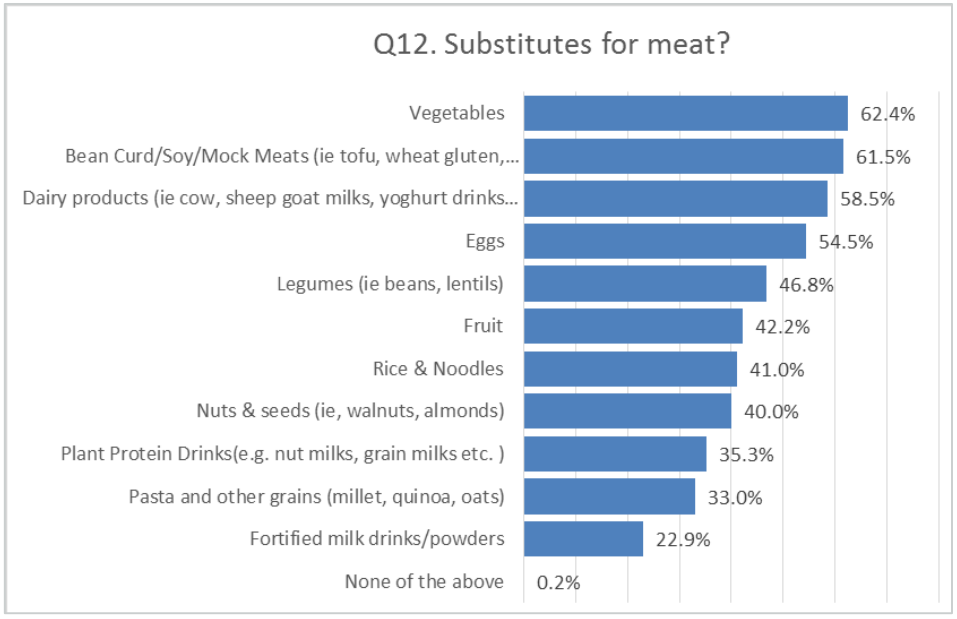
Q10. If you are specifically choosing a dairy substitute product, which factors would be most important to you? (Base: n=440 all those 'eating less' dairy at Q1 &/or Q2)

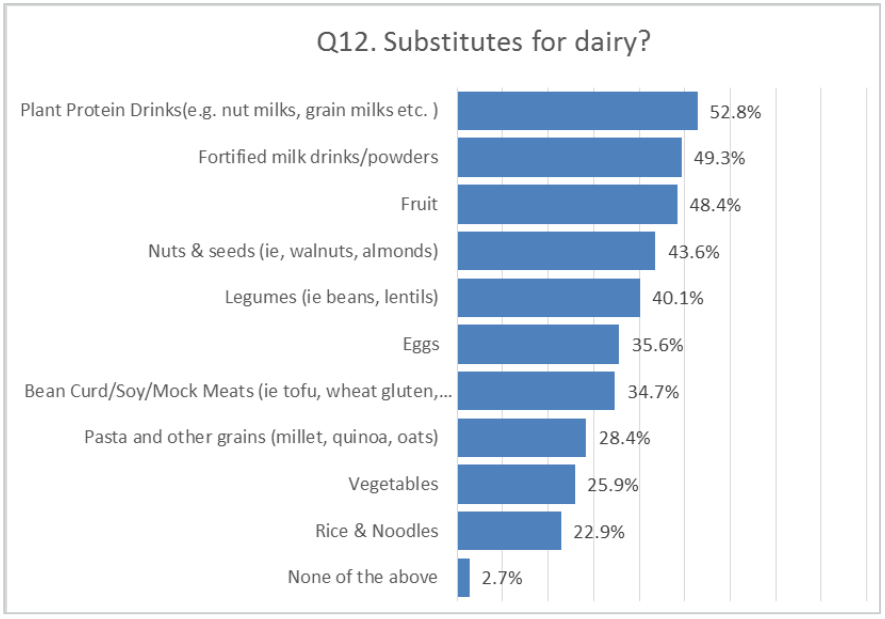


NB: prompted list

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)

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)





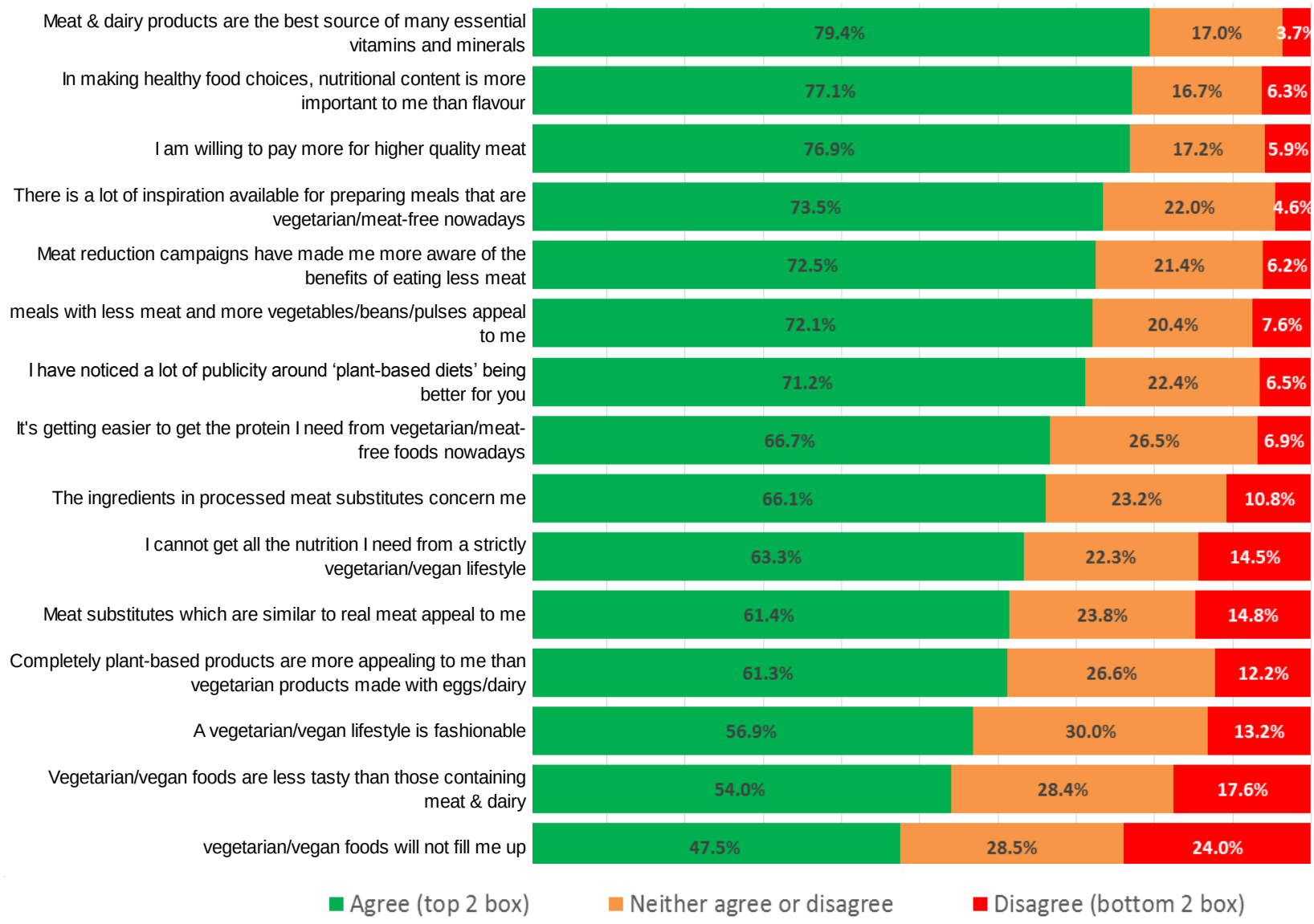
NB: prompted list

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)

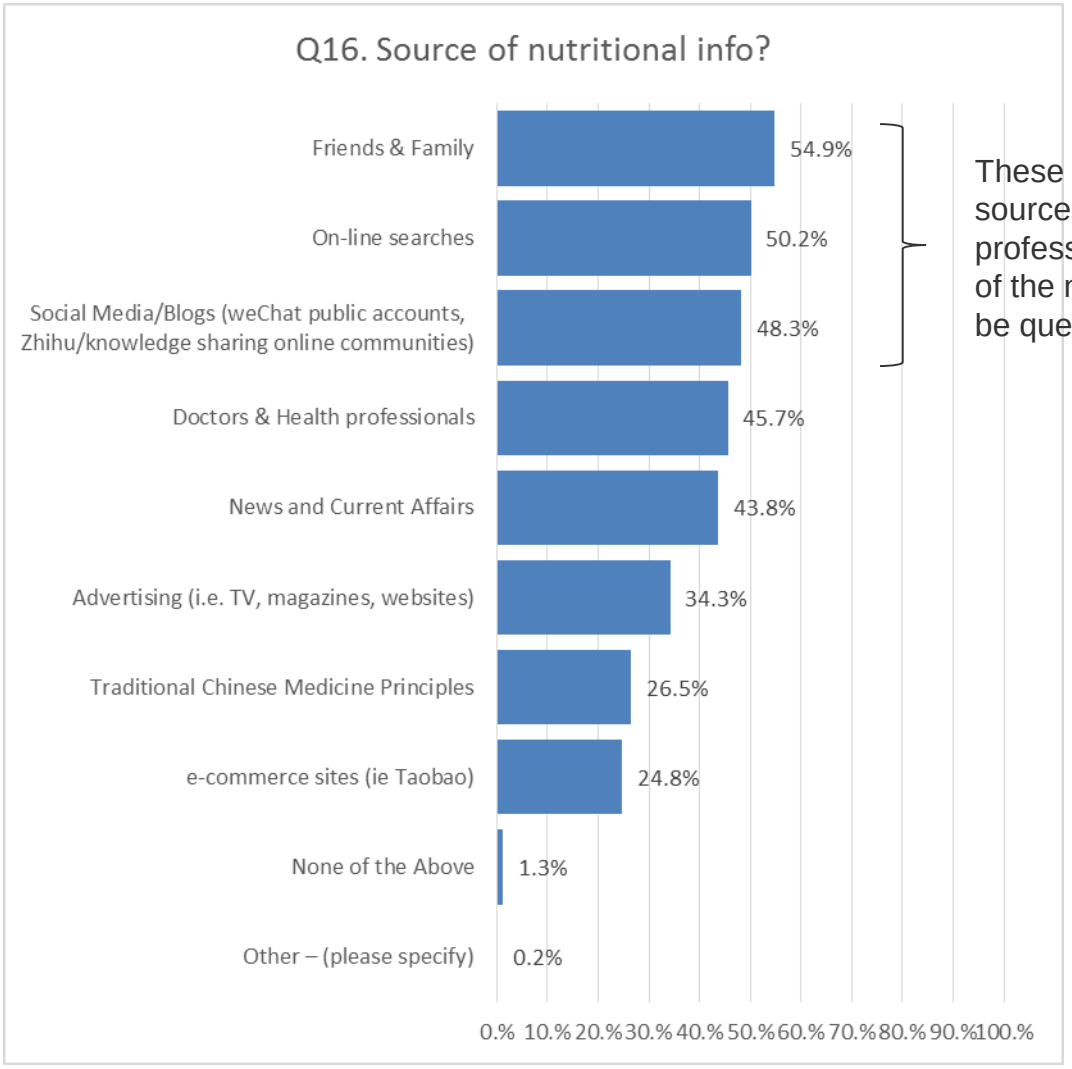
	Pork	Beef, mutton & lamb	Poultry	Fish & Seafood	Vegetables	Fruit	Rice & Noodles	Pasta and other grains	Bean Curd / Soy/ Mock Meats	Legumes	Nuts & seeds	Dairy products	Plant-based dairy alternatives
Ethical (ie free-range)	22.3%	23.5%	27.4%	19.9%	11.3%	11.3%	11.0%	9.6%	10.6%	10.5%	10.1%	15.3%	10.7%
	26.9%	32.2%	28.6%	21.1%	12.3%	12.3%	10.8%	10.7%	12.6%	12.0%	10.9%	19.9%	12.5%
All natural (ie free from chemical pesticides & fertilizers)	19.1%	21.2%	20.2%	24.6%	39.4%	37.6%	25.6%	25.7%	25.8%	30.0%	33.2%	24.8%	24.8%
	25.7%	26.6%	25.1%	29.5%	44.2%	42.7%	28.8%	29.6%	30.1%	33.0%	36.5%	29.3%	30.9%
GMO free	26.8%	24.8%	22.4%	23.8%	30.4%	29.2%	29.3%	25.5%	28.6%	31.7%	29.7%	24.4%	24.0%
	22.9%	23.9%	22.0%	22.2%	26.8%	27.4%	28.8%	28.1%	27.9%	35.6%	28.3%	25.4%	24.3%
Hormone free	23.4%	24.3%	24.6%	24.7%	22.2%	24.6%	21.7%	20.8%	22.0%	21.6%	22.1%	24.0%	21.8%
	27.5%	28.2%	29.0%	26.7%	25.6%	27.1%	21.7%	22.3%	25.8%	23.8%	24.1%	29.0%	24.0%
No additives/preservatives	20.9%	21.8%	20.8%	22.8%	26.4%	27.4%	29.2%	31.5%	33.5%	25.8%	27.2%	32.6%	33.3%
	23.8%	25.1%	23.3%	25.1%	26.8%	28.6%	31.3%	31.7%	31.3%	26.7%	30.1%	35.2%	35.4%
Environmentally friendly (ie sustainable production)	20.8%	21.3%	22.4%	29.9%	33.9%	32.0%	26.7%	27.0%	27.1%	26.6%	28.3%	26.8%	28.2%
	30.8%	31.2%	29.2%	33.4%	36.8%	35.5%	29.9%	30.6%	29.7%	32.3%	31.6%	34.2%	31.2%
Kind to animals	17.8%	20.5%	18.8%	13.6%	8.3%	6.9%	6.9%	7.4%	8.6%	7.6%	7.5%	14.8%	9.0%
	26.1%	32.0%	27.2%	18.6%	9.5%	8.1%	7.9%	9.1%	8.3%	8.5%	8.2%	18.2%	8.6%
High quality	25.5%	29.0%	22.4%	30.2%	25.9%	30.7%	32.3%	29.4%	30.4%	31.8%	35.2%	34.7%	33.5%
	34.4%	34.0%	31.5%	36.5%	31.7%	33.8%	36.7%	34.1%	34.4%	31.5%	38.2%	39.9%	38.6%
None of the above	13.6%	10.8%	13.3%	10.2%	8.8%	8.5%	9.7%	13.4%	10.6%	10.0%	8.6%	10.8%	12.0%
	6.5%	4.8%	7.1%	6.4%	6.1%	5.6%	9.2%	9.5%	9.7%	7.7%	6.6%	5.6%	8.6%

China | New Zealand

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

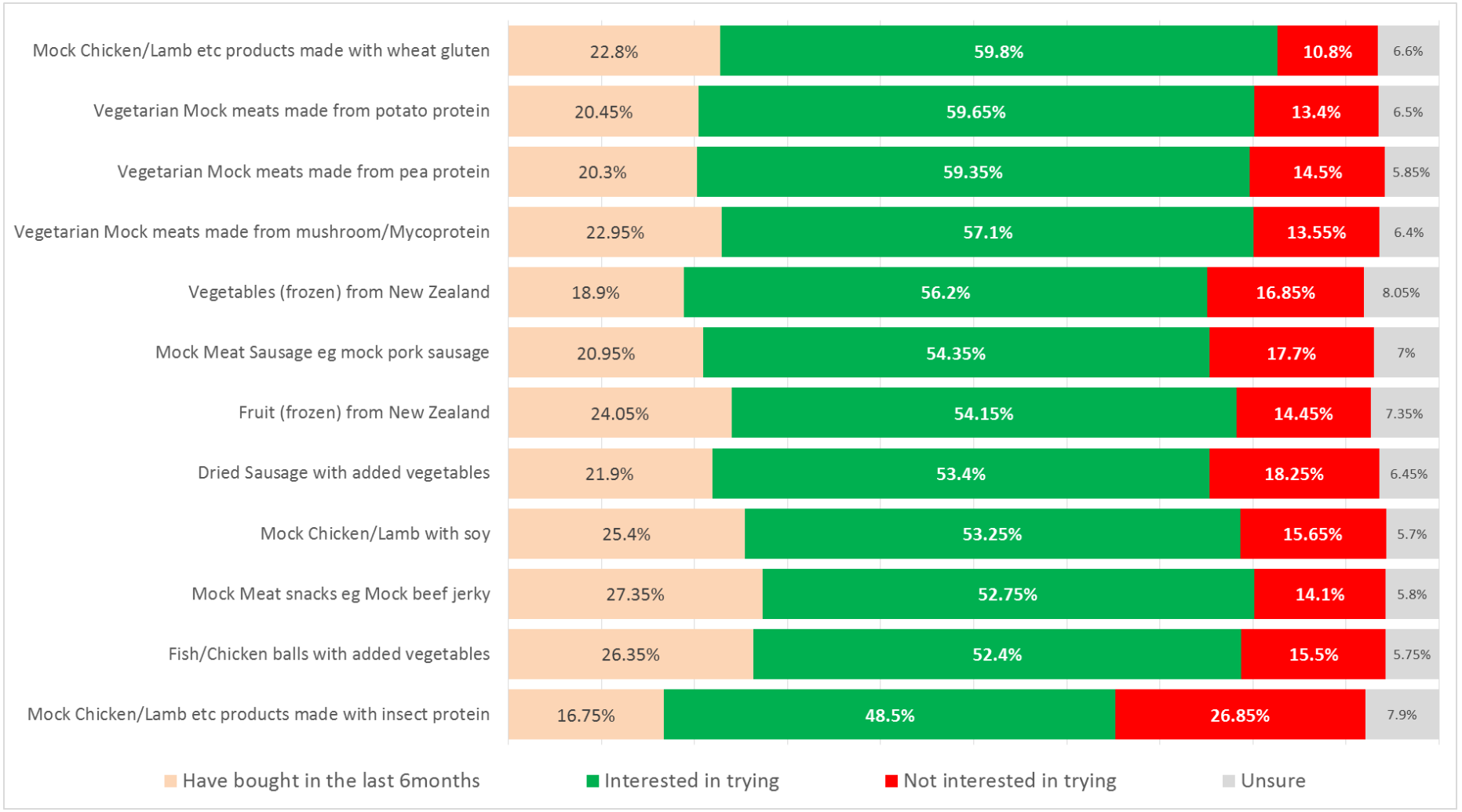


Q16. Where do get your nutritional/dietary information from?
(Base: Total n=2000 Chinese consumers)

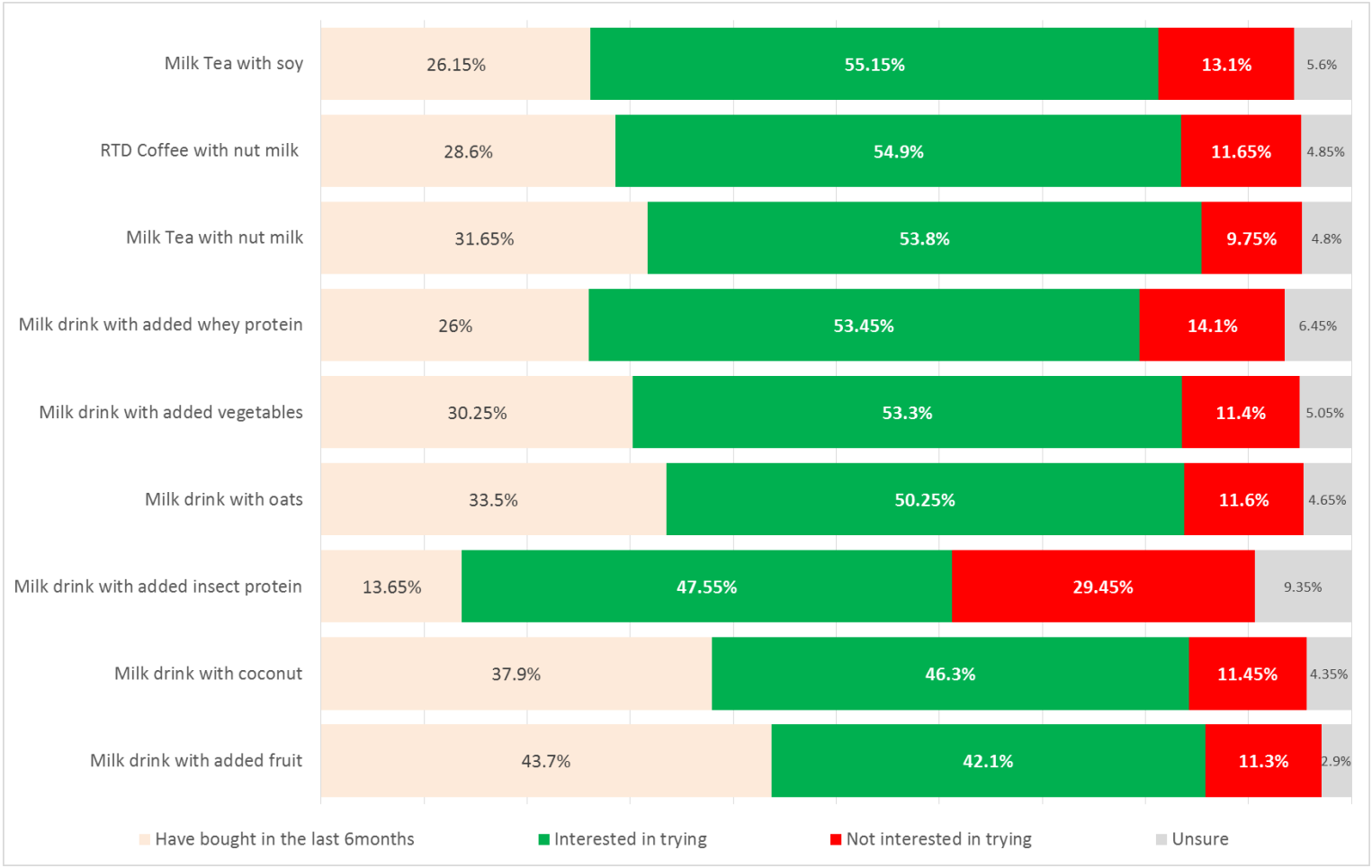


These are the initial go-to sources before asking professionals. Thus the accuracy of the nutritional information may be questionable.

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)

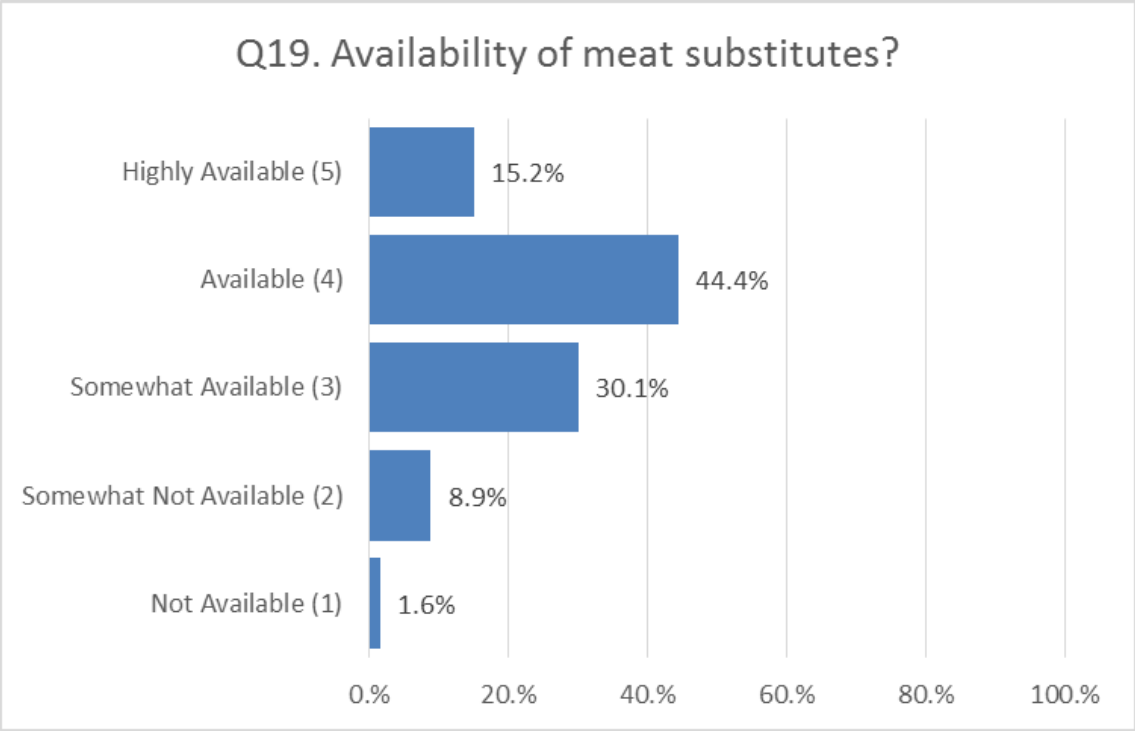


Q18. Which, if any, of the following beverages (that may or may not be available) are you interested in trying? (Base: Total n=2000 Chinese consumers)

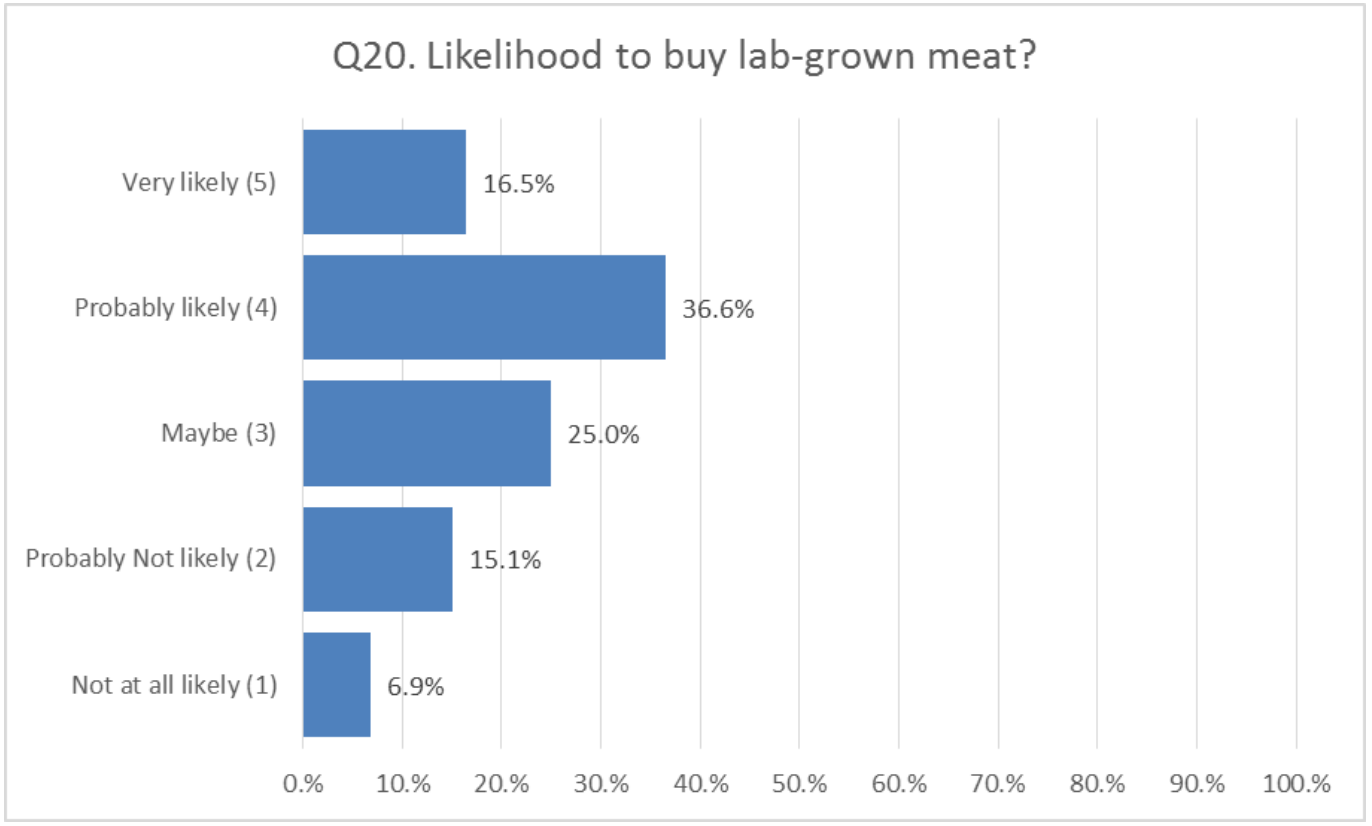


Q19. How available are meat substitutes (i.e. tofu, mock meats) to you?

(Base: Total n=2000 Chinese consumers)



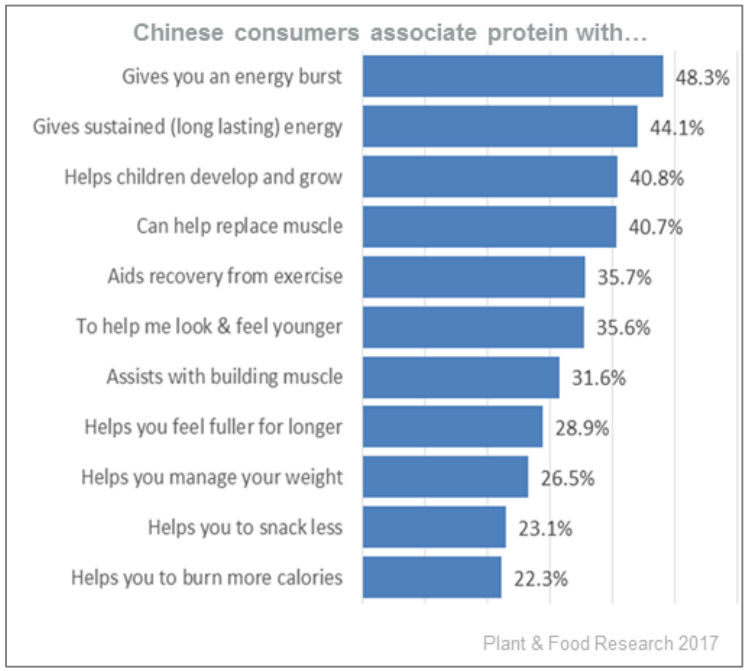
Q19. How likely would you be to buy lab-grown meat (meat grown in a laboratory not from an animal)? (Base: Total n=2000 Chinese consumers)

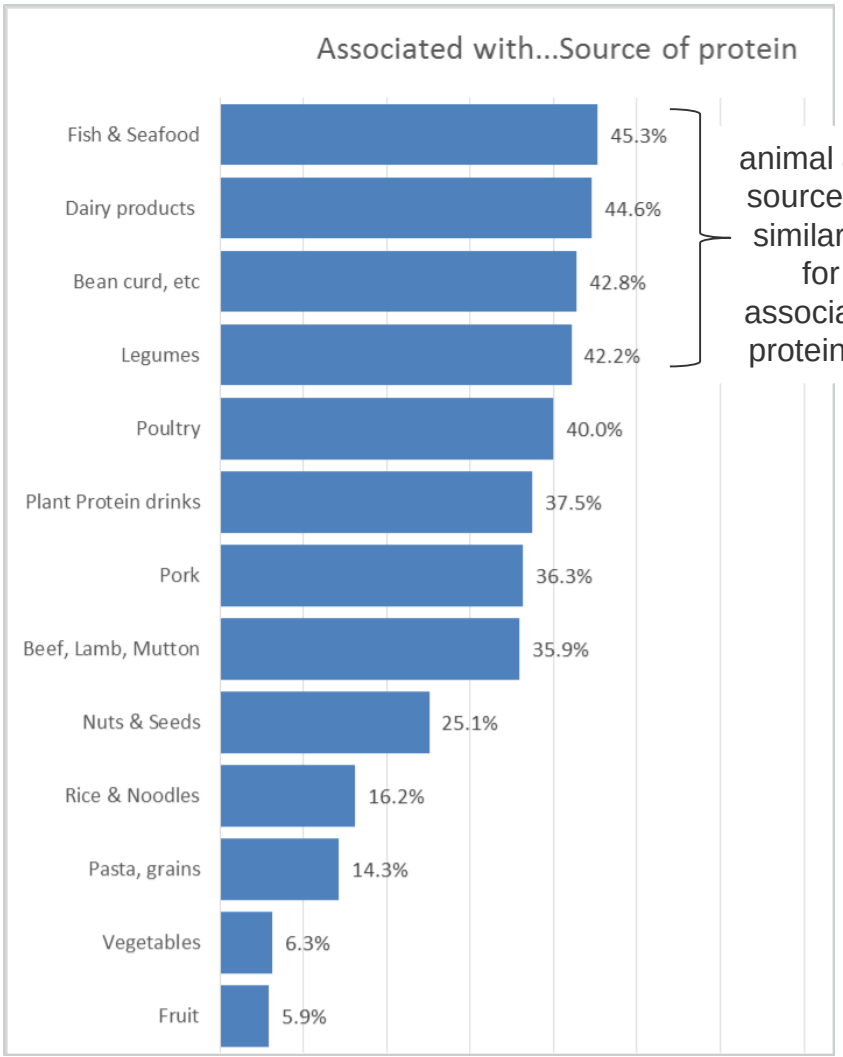


China Survey Discussion

The Chinese consumer attitude to protein

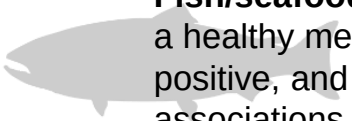
Chinese consumers recognise a diverse range of benefits from protein in their diet – most associate proteins with providing energy, and aiding in growth and repair. Some food types are more highly associated with providing protein than others.





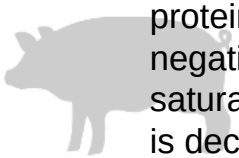
Its not all about protein…

Consumers understand that many food sources (plant- & animal-based) contribute protein to their diet; however, some have better health credentials than others

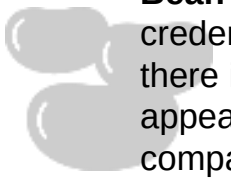


Fish/seafood dominate the Chinese view of a healthy meat protein, with the most positive, and least negative health associations. They bring flavour and texture to a meal, improve immunity, contribute calcium and are easy to digest, as well as being a good source of vitamins and minerals.

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.

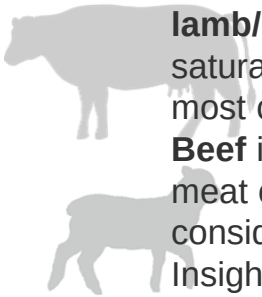


While **pork** is perceived as a good source of protein, it is strongly associated with some negative attributes, namely calories, saturated fat and cholesterol, thus popularity is declining. Increasing affluence and awareness of health could be contributing to the move away from **pork** to other meats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



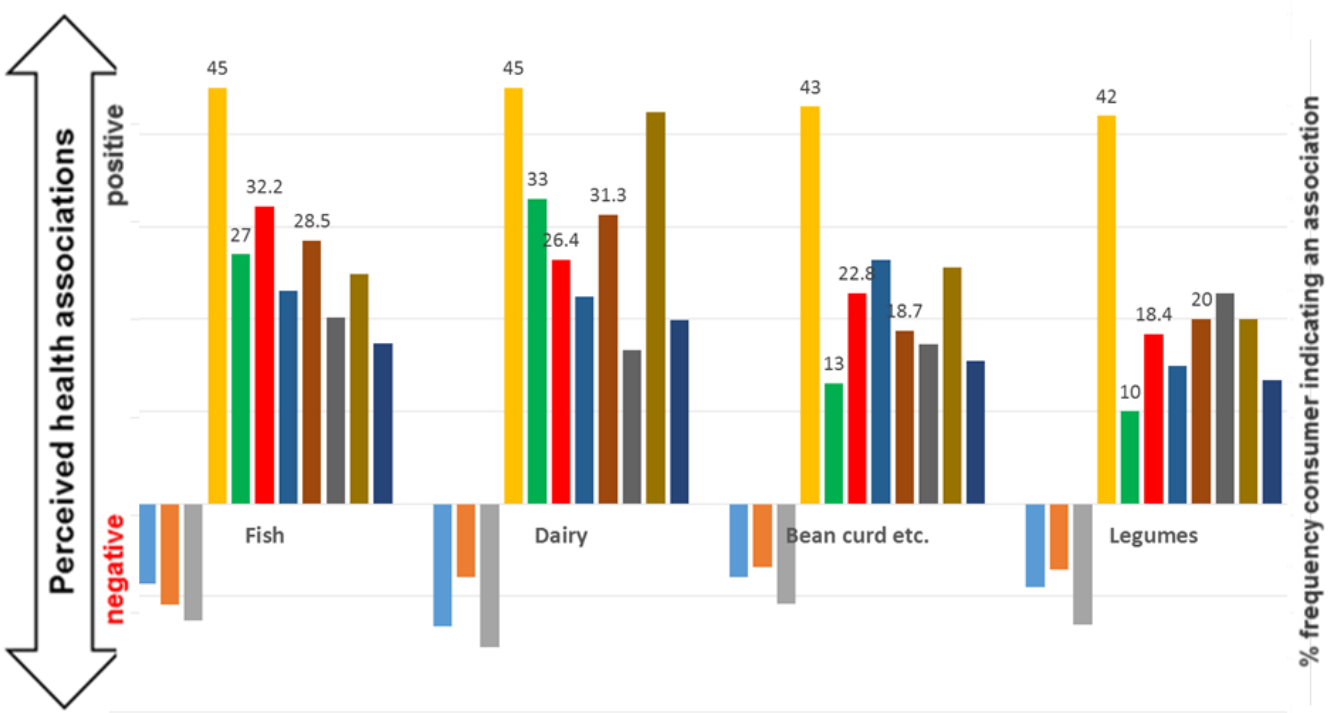
Bean curd and legumes have positive health credentials, similar to dairy and fish; however, there is less intent to eat more of them. It appears that they simply do not deliver a comparatively positive sensory experience, and do not have the perceived link with immunity that the animal-based options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

There is wide spread 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.

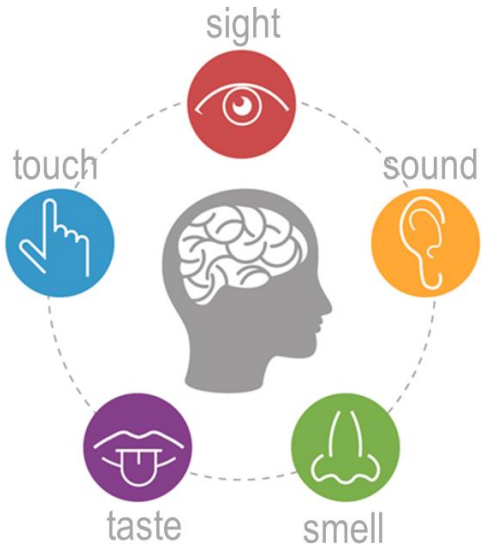
This appreciation that both animal and plant sources of protein deliver benefits (and have shortcomings) suggests that **a sudden shift to solely plant-based protein based on health benefits can not be assumed in the Chinese market**.

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 diary 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.



Nutrition Facts
Serving Size 2/3 cup (55g)
Servings Per Container About 8

Amount Per Serving	
Calories 230	Calories from Fat 72
	% Daily Value*
Total Fat 8g	**12%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 37g	**12%**
Dietary Fiber 4g	**16%**
Sugars 1g	
Protein 3g	
Vitamin A	10%
Vitamin C	8%
Calcium	20%
Iron	45%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily value may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Nutrition Facts
8 servings per container
Serving size **2/3 cup (55g)**

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Total Carbohydrate 37g	**13%**
Dietary Fiber 4g	**14%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

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 heighted 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.

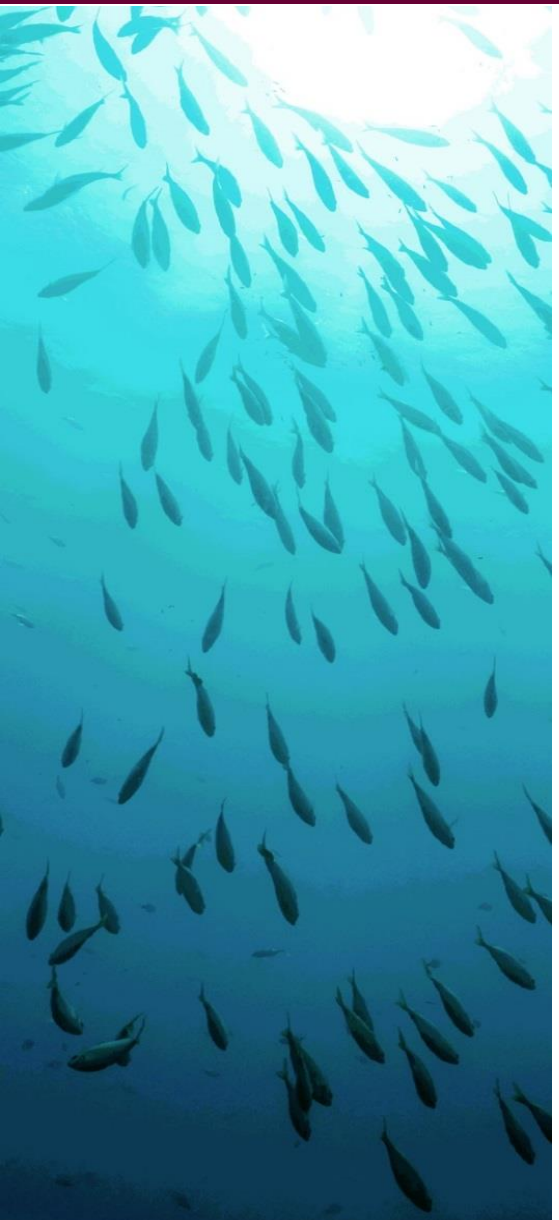
This suggests that the higher prices demanded for animal protein is justified by the perceived benefits. In fact, over three quarters of those surveyed indicated that they are **willing to pay more for higher quality meat**

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.

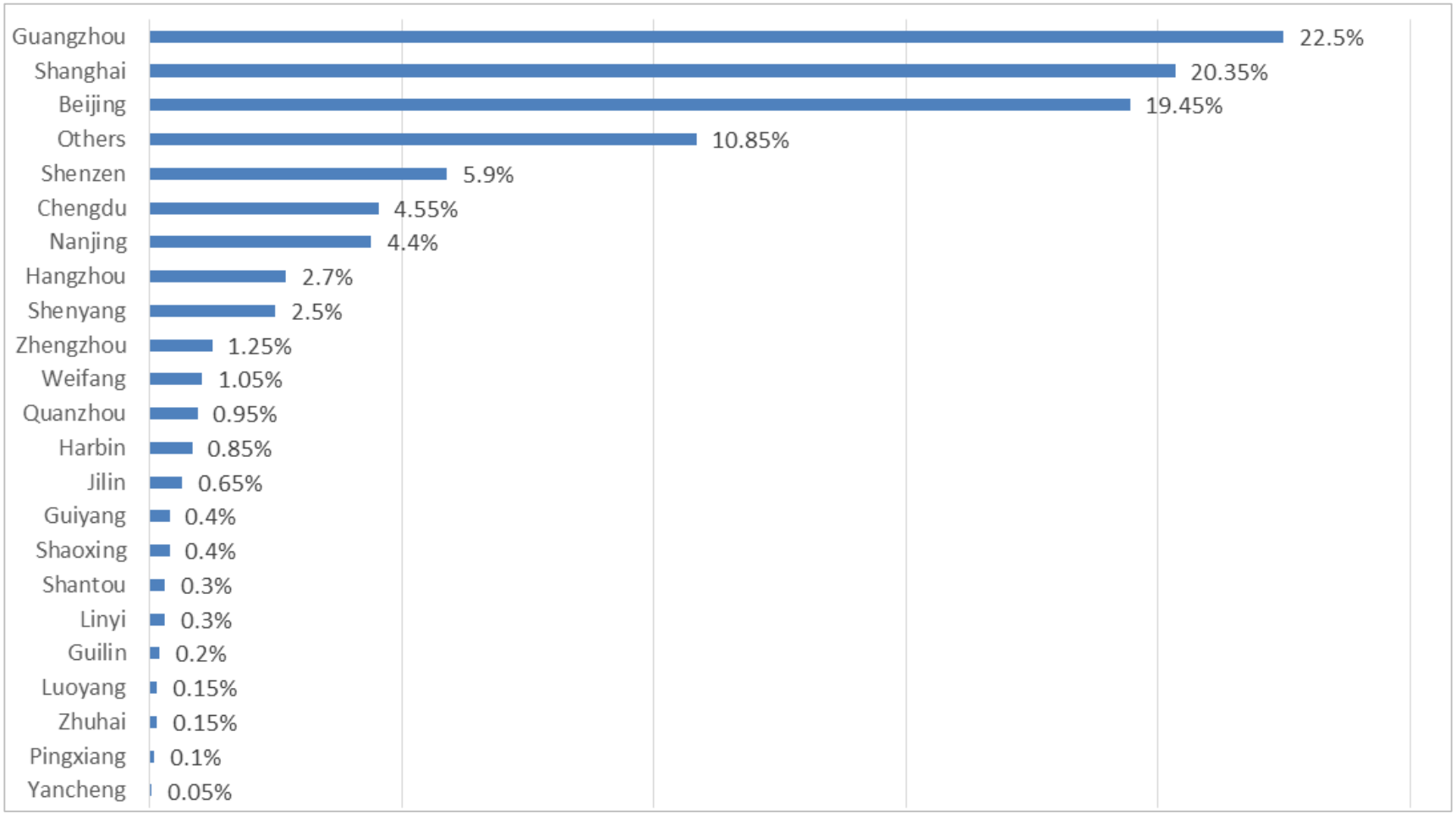
Messaging matters

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.

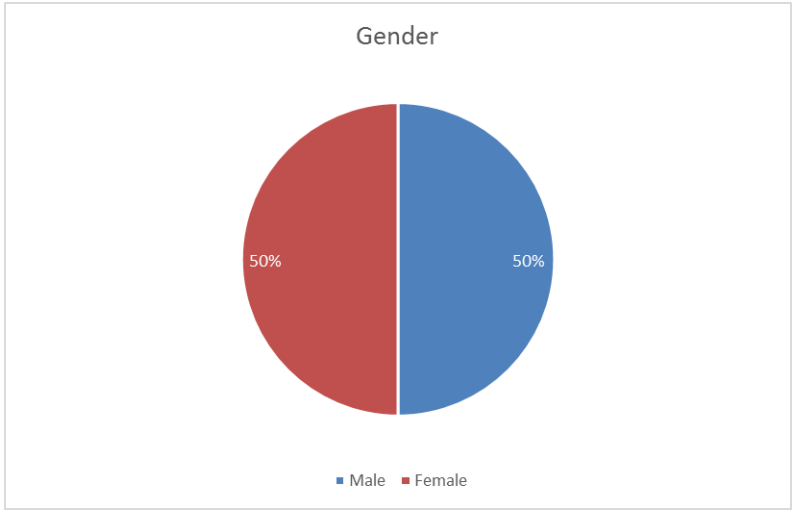
China Survey Demographics

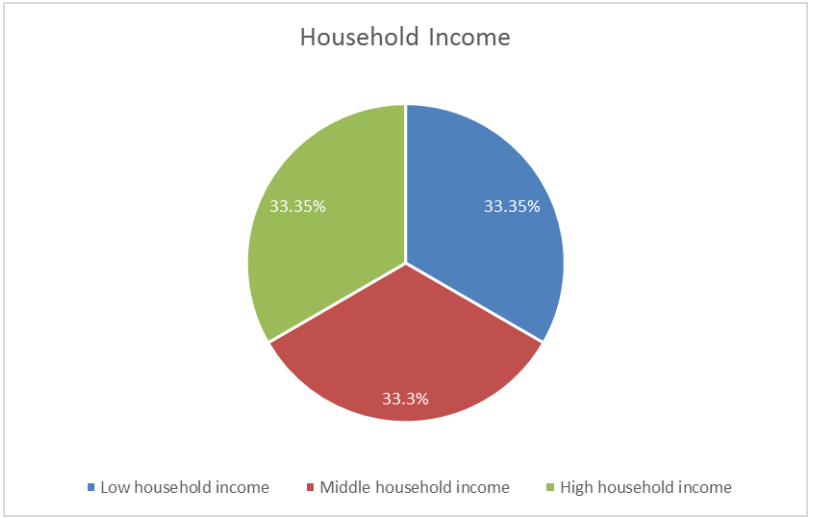
Which city do you live in?

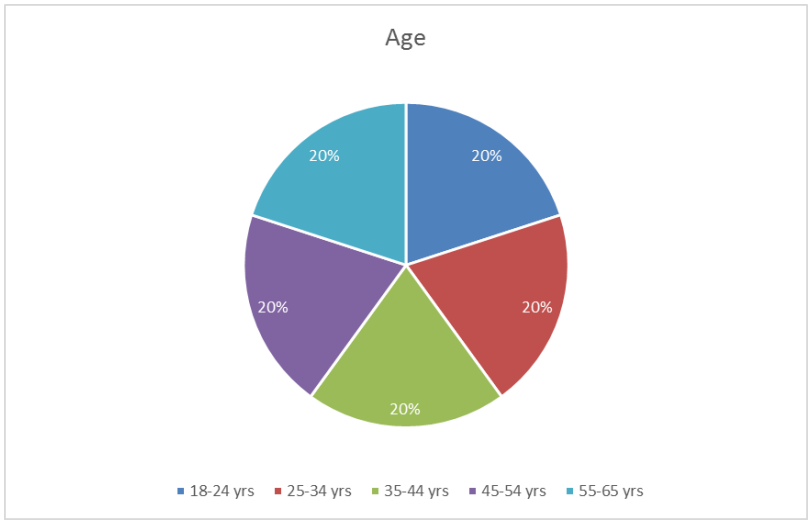


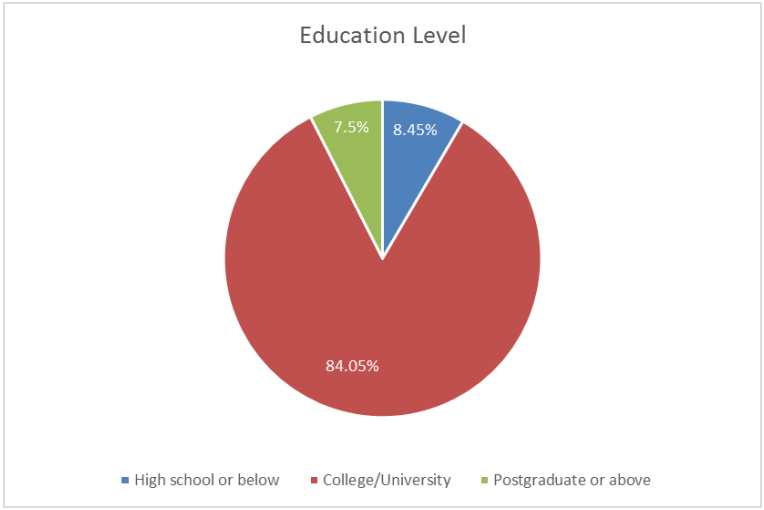
N=2000, tier 1 & 2 cities only

Demographic breakdown









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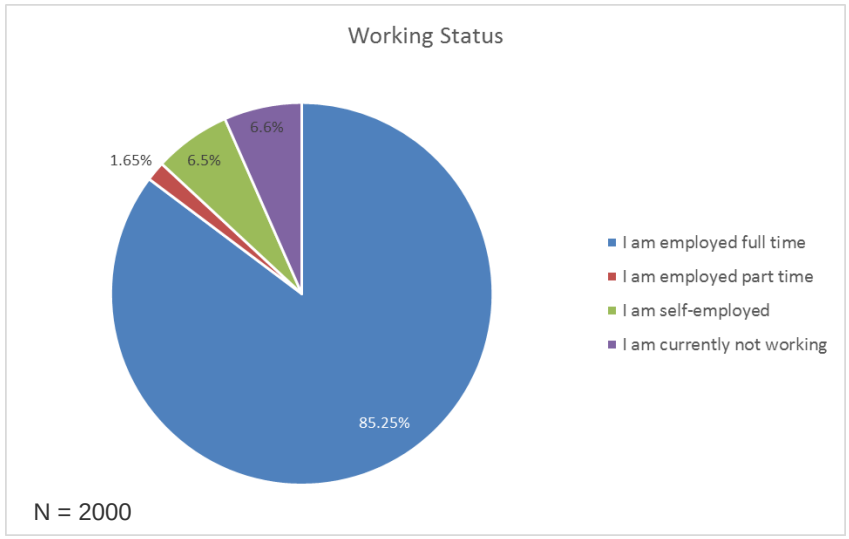

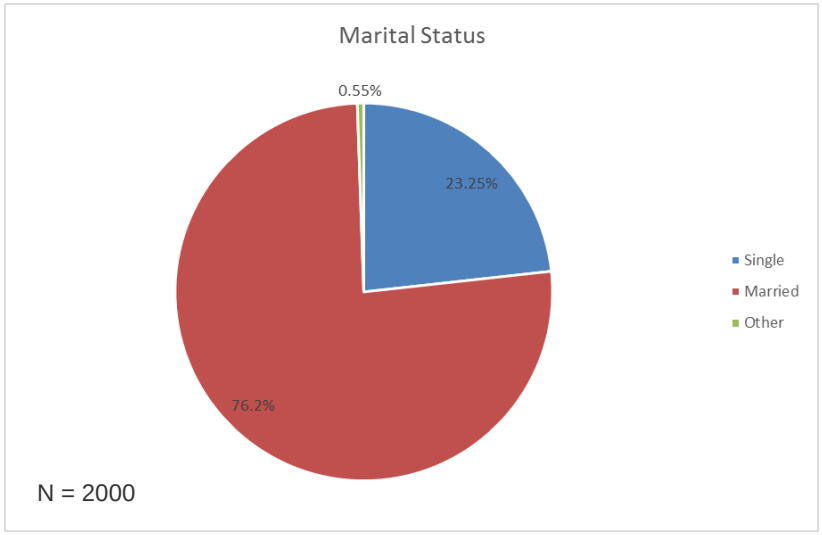

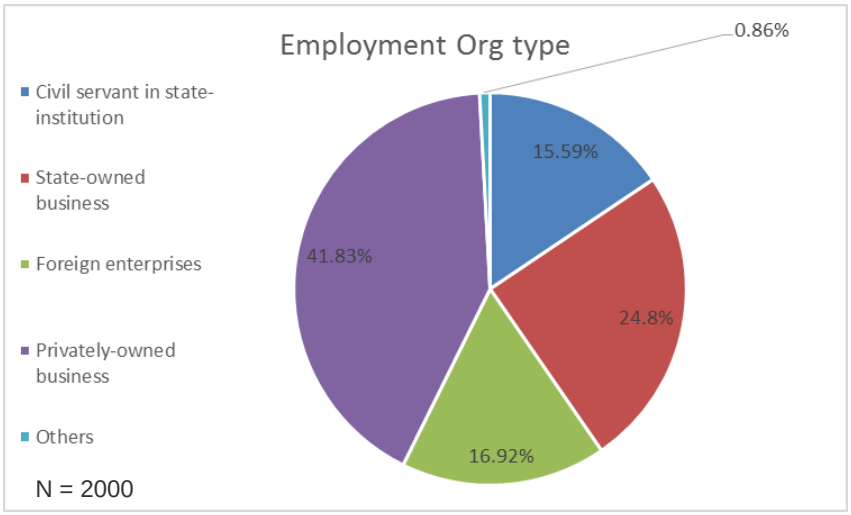

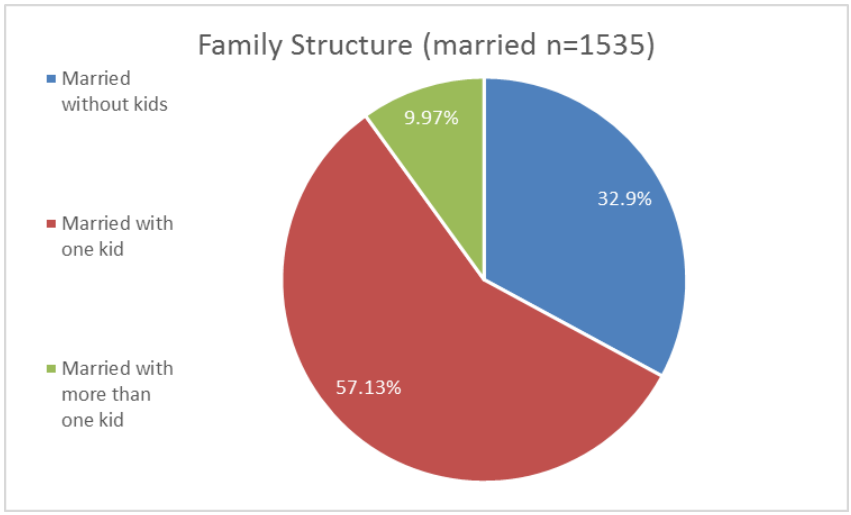

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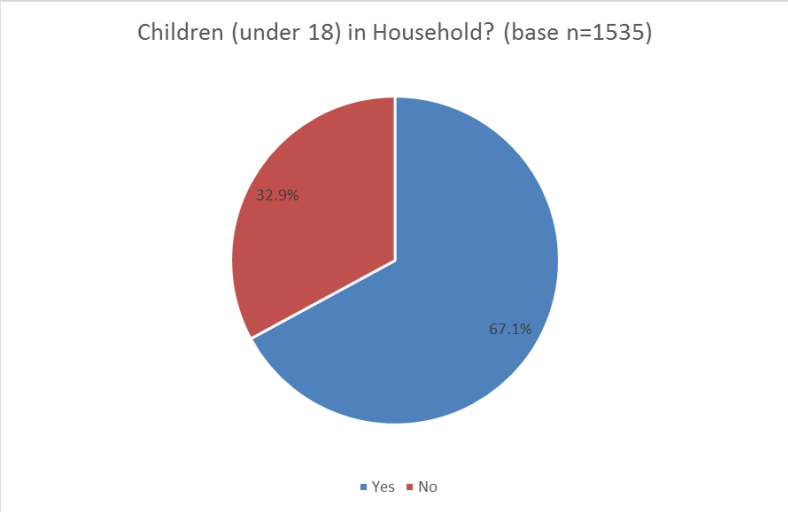

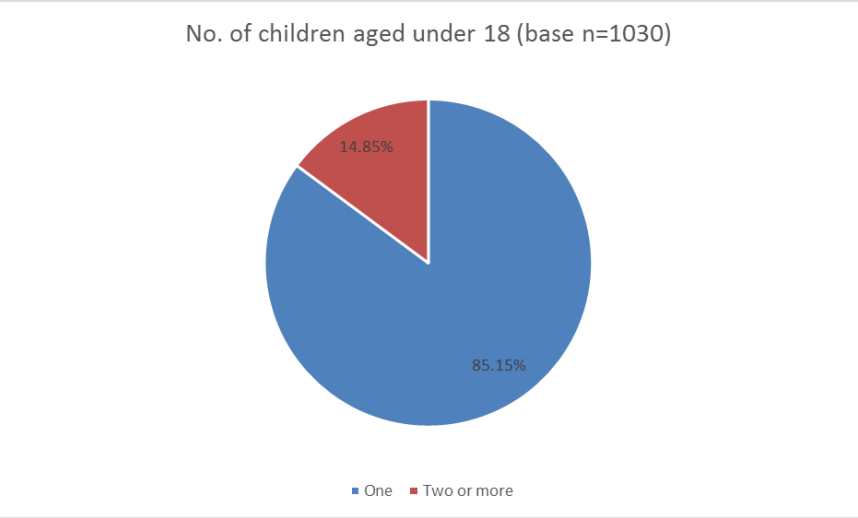

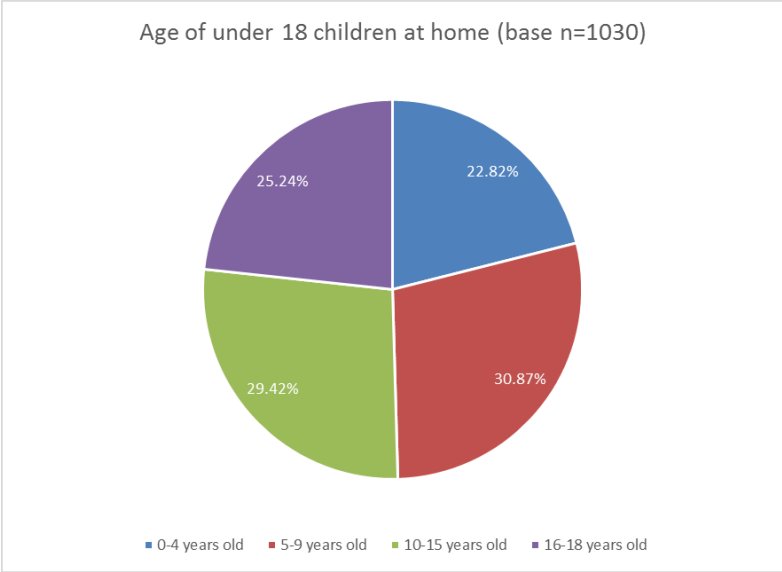

Appendices

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

Sutton K, Larsen N, Moggre G-J, Huffman L, Clothier B, Eason J, Bourne R

December 2017

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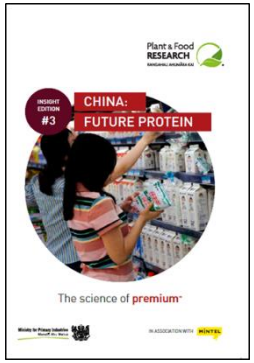

CHINA: Future Protein Insight Edition #3

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