SPEEDA ASEAN Seminar Report

Ask the developers -The potential and future of Alternative Meat-



May 10, 2022

SPEEDA

This Seminar was held in 2022 June inviting Ms. Kozue Toyama from Toyo Seikan Group and Mr. Akira Yasuda from Next Meats Singapore with the topic about "Alternative meat".

Alternative meat has recently become a familiar term in restaurants, supermarkets, and other places. In the industry, it has been called "alternative protein". Including those derived from cell culture, which are not yet in the market, Singapore is one of the countries that has been encouraging innovation by companies on a national scale.

In Singapore, domestic and foreign companies have been working together to conduct research and production development of products using cutting-edge technologies on the R&D side, while on the business side new business development, marketing, distribution sales have been demonstrated actively.

The industry might tend to have a distant from your focus, but in fact, players from different industries has been involving from domestic and overseas, offering the potential for a diverse range of business development.

We invited two front runners from the industry who has taken the challenge to enter the new market. First speaker is Ms. Toyama from Toyo Seikan Group Holdings. The company has invested to a Singaporean food tech company developing cultured shrimp. Second speaker is Mr. Yasuda from Next Meats. The unicorn food tech company has introduced their brand's alternative meat product from Japan to Singapore and to other countries as well. Both speakers will be sharing with passion, the future of the alternative meat business and their stories of developing in Singapore, the leading country in the food tech industry.

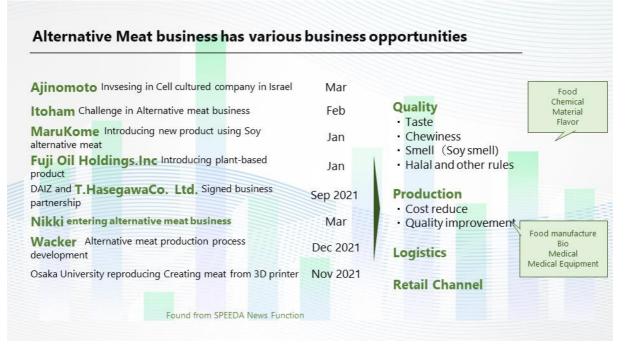
*We have used colloquial language for this webinar report to share the expressions used by our guest speakers.

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Supporting the Alternative Meat Segment Industry

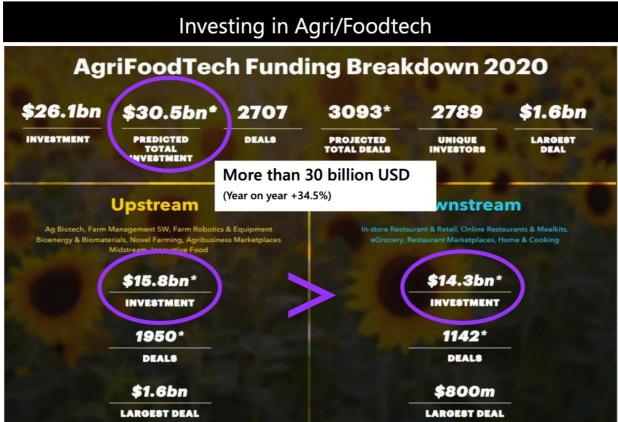
Below are some of the case studies which I found from SPEEDA news function. We can see variety in business opportunities by different companies. The players are not only from the food industry, but also it is coming from flavor and fragrance manufacturers, plant equipment companies. They have been entering the industry through business partnerships and capital alliances. Today we can see attendees from various sectors, and from here, I can tell that many companies have interest in this industry.



2. Alternative Proteins Now Attracting Attention in Singapore

Hello, my name is Toyama from Toyo Seikan Group Singapore, which manufactures packaging containers and packages.

I would like to talk about "alternative protein", which is an industry which has been getting more attention recently in Singapore.



2021 Agfunder AgriFoodTech Investment Report https://agfunder.com/research/2021-Agfunder-agrifoodtech-investment-report/

"Alternative protein" is a word that we hear a lot about these days. According to a report by AgFunder, investment, in 2020 Agri/Food tech has already exceed USD30 billion, which is 34.5% higher than the previous year, which shows a significant growth. Another trend is the investment in the upstream side of the supply chain, the so-called food production side, which has exceeded the investment in downstream side of the supply chain. This sector includes retail, food delivery.



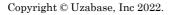
食材 - Next Generation Protein	流通 - Food Suply Chain	料理 - Future Cooking	外食 - Future Restaurant
Plant Based	Distribution Revolution	Smart Fridge SnMSUNG BOSCH Srocker Haier Srocker Haier Sratucan Classical Statement Smart Oven / Microwave June Fease Cale Brave SMMSUNG Totala Weighor SHARP HITACHI Pressore	Ghost Kitchen REEF ZUUL Close Witchen WitchenBASE Cookpy Food Deliverly Uber Eats mone bodyne Doornase Wett Zornato
Cell Based ST ST HERE Biffek.ck HERE HERE & Boomo Monore Insect	Vinstacor Cornershop D 0 (() Weee/ houstone 2000) 7/17/c COOP 200 200 20000000 200000000 D2C DISTYLEMON © Infectuals & freshly @ infs nova	CHEFMAN Instantial CHEFMAN Instantial HEALSIO	Restaurant DX -GALLEY CSalis Ctoast © Chowhow Choose O chowhow Chowhow
Lebrito" O TAKED CENETO E Ellie BugMo TAKED C C	FINANCE (PRESSARE) INSCRET Purretly alizabeth.	tepior (7, curto sunt customer antio Gardyn Ø O CSPOTO RISE ⊕ formshelf Occessor @ Corcessor	Robot Restaurant

Downstream business development in food tech has always been ahead of the curve. The background of this trend is the technology and business development driven by the digital technology in automate process, saving labor, reducing cost, and providing products and services to suit the increase in diverse needs by individual consumers.



Turning point of this trend was the adoption of the SDGs in 2015. A Research by FAO has shown that as the world's population continues growing, food supply needs to increase more than 60% on caloric basis to feed all human beings by 2050.

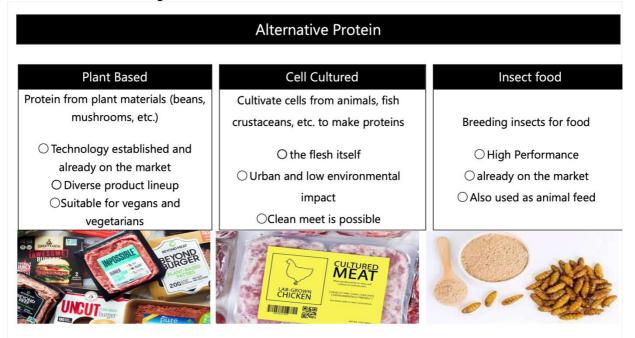
While for the demand side, the world's population has been increasing especially in Asia and Africa. This means the demand for food, especially protein, is also increasing in these regions. Economy growth will also increase volume of the middle-class range, who has the buying power and



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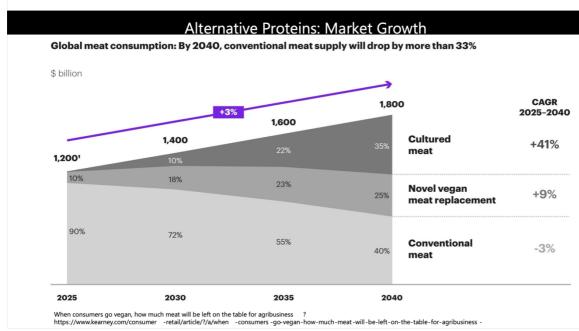


furthermore. While in countries like the U.S., more people desire to take high-quality protein or vitamins to cut out carbohydrates and lose weight to support good health. This has increased the necessary amount of food itself, especially protein, which is now in high demand. Therefore, this trend requires the creation of new foods and protein upstream. These points have brought lot of attention to the concept of "alternative proteins," which is the subject of today's talk. Although various approaches to alternative proteins are now being developed, they can be classified into three categories.



"Plant based" is the technology to produce protein from plant-derived meat or plant materials, such as beans or mushrooms. It is expected to be lower in cost and shorter in lead time compared to other existing livestock industry. Also, it has the potential for pioneering the use of new meats that cater various dietary preferences such as vegetarian, vegan, halal, and kosher. In the past, such dishes as tofu hamburgers and vegetarian food have existed in Japan, but the trend was triggered by the strong demand for healthier hamburgers and steaks in the U.S., where health-conscious consumers became more and more interested in meat-like textures, tastes, and nutritional qualities. The second is "Cell Cultured". It is a technology that produces meat by harvesting and culturing animal cells. Compared to existing livestock production, this technology reduces CO2 emissions, water, land, and other resources, and is expected to produce in urban areas where it will be consumed.

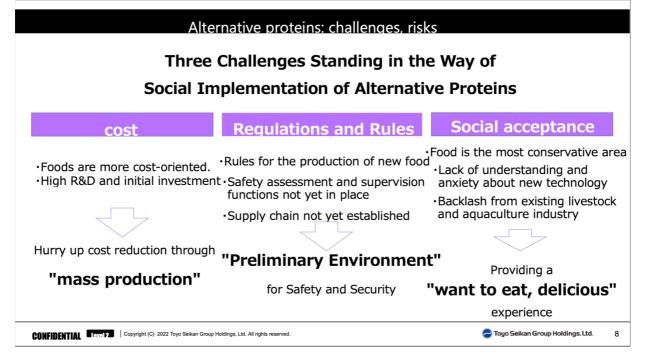
The third is "Insect food". As being a high-performing animal protein, it is also gaining attention as an alternative of cereal, protein bars, or grains.



The market for these alternative proteins is expected to grow continuously worldwide in response of the increase in demand. Some predict that by 2040, plant meat will reach 25% of the meat market and 35% for cultured meat. Alternative proteins might occupy the majority of market share, with the share of existing animal agriculture dropping down to 40%.

However, since the overall meat market is expected to grow 1.5 times in 15 years from 2025, this doesn't mean the existing market share taken by the new technology but will strike a balance between the current over supply and the demand together with the alternative protein.

here are three main challenges that alternative proteins face for social implement: cost, regulations & rules, and social acceptance.



First challenge is the "Cost". Considered as daily necessities, food product is one of the categories which reflects the cost preference from the consumers the most.

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Mass production is necessary to reduce the cost, though there's a huge hurdle in initial investment stage for this sector, as we need to establish the infrastructure such as quality and distribution management and takes a lot of effort in research and development stage. There were comments found from a consumer survey mentioning, "I want to try alternative meat, but I can't because it is too expensive." Mass production is necessary, not only for delivering them to the wealthy class, but to solve food crisis in Asia and Africa, and make it possible to deliver tasty food for everyone.

Second challenge is "Regulations and Rules". We need the business environment allowing companies to invest for mass production, though improvement in regulations and arrangement for supply chains are currently running behind the schedule.

Third challenge is "Social Acceptance". Food is the most conservative area, deeply connected to culture, customs, and taste. People are cautious and anxious about new foods. For us suppliers, it will be crucial to share the experience with people to think "I eat it because it tastes good" or "I want to try this" not only for the global environment.



Singapore is now accelerating its efforts to overcome these three challenges and build a food tech hub in Asia centralizing innovative technologies related to jobs and nutrition. As the country has very limited resource, the country is dependent on imports for more than 90% for food, which means they are always facing the risk in supply caused by climate change, human and livestock infectious diseases like covid19, and changes in conditions of the importing side, such as the current situation in Russia and Ukraine and has been seeking for a solution.



FoodInnovate	Integrated support system from R&D to commercialization
FoodInnovate	2.5
A multi-agency initiative 9 To equip Singapore-based companies with resources to create food for the second secon	SFA established in April 2019
To position Singapore as the <u>location of choice</u> for creating food for Lead Agency: Enterprise Singapore EDB	
Strategies	■ Target : 30 by 30
(1) PROVIDE INFRASTRUCTURE To facilitate innovation, trial of new ideas and technologies, and accelerate and technologies, and accelerate and mercrialization of new products (3) DRIVE CO-INNOVATION (4) CULTIVATE DISRUP1	Supporting the R&D and commercialization of
To create platforms for co-innovation	technologies and services that enable food
the discussion of mining hybrid of the discussion of the disc	development in tropical cities.
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Singapore Food Agency was established in 2019, bringing together the food functions previously divided among these three agencies 1)Ministry of Agriculture, Forestry and Fisheries (MAFF), 2) Environment Agency, and 3)Health Sciences Authority. In addition, led by Enterprise Singapore, the Agency for Science, Technology and Research (A*STAR), the Singapore Economic Development Board (EDB), and the Food The Singapore Food Agency (SFA) joined to take initiative of managing and supporting the entire process from R&D to commercialization of food tech. The maximum amount of funds planned for this project is 144 million Singapore dollars.



In "The Singapore Food Story" a food production policy published by the SFA of Singapore, three policies have been outlined to establish a stable food supply even in a tropical city like Singapore.

- 1) Diversifying import sources: Singapore imports from 170 countries and is trying to keep it stabled.
- Developing local industries: Considered as top priority, Singapore has an aggressive goal set "30 by 30" to raise the food self-sufficiency ratio from less than10% to 30% on calorie basis by

2030. In specific items, eggs, leafy vegetables, and fresh fish, initiative has been already taken and we are able to find "Made in Singapore" products in local supermarkets.

3) Supporting global expansion by local companies: This is to assist local companies expand overseas. This can also support Singapore to secure new destinations for food imports.

By implementing these three policies firmly, Singapore is now moving forward to support food tech and alternative proteins.

3. Why Japanese alternative meat is highly appreciated in Singapore

Hi, I am Yasuda, CEO of Next Meats Singapore, nice to meet you.

First, let me introduce myself. I have been in Singapore for 8 years now. Besides my business with Next Meats, I also run a consulting and trading company called Vintage Management Pte Ltd. Japan. The company has an office in both Japan and Singapore, with the philosophy to increase number of Japan fans worldwide by providing Japanese technology to solve global challenges. When the founder of Next Meats, who was originally a friend of mine, launched his own business, I offered to support him, and currently in charge of the Singapore business to expand business for Southeast Asia. Looking after both Southeast Asia and Middle East market, I believe in the opportunity utilising Japanese technology to solve global food issues.

I hitchhiked around 47 Japan's prefectures when I was a student, and during this time I realized that there are many wonderful products in Japan, and I wanted to be a part of bringing these products to the world someday. 2019, I published a book titled "Increase the number of Japan fans around the world" which I shared my current view of both Japan and other countries, and how to increase the number of Japanese fans. As for public activities, I have been working as an advisor for Small and Medium Enterprise Corporation and the Association of Local Authorities for International Relations. Also, I am working with Hokkaido University, where I graduated, as a partner to promote industry-academia-government collaboration. In my private life, I'm playing soccer every weekend. If you are in Singapore and interested in soccer, please join.

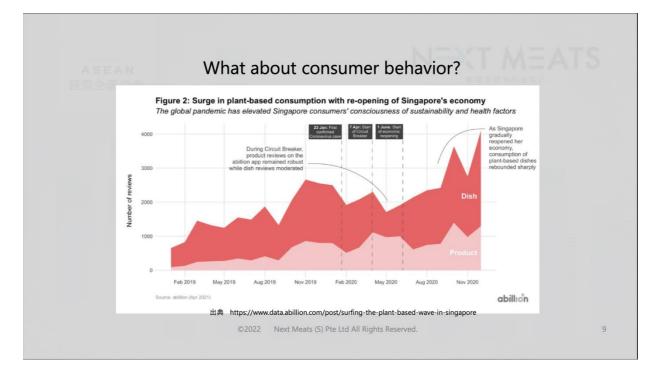
Next, let me introduce my company, Next Meats, which we call "NM". The Japanese company has been working on alternative protein development with a theme of "sustainability". We are trying to replace not only meat but also other livestock products such as seafood and milk. We have our lab in Nagaoka, Japan.

The reason why we have gained worldwide attention is because we are the first in the world who produced, developed, and sold substitute of "Yakiniku"(sliced meat for BBQ) meat. Most meat substitutes are minced meat, such as patties and sausages, but we sell ours in the form of Sliced Meat, and there are not many players in the market yet.



The advantage of sliced meat is, because it can be applied to different cuisines, it can be used for various recipes from different countries. The raw material of this sliced meat is soybeans. Mainly for this sliced meat product, we produce chips made of 100% soybeans.

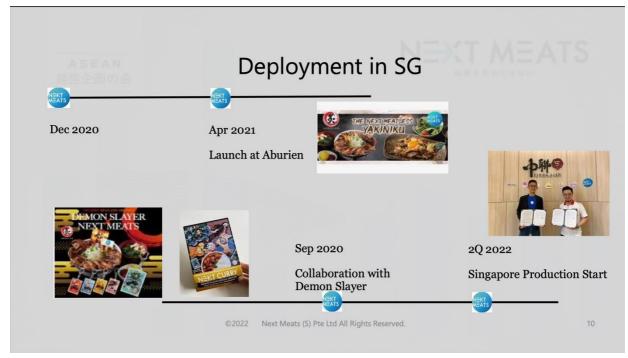
We are offering these products, "Next Harami (skirt steak)" and "Next karubi(short ribs), in Japanese supermarkets like the brands listed here. Many of those alternative meat products are sold frozen, but we have chilled products to challenge in this market.



Regarding the consumer behavior in Singapore, the interest of Singaporeans in alternative meats is very high.

This result from a research by Abillion (shared above), shows the time in horizontal axis from 2019~2020 of every 3months, and the vertical axis shows the number of reviews on Social network Websites, and how the total number of reviews on plant-based food has been changing. The dotted line from February to June / July of 2020, there was a drop for a certain time due to Circuit Breakout in Singapore. When we faced food service restriction due to this pandemic, the number of reviews about the products and food showed growth, and public is now paying close attention again recently.

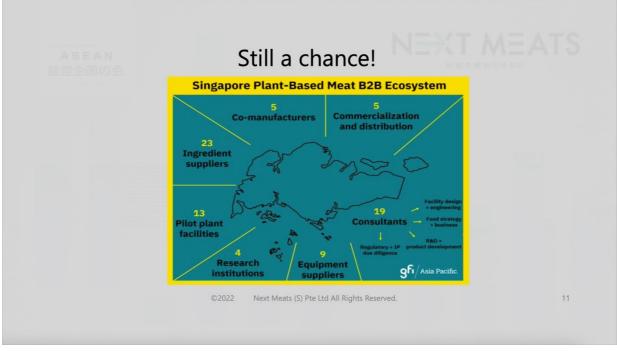
Singapore is a multi-ethnic country; therefore, some people might not be able to eat meat (pork and beef) for their religion. However, alternative meats can be consumed, and I have heard from various restaurants and hotels that requests from consumers has been increasing these days. For example, sushi restaurants are adding plant-based seafood to their menus, and yakiniku restaurants are asking for plant-based meats to be available for their customers, so individuals have a choice in the menu when dining in a group. The growing demand from hotels and restaurants is something we see recognize daily in doing our business.



As for our business development in Singapore, we started our activities in Singapore since December 2020. From there, we first imported frozen NEXT Karubi and NEXT Harami from Japan and started marketing from Japan. In April 2021, we launched our products at "Aburi-En", a rice bowl restaurant in Singapore. Then, in September 2021, we collaborated with "Demon Slayer" to develop a 100% plant-based curry at Don-Don-DonKi here in Singapore.

We are now working in progress to manufacture alternative meats in Singapore. Till now, we imported frozen or room temperature products from Japan and sold them in Singapore. Though, flavors were arranged for Japanese consumers, and as most of the products were frozen, so the transportation cost was high.

Therefore, we have been working to launch "Made in Singapore" yakiniku meat substitutes products around May this year. By importing the ingredients and dried chips for yakiniku from Japan and completing the final process here in a Singaporean factory, with Singaporean chefs working on seasoning. We have partnered with a local OEM company and have been working on this. Another the advantages of developing a "Made in Singapore" is by this way we can deliver the products to restaurants and hotels in plain, unseasoned form.



As Ms. Toyama mentioned earlier, Singapore government is supporting the food tech sector, therefore there are still many business opportunities, including those from related industries.

The chart here explains the Singapore Plant-Based Meat B2B Ecosystem. For example, the 9 equipment suppliers at the bottom represent the number of companies. Those 9 companies supply machinery to make meat substitutes. There are also 4 research institutes, 13 pilot plants, 23 companies supplying raw materials, 5 companies capable of joint production, 5 distribution/wholesale companies, and 19 consulting companies. There is a lot of players in this small area of Singapore. Givaudan, a major flavoring company, is also conducting R&D in Singapore to remove the odor of soybeans. Meat forming machinery manufacturers are also moving into the market. Since the raw material is soybean flour, other ingredients can be added to the flour (e.g., in collaboration with Euglena). I think there will be situations where we will work with ingredients manufacturers. It is also said that soybeans alone are not enough to bring the quality of meat closer to real meat, and what is important and necessary is fat and lipids. I feel that there is a great potential of growth in these value adding areas, such as culturing and adding fat or nutritional value. Pilot plant is very convenient and can be greatly utilized. Cost can be calculated on daily basis. Singapore also works closely with the Food Authority on regulations and approvals for prototyping products, making it very easy to obtain permits and approvals. I feel that there is a great opportunity for those who are engaged in food-related businesses in Japan, adding value of food and nutritional to the current plant meat. I believe particularly Japanese people are the most experienced and the best in the world in the fields of processing, cooking, and storing soy products. I would like to see Japanese manufacturers who has expertise in these fields expand their business to Singapore and take on the challenges together. Singapore has great human resources. It is very easy to recruit students and researchers in the alternative meat field, so the start-up of the business can be quite smooth. Some universities have established specialized departments in food tech, and if we can make good use of them, it will lead to hiring excellent human resources quickly with small initial investment.

As for future development, as mentioned earlier, we will bring ingredients from Japan and develop "Made in Singapore" alternative meats and plant meats. We are in the process of creating alternative meats that can please the people in Singapore. I believe that we will probably see more and more localize in flavor and application of alternative meats worldwide. I believe that the key to

success will be the "simplicity to handle," such as the ability to easily change the flavor and shape for each countries request. We are focusing on the development of room-temperature, retortpouch products and packaging that can be transported without using a cold chain. From Singapore, we hope to deliver our products to Malaysia, Thailand, and even the Middle East and Africa. Halal certification is also easy to obtain in Singapore, so we would like to take on the challenge of obtaining certification as the next step and eventually expand our sales from Singapore to the rest of the world, including the Muslim regions. Again, I would like to reiterate that this is a market with a lot of opportunities, to start up a business from scratch with less risk, so I would like to encourage you to give a try in this market. Thank you very much for your attention.

4. Bringing cultured shrimp to the dinner table: Toyo Seikan Group's efforts

Toyo Seikan Group is promoting their business by investing to a cultured meat startup.

World's first marketing authorization: Cultured chicken nuggets

World's first & only marketing approval in Singapore (as of March 2022)

•December 2020: eat JUST, a U.S. company, receives marketing authorization from the Singaporean government for limited availability at member restaurants.

•May 2021: 3 types of food delivery offered at the Cantonese restaurant "Madame Fan" Order and take out at food panda (Once a week, lunch only) @ SGD 23.- (about 1,800 yen)



Our cell-cultured meat is currently the first and only meat in the world to be approved to sell in Singapore. In 2020, American company, eat JUST, received approval from the Singapore government to sell cultured chicken nuggets and started offering them in its members-only restaurants. Then, in May 2021, eat JUST began offering three different dishes at the JW Marriott Hotel's Cantonese restaurant. The dish shown in the photo is a salad topped with cultured chicken nuggets, this costs 23 Singapore dollars, might seem to be a bit expensive.

World's first marketing authorization: Cultured chicken nuggets

Pop-up with Hawker

•March 2022:

Limited quantity available at Loo's Hainanese Curry Rice in Hawker SGD 4.- (about 350 yen)

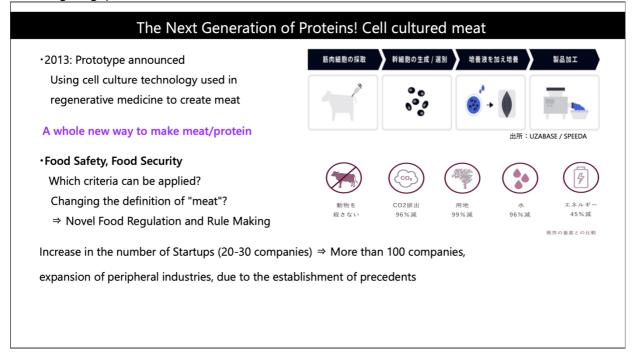
From fine dining to everyday dining Cultured meat and food products are scheduled to be launched worldwide from 2022 onward.



Eat Just's cell-cultured Good Meat at Loo's Hainanese Curry Rice in Tiong Bahru, on March 1, 2022. ST PHOTO: GAVIN FOO

While a food stall recently started offering this Hainanese curry rise topped with cultured chicken nuggets for S\$4. They only sell for limited quantity so it may not be profitable, but it showed me that cultured meat can be something you can taste not only at a high-end restaurant, but something you can bring to your daily dining table.

In fact, cultured meat is scheduled to be launched in various parts of the world from 2022 onward, following Singapore.



When prototype of cultured meat was first presented at the Netherlands in 2013, it was called "Ferrari Burger", as the cost almost the same as a Ferrari. Biotech has been utilised to harvest cells from live animals without killing them and turning it to meat in a bioreactor. However, the biggest bottleneck was how to guarantee food security and safety. Still, there's an ongoing discussion to clarify management standards, and whether cultured meat, which does not involve slaughtering the animals, but can be considered as "meat". Other issues include whether it is acceptable to eat

cultured meat as a religious practice, as well as ethics, morality, education, and nutrition education. To explain a little about safety standards, there are basically two approaches in the world: First is to apply existing standards and modify them only where they do not apply; Second is to create new standards suitable for cultured meat and for new food products. In Singapore, the first approach has been taken. Basically, the final product is analyzed and evaluated based on existing safety standards, and what is added in the production process is also evaluated to confirm that nothing that has not been treated as a food product before is included. This process enabled us to achieve the world's first approval mentioned earlier by conducting proper evaluation with a sense of speed. The number of start-up companies has increased from 20-30 to more than 100 now. Many players from related industries have now showed up.





September 2020 Toyo Seikan Group invests in Shiok Meats, a startup company that produces shrimp and other crustaceans through cell culture.

Social issues to be solved: food crisis, urban poverty, climate change, environmental pollution

Mission: Bringing new food to the table (building food distribution) as a food infrastructure company



Photo credit :Shiok Meats

We, the Toyo Seikan Group, is also a player from the related industry, and we invested in cultured shrimp startup Shiok Meats in September 2020. We invested in Shiok Meats because of the following three reasons: (1) we expected that the business would be commercialized faster in Singapore than in Japan, given the looming issue of protein shortage in Asian urban areas; (2) Shiok Meats targeted Asia (3) Shiok Meats specialized in seafood and crustaceans, while most cultured meat start-ups at that time were engaged in cultured beef. We started with Shiok Meats with the hope of bringing this to the dinner table as a company that has supported the infrastructure of food.



Last year, we started a mini-R&D lab equipped with the cell-to-product process to confirm the processes necessary for marketing approval. Construction of a pilot plant has started this year, and we are planning to obtain marketing approval and launch the product next year in 2023.

Alternative Proteins are Lab to Market,

Scale-up Phase

#Build supply chain, #localization is the key word.

Compared to three years ago when we first came to Singapore, the food tech situation in Singapore has changed drastically, and I think it is now accelerating rapidly. In this context, this alternative protein is entering the "Lab to Market" phase of scaling up, and I believe that the two keywords for Japanese companies to enter and contribute to this area are "Build supply chain" and "localization". As for the supply chain, the Food Agency's mission is to ensure food safety from farm to table, and it is very important that these new food products are delivered to tables and with the correct information provided to the consumers. I believe that quality control and traceability are areas where Japanese companies with well-established food systems has a great potential to contribute.

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Localized deliciousness

Asian Local "Deliciousness"

Acceptance of new foods depends on whether they are "want to eat" and "taste good".

Asian Localized Product Development Beef bowls and gapao using edible meat Shiok Meats: Shrimp siumai, tom yum kung, chili crab

Japanese companies leverage knowledge of long-time Asian food providers



As for Asian local delicacies, it is still very important to make people think that the food tastes good, and I think it will be important to provide a method which suits the eating habits of each region and each person. Impossible Foods and Beyond Meat, both of which were early adopters of this concept, have increased their market share by offering healthy hamburgers and responding to the needs of Americans who want to continue enjoying delicious hamburgers. Asia, on the other hand, is it hamburgers? No, because people don't want to keep eating hamburgers that much. In Asia we have Asian localized yakiniku (BBQ), beef bowls, and Gapao Rice, and Shiok Meats has introduced prototypes of such items as shrimp shumai, Tom Yang Kung, and chili crab.

In terms of raw materials and the manufacturing processes, it is necessary to select those that are well suited to the local market. As Japanese companies has been supporting Asian food culture, I believe that they can utilise their insights for the food tech and alternative proteins industry.