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AN INVITATION TO SUBSCRIBE TO "China's Alternative Protein Market"

The next front in alternative proteins

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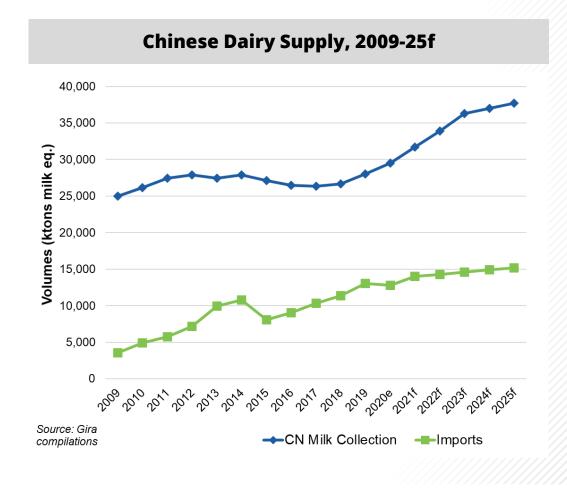


0 1. INTRODUCTION OWHAT IS THE POTENTIAL FOR PROTEIN ALTERNATIVES IN CHINA

The concept of 2.0 alternative proteins is well established in western markets. The last few years has been characterised by major capital inflows into the alternative protein space. Sales have grown by >10% p.a., and Covid-19 has acted to accelerate this. The trend has now reached China and its market of 1.4 bio consumers hungry for new and innovative products.

China has a long history of producing products and dishes that mimic the taste of meat and dairy. Most local companies are using old technology, with a few working on 2.0 solutions – most currently lag the Western competitors. The race to catch-up has started, and if other Chinese industries are a proxy, it will not take long!

- Local and international companies in China are rapidly expanding into the alternative industry with new product launches, with capital raises increasing considerably in 2020. Western companies are already placing their brands in the market,-looking for a share of the next real growth opportunity.
- A range of different challenges exist for companies targeting the Chinese market, with mouthfeel and texture often more important to Chinese consumers. This is something that alternative companies have struggled to recreate at present.
 - The drivers that push consumers towards these are far more centred on health, nutritional benefits and food safety; ethical and sustainability drivers are of low importance to date in China.
- The focus remains in higher tier cities, where consumers are hungry for innovation, and have higher disposable incomes.
 - The trickle down to the 3rd and 4th tier cities give the market huge long-term growth potential.
- Imports are the key channel for companies supplying the market, but there is a higher cost profile associated with this; many are looking at options to development assets on the ground in China.



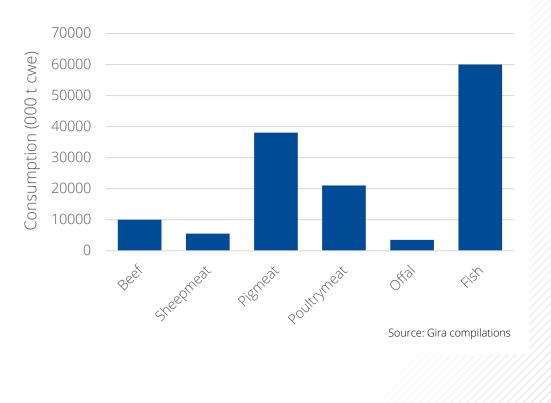




1. INTRODUCTION WHAT IS THE POTENTIAL FOR PROTEIN ALTERNATIVES IN CHINA

The Chinese market is ripe for alternative proteins, as a number of drivers align:

- A market known to attach greater trust and premiums to imported food products. What will be the implications here for alternative products?
- High prices of domestically produced meat and dairy.
- A large and expanding group of middle class consumers in booming urban areas looking for innovation and who latch on to and drive new food and drink trends.
- Engrained acceptance of plant based alternatives to meat and dairy, although this may create unintended competition for 2.0 companies who could struggle to differentiate.
- Significant supply of plant based ingredients and a vast soy protein processing capacity. China is currently a major protein concentrate and isolate exporter!
- There has so far been little real insight into how China will develop. There is a need for more clarity as the global industry positions for the next step in the Chinese alternative protein market.
- This report sets out the answers to key issues:
- Is the Chinese industry looking to develop its own solutions?
- Will they need external technology?
- Is there an opportunity to import now, or do western companies need in-country assets if they want to leverage the opportunity?
- What challenges do 2.0 face from the incumbent meat and dairy industry, and other sectors?
- How are brands developing now in the 2.0 space?
- How important will the government be in the evolution of the 2.0 space?



Chinese Meat and Fish Consumption – 2019

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0 2. OBJECTIVE: **PROVIDE CLARITY TO THE FAST EVOLVING SITUATION IN CHINA**

THE STARTING POINT FOR THE STUDY IS TO PROVIDE THOSE LOOKING TO MOVE THE NEEDLE IN CHINA'S PROTEIN ALTERNATIVE MARKET WITH REAL ACTIONABLE INSIGHT. WHAT ARE TODAYS KEY ISSUES FOR THE DEVELOPMENT OF THE MARKET, WHAT ARE THE IMMEDIATE OPPORTUNITIES, AND WHERE IS IT HEADING OVER THE NEXT DECADE.

In order to achieve this Gira and IQC combined their respective knowledge of the Chinese and global markets, for food, meat and dairy, alongside the lessons already learnt in protein alternatives to provide real insight into this much lauded market.

The following areas have been identified as being key to understanding the "what next":

- The background China's current protein market, for both meat and dairy its size, drivers and consumer issues.
 - The potential for protein alternatives to compete, and their potential market size.
 - Which will likely be the products that are most susceptible to the alternative protein movement?
 - Attitudes towards alternative protein products; what will be the key drivers for the 2.0 generation of alternatives?
- Current 2.0 technology in protein alternatives focussed on what has already arrived in China, and what is in the pipeline.
- Chinese origin, or off the international market. How are they adapting to Chinese tastes?
- Regulator control China's food market controls are seen as a barrier to outsiders, but what does this mean to the topic in hand.
 - Both for importing technology (and ingredients) as well as for those developing in China.







OBJECTIVE: PROVIDE CLARITY ON THE FAST EVOLVING SITUATION IN CHINA

- What is the Chinese government stance on protein alternatives is there funding?
 - Are these products viewed favourably, potentially as a solution to both increased import reliance on food products, and environmental targets?
- What approach to the market will likely be favoured by government action? Import v local supply?
- To what extent will it act to accelerate the industry development? As has been shown, its involvement can drive vast gains in a short period of time!
- Who will develop protein alternatives in China todays stakeholders, the early investors, the government and those still in the development cycle.
 - Is there a drive for Chinese style products, or is the focus on producing western style products?
 - Where is this going? Where do the best opportunities lie?
- The future supply chains for protein alternatives will China fit them in alongside their more traditional cousins, or can China's fast evolving market find new ways for them to reach the market.
- How is China's traditional meat and dairy industry reacting? Are they early adopters, supporters, or is this viewed as a challenge to be beaten?
- Chinese consumer perceptions in a market where food innovation is a boom and bust cycle, with trends flashing through the market, is there more substance than a new WeChat image?
- Go to market strategy given all of the above, and the market developments, which channels are opening up right now?
- The outlook where is the protein alternative market in China going over the next decade?
- What are likely to be the real drivers for growth, and what will China's role in the global protein alternative market be?

THERE ARE NO SIMPLE ANSWERS, THE SITUATION WILL EVOLVE, BUT PROTEIN ALTERNATIVE PRODUCTS ARE ALREADY IN THE MARKET, ALREADY BOOMING. THE REPORT WILL EXPLAIN THE WHO, THE HOW AND THE WHY...







3. METHODOLOGY GIRA AND IQC'S COMBINED INSIGHT AND EXPERIENCE

THE WORK ON THIS ALTERNATIVE PROTEIN REPORT WAS CARRIED OUT IN THREE INTERCONNECTED TASKS.

- 1. Focused desk research on key developments, in the context of Gira's existing insight and data from the Gira Meat Club, Gira Asia Meat Club and the Gira Dairy Club, alongside IQC's unique position inside the Chinese market, and its existing relationships in the alternative protein supply chain.
 - Significant update of Gira's view of the current situation in China, based on the latest numbers, and Gira's understanding of the forces at play in the market.
 - Fresh insight into the existing data, held within the Chinese corporate world.
 - Multi language program, Chinese, English and others.
- 2. Selective interview program with over 50 key industry players.
 - Key movers and shakers in the Chinese food industry; those best placed to explain how alternative proteins are placed, and how they see them evolving.
 - Global suppliers, producers and analysts; what is the view of the outside world?
 - The international field of alternative companies, where is their technology today, and what is planned for Asia.
- 3. Scenario analysis: the 'think tank' using Gira and IQC's combined decades of experience, and the insight and numbers gleaned in steps 1 and 2, what is the most probable outlook? What is the story hidden between the lines?

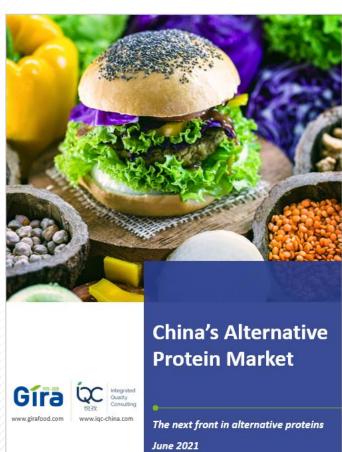
MEAT AND DAIRY COMBINED? - whilst it is understood that very few of companies are heavily involved in both the meat and dairy sectors, the positioning of protein alternatives in both these markets share many parallels, which are relevant to each other, and often draw on similar technology. We combined resources of our team and international contacts to provide an informative and tightly written report that will provide a solid sounding board based on what we know of the situation at the time of writing. Within each section there are be breakouts of relevant detail for each, making it clear where opportunities are different, and where they converge. We utilised a small core team of experienced consultants in China and abroad to focus on this dynamic and fast changing situation. We called on selective assistance from our global network, to gather the most up-to-date insight on selected issues and from selected contacts.

THE DELIVERABLE:

The main report will be delivered in English in a searchable PDF format. It is 193 pages of detailed insight and conclusions. It will be accompanied by 2 webinars in late June / early July '21, in English language.



4. STRUCTURE OF THE REPORT CONTENTS PAGE 4 5





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4. STRUCTURE OF THE REPORT FOCUSED REPORT, WITH SUBSEQUENT WEBINAR

EXECUTIVE SUMMARY

Six pages on the current state of the alternative protein market in China, the key drivers and brakes, the major players, and the real opportunities in the market, detailing how it is likely to evolve in the coming decade.

CURRENT CHINESE PROTEIN MARKET

The size and development of China's meat and dairy market; what are the key drivers?

- What are the major product categories that are likely to be most susceptible to alternative products? And why?
- What is the potential for protein alternatives to compete in the market, and the potential market size for protein alternatives.

CURRENT PROTEIN ALTERNATIVE TECHNOLOGY IN CHINA

A review of the current technology categories for alternative meat and dairy products. At what stage of the alternative protein maturity cycle is China today and what might influence this in the near-term?

- Review of the engrained protein alternative products in the market. How will these impact the evolution of 2.0 products?
- New 2.0 alternative protein products on the Chinese market, examining plant based, fermented and cell-based products.
- How are these products priced v 1.0 products, as well as incumbent meat and dairy products?
- Estimations of the size of the market, split between the major technologies.





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4. STRUCTURE OF THE REPORT FOCUSED REPORT, WITH WEBINAR ON RELEASE

REGULATORY CONTROL & CHINESE GOVERNMENT POSITION FOR ALTERNATIVES PROTEINS

What are the regulatory requirements for meat and dairy alternatives? How are these evolving?

- Regulations for the approval of protein alternatives manufactured in China?
- Regulations governing the import of protein alternatives?

How is the Chinese government likely to impact the evolution of the alternative protein market?

- How may the Chinese governments desire to drive sustainability and decrease the environmental impact of its protein industry incentivise this? Will its ties to the incumbent industry impact its thinking here?
- The apparent key drivers and limitations influencing Chinese policy makers when setting goals addressing the alternative protein industry?

WHO WILL DEVELOP PROTEIN ALTERNATIVES IN CHINA?

Which companies are already active in the space?

- Where are the local innovation clusters that exist today which promote scientific, nutritional, entrepreneurial or social awareness progress related to China's meat/dairy 2.0 space?
- What are the key areas of focus, and who will fund these developments? (corporate, venture capital, academic and government-funded initiatives).
- Which stakeholders private, government and non-government organisations are the most influential and proactive in promoting meat and dairy replacement products in order to shift consumer demand to more flexitarian diets?





4. STRUCTURE OF THE REPORT FOCUSED REPORT, WITH WEBINAR ON RELEASE

FUTURE SUPPLY CHAIN FOR PROTEIN ALTERNATIVES IN CHINA

What are the main perceived challenges in terms of the supply chain, production technology, product innovation or commercial feasibility for successful adaptation of novel meat/dairy replacement solutions in China?

- How might the traditional animal protein industry react to these new developments? Is it a zero-sum game or can China's industrial meat complex be reconciled with the emergence of the alternative protein sector?
- Will China build domestic production based on imported raw materials? Or is the solution to look to an entirely Chinese supply chain?

CONSUMER INSIGHTS – THE PERCEPTION AND POSITION OF ALTERNATIVES

What are the main social awareness themes related to alternative protein products that (are expected to) resonate most with Chinese consumers and influence buying behaviour? (Environmental v health v animal welfare, and others).

- The drivers that push consumers towards protein alternatives appear to be more centred on health, nutritional benefits and food safety.
 What role does sustainability-specific product and brand messaging play in educating Chinese consumers around alternative protein solutions, including but not limited to public health, environmental, animal welfare, and climate change topics?
- What is the role for protein alternatives in China?





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4. STRUCTURE OF THE REPORT FOCUSED REPORT, WITH WEBINAR ON RELEASE

GTM STRATEGY FOR COMPANIES

- Which are the key sales channels for alternative products? FS v retail?
- Case studies will be given for FS operators such as Starbucks, YUM etc. as well as selected local QSR players and F&B operators, in addition to the retail channel, including brick-and-mortar, online and omni-channel operators.
- Product positioning in the market, primarily focussed on the pricing strategy. What is the current price point of alternatives in the Chinese market retail and foodservice? How do these compare to traditional meat and dairy products? How will this evolve?

THE OUTLOOK

As more alternative products are approved for China, how will the market evolve, what will be the drivers for increased sales volume, and where will they really grow?

- The time line future evolution of alternative proteins in the Chinese market. How will these fit with the existing animal protein markets?
- Key product categories that will likely drive the market. Split between meat and dairy.
- What will be the potential size of the alt-meat, alt-fish and alt-dairy markets in China by 2030? What market share can these categories realistically capture? How can they achieve this?
- The market evolution, split between plant-based, fermented and cell-based products.
- Corporate development; will the industry be led by Chinese-based companies, or will the entrance of western companies be the key market driver?
- Will China become a major import destination for protein alternatives?
- What potential exists for China to become an exporter of protein alternative products, not just the ingredients utilised in them?









EXAMPLE PAGES

Alt-protein Market Evolution Scenarios

Significant variance across scenarios; government support the key driver

Government support: arguably

Whether or not the govern

industry will drive considera

overall market trajectory.

If the Chinese government of

priority and therefore some

to lead, it is likely considerab

research assistance and a rai

from both Chinese and global

linked to diet which impact o

credit for example; driving th

Government approval of tech

important driver, in particula

With assistance, a base case s

be on the lower side. By 2030

On the other side, if the indus

government assistance, robu

is still expected. However it

and our base case projection

would encourage considera

government could implement

This will be in the form of dir

variable for the industry

the industry.

takes place.

50% higher.

in this scenario.

Focusing on alt-protein and dairy, should some key variables weigh negatively in the coming decade, the market share is likely to be ~45% lower with the opportunity sitting perhaps more at \$8-9hn.

Whilst still representing a notable opportunity for companies this would represent relatively weak growth for the market in the context of its potentia

This would likely stem primarily from poor government support and a real slowing of consumer demand that slows the uptake and take-off of these products.

The longer term growth opportunities will likely remain in place: these will just be shifted back and take longer to realise.

Under a positive scenario however, if many of the potential variables align, the upside case could be very strong, up potentially 50%.

This would require considerable government support, but if this were to materialise, vast investment in this sector is expected.

- This would allow for rapid expansion of production. The ease of developing assets would be fundamental here, with government support imperative

A market of \$20-23bn could not be ruled out, but this would represent a very strong upside case. The main challenge would just be in building that many assets required to produce these products in such a short period of time.

Meat, Tofu, & 1.0/2.0 Alt-Proteins

Added layer of complexity in China

Analysing alternative proteins in Western markets, whilst still plagued by misinformation, is generally relatively straightforward, particularly when segmenting the products Tofu and other "alternative" products are present in the markets, but generally the volumes are very small.

When it comes to China, particularly for alternative meat products, there is another layer of complexity derived from a range of previously established "faux meat" products. Within China there are three different categories when it comes to "alternative proteins".

Traditional alternatives such as Tofu style products.

- 1.0 generation alternative products such as "bean curd pork". Soymilk fits into this category, but is also a traditional product.

- In China, these can still quite closely mimic the look of the real thing, but not always taste We are therefore only breaking the alt-dairy category into 1.0 and 2.0 products.

 2.0 generation alternative products such as Oatly. OMN!EAT and Hero Protein which more closely mimic the products they are replicating.

Depending on what was included in their analysis, one can end up with significant differences in the market sizing of alternative proteins in China. This is much more pronounced in the alt-meat category.

 The traditional and 1.0 alt-protein product categories are large in China.

· This has ramifications for what the current market opportunity is, its growth rates, where the opportunities are, and importantly, some of the market risks,

We are not in disagreement with preceding analysis that there is a vast opportunity in China, just that the current market size is orders of magnitude smaller than that articulated.

- Certain market observers place the alternative meat market at \$10bn, others more conservatively at \$1bn.
- These high figures and the wide spread result from the scope of products included.
- Estimates at the higher end include all tofu products, whilst lower estimates omit the tofu and but incorporate the 1.0 alt-meat products.

This report will be focussing on the 2.0 generation of products which present a current market for alt-meat products of ~\$25mn, and dairy at ~\$100mn. These are expanding exponentially though!

Gira QC

China Alt-Protein Opportunities Sira-IQC 2021

Chinese Protein Market – Production Aquatic products make up half of protein production

Poultry has four main segments: white broilers, yellow broilers,

White broilers make up about 50% of total poultry production and go mostly to QSR and canteen sales, but are beginning to penetrate the home market with strong industry marketing and promotional support. White broilers are produced and slaughtered in modern, vertically-integrated facilities

Yellow broilers made up about 20% of total poultry production and are still favoured by home buyers. Much of the production Sourcing animals to meet d still comes from small farmers and sold live in wet markets, but abattoirs that is changing. Overproduction hit the market in 2020 as small farmers switched from pigs to yellow chicken, while

> calves for slaughter Little prospect for a significa

Evolution of production Fish and other aquatic prod protein source in 2016. China Protein Production: Aquatic Products vs Meat, Category includes wild cate Products include fish, shri Total meats Fishing & aquaculture 2.6% CAGR 2009-2019 VS Production trends worldwide.



Big boost in 2019 and 2020 dug fishponds to replace pig Yangzi Valley where water

Aquatic products totalled a production in 2020 (but less heavy meat imports).

> CAGR to 2025 estimated at Growth will slow as pigme

Traditional Chinese Plant Based Dairy Products

"Old" products facing the challenge of a new generation of plant-based "milk"

Contrary to many western markets, alternative dairy products Other plant-based protein beverages are not novel, and have been engrained in Chinese culture for Besides soy, other plant-based protein beverage also millennia. These have almost entirely focused on the drinking traditionally exists in China. milk category, driven in part by the high share of the

population being lactose-intolerant, and also by the lack of dairy competition. Soymilk has been consumed in China for 2000 years, while cow

- milk was not traditionally consumed. · Soymilk is traditionally an important element of breakfast in
- China. It is often prepared by breakfast vendors: the informal channel here is very important.
- Most soymilk consumed in China is sold loose (by breakfast vendors), at rather cheap prices. The second largest product category is soymilk powder. RTD (chilled or
- ambient) sovmilk only accounts for a small share of the total sovmilk consumption
- Basic RTD ambient soymilk products are sold at around RMB 10/L, compared to basic drinking cows milk products at RMB 13/L.
- For many years, the dairy industry and government institutions have communicated on the benefits of dairy products to encourage dairy consumption. At retail. consumers are more inclined to buy RTD cow milk than RTD 1.0 sovmilk products, especially as there is no big price gap between these two categories.
- Cow milk is considered to have a higher nutritional value than sovmilk.
- With the renewal of the concept of plant-based proteins in China, both plant-based protein beverage producers and major dairy companies have tried to ride on this wave with a new generation of products, with innovation in packaging, taste and marketing, to position their products in the higher-end of the market.

Dali Group's Soymilk Brand "Dou Ben Dou", First

Launched in 2017

豆本豆

since 1975).

market segments

meals or on-the-go.

restaurants

of RMB 8-9/L).

Traditional Plant-based Protein Beverage (Yangyuan, Lulu, Yeshu, Yinlu)

The most important brands are: Yang Yuan (walnut drink, since

1997), Ye Shu (Coconut drink, since 1987), Yin Lu (peanut &

dairy drink, since 1985), Lu Lu (Chinese sweet almond drink,

They have a dominant market share in their respective

These products are consumed as a beverage, accompanying

· They are mostly sold through retail, but are also sold at

They are targeting the mass market, with average pricing

around RMB 15/L (except for Yin Lu which is at a cheaper price

These are very mature products. There is a lack of innovation

A new generation of plant-based "milk" products are trying to

replace the notion of "beverage" by "milk", to position their

· They also tend to use new ingredients as oat, quinoa,

facing the evolution of Chinese consumers' demand.

products in the higher-end of the market

macadamia, cashew nut, hazelnut.

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Source: Gira compilation

Evolution of production Cattle production has failed despite high beef prices. Cattle were historically far

when their work life ended.

Slaughter and processing co

big pork players. Production trends

many wet markets were closed due to Covid.

Herds remain small and pro overgrazing a problem on t Some feedlots have develo Duck and geese together make up about 30% of production.



pork production. Recent large investments have gone to deep processing and

Poultry

Evolution of production

2009-2025f, Mio t cwe

160

ducks and geese.

convenience retail market and exports. Poultry production is expected to rise for the next 3 years, but

oversupply situation, with consumers in part moving back to their preferred protein.

suffer when pork production recovers and create a temporary Fishing & Aquaculture

prepared food production targeting the QSR channel, the The Chinese government ha higher share of supply from

5 years despite beef's grow Long-term growth will come but even so will remain shor





5. TIMING & SUBSCRIPTION A FOCUSED, TIMELY AND INEXPENSIVE STUDY ON A CRUCIAL SUBJECT



TIMING – available now

2020 was the year 2.0 alt-meat and alt-dairy products really took off in China. This was driven by both multinational's exporting to China and Chinese companies producing locally. Considerable inroads in the market are now being made. There is a need now to understand what is happening in China's alternatives market, to help identify where the opportunities lie for companies operating in the space.

The research was carried out through early 2021, with publication of the report, in June 2021.

• The report is now available for immediate dispatch.

FE

- The subscription to the crisis-impact programme is USD12,900
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- This will cover:
 - An electronic copy of the report
 - Attendance to the webinar or access to stream the recorded webinar
- Purchase of this study is for use within your own company, and may not be circulated outside of the purchasing company.

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SOME OF GIRA'S ANIMAL PROTEIN & DAIRY CLIENTS

Abbott Laboratories	Cargill	EU Commission	IMS	Mueller	TetraPak
ABF	Chr Hansen	Eucolait	INAC	Multivac	TVI
ABP	CNIEL	Eurial	Interbev	National Pork Board (US)	Tyson
Agropur	Cobb	Fedegan	JAPFA	Nestlé	Unilever
Agrial/Eurial	CP Foods	Ferrero	JBS	Nutreco	USDEC
ALIC	Coveris	FIT	Kemin	Paccor	USMEF
Alpma	Dairygold	Fonterra	Kerry	Pfiver	Valio
Arla Foods	Danish Crown	Friesland Campina	Lactalis	Rabobank	Vion
Aviagen	Dantrade (Danone)	GEA	Laïta	Rusagro	VLAM
Bell	DMK	Glanbia	Land O'Lakes	Rupp	Yili
BordBia	DSM	HK Scan	Mondelez	Savushkin	
BRF	DuPont	Hilton Food Group	Meggle	Sealed Air	
Bunge	Emmi	Huishan Dairy	Minerva	Smithfield	
Canada Pork	Elanco	IFC (World Bank)	MLA	Sodiaal	

In addition to a number of retailers, caterers, banks and Investment Funds





SOME OF IQC'S ANIMAL PROTEIN & DAIRY CLIENTS







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