

Organic Food and Healthy Food R&D

The spread of the COVID-19 pandemic brought about changes in all business groups as well as changes in consumer behaviors. As for Thai Wah, which is in the agriculture and food business, we must cope with the safety throughout the entire process as consumers have turned to give priority to cleaner, safer, and healthier food. Thai Wah is an international food producer and exporter, who exports to ASEAN countries as well as more than 32 countries worldwide. We are committed to building consumer confidence and producing or developing products that are up to date and meet the market demands that are always adjusting.

With our expertise and experience in tapioca flour and food products made from flour, we pay meticulous attention starting from selection of raw materials that goes through quality selection process, supervision of production process, and final quality inspection before delivering products into the hands of customers and consumers worldwide. As a business leader in the agriculture and food industry, the Company gives great priority to improvement of quality and safety levels throughout the entire process with the ongoing intention and commitment in the development of consumer's good health. In 2021,



the Company continuously collaborated with its business partners, research institute, and Chulalongkorn University on research for new food innovations in order to achieve good products, that are delicious, convenient, have nutritional value and are good for health so as to maintain the sustainability of its leadership in the food business.

Innovations on Procedures, Products, and Services

Quick changes that occurred today have several aspects which can affect business performance, both in terms of risk and opportunity. As for Thai Wah, which is in the business related to agriculture and food industry, changes in consumer consumption behaviors is thus considered an important matter by the Company. The Company emphasizes being part of the support for good living and daily life of consumers, as good health starts with the consumption of food with complete nutritional values according to the correct nutritional principle. For this reason, the Company is greatly aware of its responsibility in conducting research and development of innovative products for consumers' good health as well as continuing its operation in reducing the use of natural resources and reducing the effects on the environment.

Thai Wah therefore places great importance on the research of new innovations in order to promote the better well-being of consumers and meet the needs of consumers of all ages. The Company has planned to develop innovations that are friendly to society and the environment as a guideline in advancing the development of healthy food and as an organization which will help to improve the well-being of consumers in society. We aim to present new alternatives to consumers by having product development process with standard, safety, and richness in nutrients that meets the needs of each group of consumers. We also intend to create knowledge and understanding of products for better health as well. The Company has the goal of having products for health and consumers' well-being being created from at least 50 percent of the Company's Research and Development Project on Innovations.

The main factors which are under consideration in the process of developing health products consist of increasing nutritional quality that is convenient to consumers, creating diversity of products by using local raw materials and ingredients, having appropriate price, and meeting market and consumer trends. In 2021, the Company developed a new product, that is, food made from plants as food ingredients in order to promote food products from plants which is the world food trend. Not only it is good for health, but it is also for conservation of the environment as well as for promotion of sustainable agriculture. Thai Wah has thus started to deliver and/or sell prototype products to targeted groups of customers, both domestically and internationally, in order for them to try. During the past year, a total of five new products has been introduced, of which 70 percent of the total products had been through the product development process with emphasis on nutrition, health, and good well-being of consumers.

Product Performance innovations focus to improve nutritional outcomes

	2020	2021	Target 2022
Number of consumer health and wellness products	5	5	5
Developed products that focus on health and wellness to new products (%)	50	70	85

Thai Wah and World Trend 2021



Virtual Everything Is Here To Stay

Many companies have changed the way they work by being connected via internet, and by not meeting face to face. Thai Wah has also brought technology into the way we work such as meeting via MS Teams, using GoPro cameras for live broadcast from production lines, and attending worldwide meetings through digital channels. In 2021, virtual communications will be developed and will be more widely used. Another tool which will play a role on present day work is Data Analytics. It can be used in analyzing and predicting things that may occur in the business more precisely.



The Future of Food

Air protein: Protein from air, which has been synthesized from carbon dioxide. A start-up, under the name of “Air Protein,” received capital of more than 32 million US dollars from ADM Ventures Barclays and Google Ventures in its product development for sale to consumers.

Cell-based food: Production of plants and meats from laboratory by tissue culture from plant or animal cells, in order to achieve sustainability of raw materials in food production in the future.

Plant-based meat: It has been predicted that the synthetic meat market will have growth of 14 percent due to more consumption, of which the most important factor is that it is good for body and health, better than consumption of real meat.



Regenerative agricultural

The regenerative agricultural system is an agricultural system that enhances soil abundance and soil biological base, along with increasing production efficiency. It is an agricultural system which has high economic and biological stability, reduces the destruction level of the ecosystem outside the farm, reduces the use of chemical fertilizers, and can be linked to the development of the company’s social responsibility towards activities that have effects on society and the environment.

- **Organic products**

The New Normal era has affected the consumers' behaviors. They take more care of their health, have more concerns about family health, and look for safe and healthy food. Consequently, the consumption and selection of organic products have grown more popular among consumers nowadays. It is likely that consuming more organic or natural food that does not contain chemicals will continuously gain more popularity. "Determined to deliver the best to consumers" is our main strategy because of the health benefits associated with the selection of goods for consumption. Therefore, Thai Wah continues to focus on producing healthy and nutritious products.

We, Thai Wah, believe that rice, cassava and other relevant ingredients are more than just agricultural products. They are regarded as fundamental factors in people's lives as well as parts that drive economic development and help save the environment. Our company is committed to developing innovations to deliver clean and nutritious products for sustainable consumption according to the mission of Thai Wah. Currently, Thai Wah is certified ECOCERT® for its products: glutinous rice starch, rice starch, dry rice noodle, dry vermicelli noodle, and tapioca starch. For exports to the United States and Europe, organic certification will increase the opportunity of "Thai Wah" to compete in the world market such as:

- Add value to agricultural products
- Grow in new markets such as organic food market, and market with its food for health-loving customers who are concerned about food safety
- Expand customer base to USA and EU
- Establish a bond of trust with customers and consumers





Organic Agriculture

Nature friendly-planting and production



Why organic products are good for us



"Building sustainability from the ground up"



- Healthy Food and Environmentally Friendly Food



Double Dragon Balance

Benefit

- Premium mung bean
- Low GI, balance blood sugar level
- No bleaching, gluten-free, chemical-free
- Received International Taste Institute, 2-star since 2020



Food Ingredient Products

Benefit

- Flour for baked and fried food, gluten-free
- Plant fiber, balance blood sugar level



Waxy Tapioca Starch

Benefit

- 100% plant-based
- Gluten-free
- Non-GMO and chemical-free
- High elasticity and transparency, can be used as modified starch alternative
- High amylopectin, higher viscosity compared to other type of starch
- Low temperature during production process to increase efficiency, reduce waste and reduce carbon dioxide from the process.

“An excellent texturizer with its high moisture retention and expansion properties”

<https://www.roestarch.com/expertise/Waxy-tapioca-starch>

Our Expertise



Bakery

High performance for delicate applications

CASSBAKE™ 101

CASSMAX™ 20



Batter and breading

Appetizing appearance with built-in functionality

AMYROSE™ 738RF

CASSBIND™ 321P



Meat

Cost-effective solutions for yield and texture

CASSTEX™ 13

CASSBIND™ 365P

AMYROSE™ HV600



Dairy Products

Dependable stability with clean flavor

CASSFLO™ 500

AMYROSE™ 184RS

CASSMAX™ 23



Noodle

Consumer satisfaction with processing ease

CASSTEX™ 22

CASSTEX™ 54

AMYROSE™ 200GF



Soup, sauce and dressing

Process specific functionality for perfect texture

CASSFLO™ 500

AMYROSE™ 184RS

CASSMAX™ 23



Snack

Stand out snack foods with creative textures

CASSTEXTM 31

CASSLITETM 100

AMYROSE CRISPTM

Others

Serving up tasty drink with tapioca pearls add texture to bubble tea

- **Bioplastic products from tapioca starch**

Apart from food research and development, the Company has been conducting research and development of new product which is environmentally friendly and meet the consumer behavior of using more food packaging. The Company initiates news business, i.e., bioplastic, creating value for tapioca starch Bioplastic can be 100% biodegraded, which are used for packaging and agricultural usage to reduce non-biodegradable plastic.

ROSECO



Thai Wah is the first tapioca starch-derived bioplastic under ROSECO brand to add value to agricultural products which is in line with our key sustainable strategy. We also commit to develop the business sustainably and take part in protecting and solving environmental issues such as plastic waste and global warming. Bioplastics are considered to be one of the key innovations in the contribution to biological ecosystems to address waste reduction and sustainable packaging solutions.

- Increase the amount of recycled material for more than 50 percent.
- Reduce carbon dioxide emissions and reduce waste disposal.
- Reduce costs

In addition, innovative technologies of bioplastics are in line with “Circular Economy” or one of the key models driving the BCG Economy to prepare for the transition to a new economic system that will lead to sustainable development in the future. Bioplastics technology also brings benefits to the development of Thai industry. It can be used to produce products that are biodegradable, such as disposable packaging e.g., bags, glass straws and used in the agricultural industry, such as biodegradable mulch.

"A Sustainable zero-waste solution for the better world"



An effective way to reduce Food Insecurity and Plastic Waste



Mulch
film



Cutlery



Garbage
bags



Food
container



Straw



Net



Shopping bags



Cup

Many global consumer goods manufacturers have pledged to minimize the use of fossil-based plastics and support bioplastics and compostable plastics. The demand for these products is growing strongly which influence the business investment and expansion around the world, especially China, Korea and Japan, ready to be a leader in Asia. There are millions of investors in expanding local bioplastics production capacity.

Engaging New Solutions to Meet Sustainability Commitments

RETHINKING MATERIALS INNOVATION SUMMIT MAY 19-20, 2021

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THAI WAH
PUBLIC COMPANY LIMITED

Sustainable BioPlastics Asia

19 January 2022, 15:00 SGT (GMT +8)

SPEAKERS





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- **Innovation Hub**

For the past 2 years, Thai Wah has been cooperate with an Innovative Research Center at the Faculty of Science, Chulalongkorn University to support research and development on food and health, as well as R&D of products for sustainability, in the forms of research grants or joint researches with the Faculty of Science or other faculties of Chulalongkorn University. The aim is to produce more of the researchers who are specialized in the fields that match the Company's needs, and to conveniently build upon the research results for commercial purpose. In addition to the Innovative Research Center, there are Ideation Hub at Headquarter, Sathorn and Application Hub at Shanghai, China. Thai Wah has also forged cooperation network with other public and private research institutes to jointly conduct R&D for the manufacturing of new healthy products into the market.



Innovation Hub at Chula



Application Hub at Shanghai



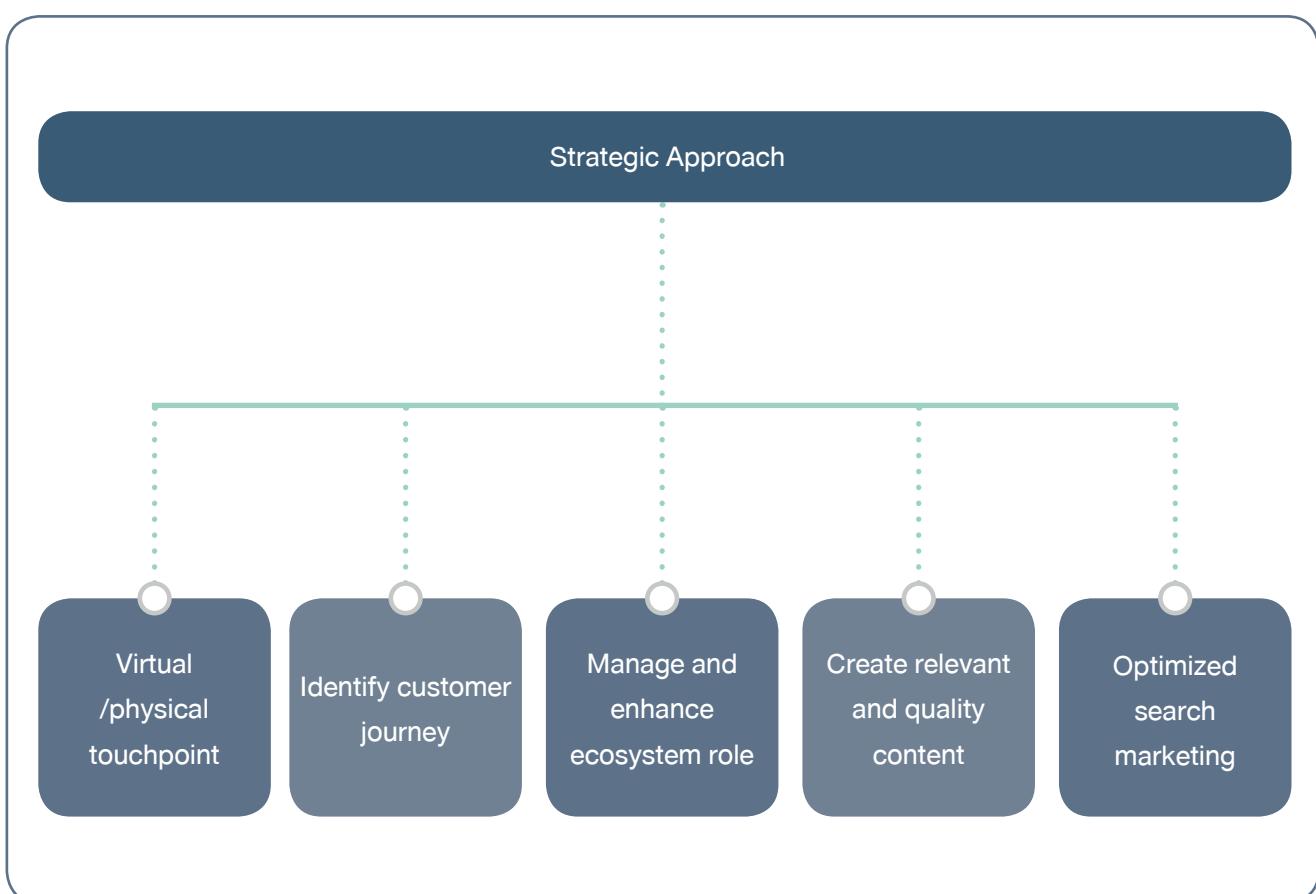
Ideation Hub at Sathorn

	2019	2020	2021	Target 2022
Research and Development Expenses	22.8	24.5	33.8	37.2
Number of Research and Development Personnel	11	14	14	15
Number of Patents and Petty Patents	-	-	-	1-2

- **Digital Marketing Technology and Sustainability**

One of the rapid changes that has been occurred currently is the technological advancement. An outbreak of COVID-19 pandemic and the consequential social distancing measure have caused disruptive change to global digital technology trend and consumer behavior, prompting consumers to adjust themselves into the so-called New Normal. COVID-19 is a catalyst that forces all sectors to reshape daily-life behaviors, work, consumption, and shopping habits. Most consumers turn to online shopping for their safety and convenience. They also become more aware of their own health and opt for behaviors that contribute to social sustainability.

With the rapid change in businesses and e-commerce, Thai Wah has finetuned our business and service direction to be in line with the changing consumer behavior. Such finetuning has helped reduce cost and expenses, and reflected the Company's transparency and social and environmental responsibility, as well as our commitment to conduct business responsibly. Online advertisement via various social media platforms, i.e., the Company's website, Facebook, YouTube, Linkedin, and Line@, has been undertaken in order to communicate with and receive feedbacks directly from the consumers, promote customer engagement through digital marketing, and enhance capacity and diversity of communication platforms. This is for brand recognition and growth, both in terms of the corporate image and increased sales. The Company also has a marketing strategy that meet the changes.





www.thaiwah.com/

[https://web.facebook.com/
Thaiwahofficial](https://web.facebook.com/Thaiwahofficial)



[www.youtube.com
Thai Wah Public Company Limited](http://www.youtube.com/Thai Wah Public Company Limited)

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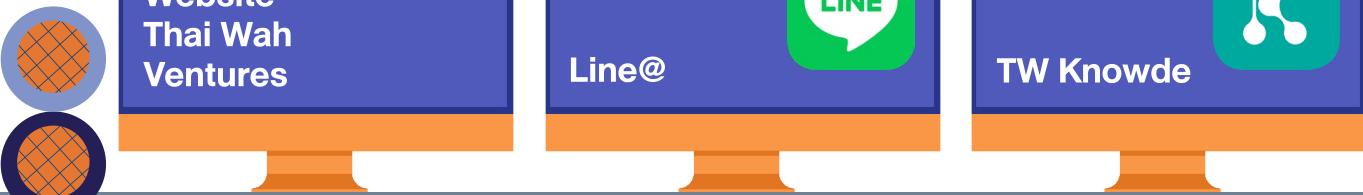
www.rovestarch.com/



<https://doubledragonbrand.com/>

Stay home and order online at Lazada and Shopee

<https://vn.doubledragonbrand.com/en/>



www.thaiwahventures.com/

@ThaiwahStarch
@Thaiwahlovenoodles

[www.knowde.com/stores/
Thai Wah](http://www.knowde.com/stores/Thai Wah)

Enhancing Quality and Food Safety

Thai Wah has been aware of the safety measures in every single production process and focus on the employees' safety awareness with efficient traceability system and production validation through use of scientific methods and modern and standardized equipment. The Company's food manufacturing process is operated in accordance with HACCP and GMP management systems to ensure safety of our food products and comply with laws and regulations of both Thailand and partner countries on food safety. Moreover, in May 2021, Vermicelli and Rice Noodle Factory in Banglane, Nakorn Pathom province, is approved in "IPHA – Industrial and Production Hygiene Administration" to emphasize the confidence in safety measures to cope with Covid-19.

The Company's internal control procedure has continuously been improved to ensure that related data and information be accurate, complete, and can be explicitly disclosed to concerned parties. We have a policy to manufacture high quality and standard products through adoption of efficient and modern technologies and product quality traceability system at all production stages, as a result of which the Company has been certified with many international standards as follows:

Starch Factory



Food Factory



Covid-19 situation influence consumer behavior around the world which reflect priority on food quality and safety, especially nutritional food with safe production process in addition to taste, diversity, and convenience. Priority has been placed on product research and development to meet the need of consumers for adequate access to food and healthy nutrition. This challenging situation is an important opportunity that the Company have to constantly develop our products. Our laboratory capacity has been enhanced, and as a result, the Company has been certified with ISO/IEC 17025 from Ministry of Public Health.

In addition, the Company is committed to maintaining and developing quality management systems throughout the organization to produce quality products and safe for consumption, controlling quality throughout the value chain, and instilling knowledge and awareness on good nutrition among the public to keep up with the changes.

Product and Service Labelling

The Company has been aware of the importance in accurately displaying product information and made it an obligation to attach the packages and/or labels of all Company's products with the information on nutrition, proper cooking instruction, and any other information that is in line with related laws, regulations, and international standards. This is in order for the consumers to get the most out the use of company products. The Company also organize training for employees to understand relevant standards and importance of displaying product information which is to promote employees' working efficiency.

The Company commits to produce quality, safe, and healthy products which are delivered on time to meet consumer's satisfaction. Quality and production control have been regularly implemented on par with the international standard. Customer satisfaction is our performance indicator based on which product quality and services are further improved and developed.

Brand Equity

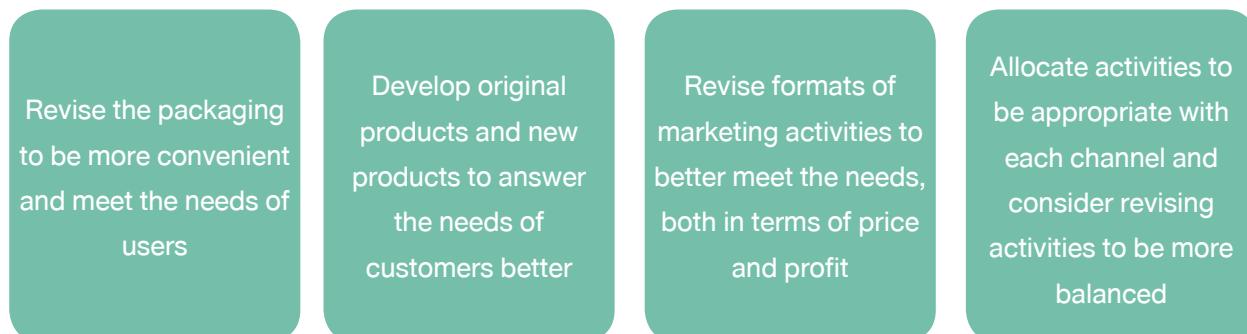
The Company believes that our mission is to create quality products with nutritional values through food quality analysis process in a bid to gain trust from our customers across the globe. In order to sustain our product leadership, we strive to continuously collaborate with regional business partners in R&D and development of different innovations.

- Marketing Communication and Customer Privacy

The company commits to produce quality, safe, and healthy products which are delivered on time to meet consumer's satisfaction. Quality and production control have been regularly implemented on par with the international standard. Customer satisfaction is our performance indicator, based on which product quality and services are further improved and developed.

The company annually conduct customer satisfaction evaluation on Thai Wah's products and services. The results have been submitted to the management every year for further product and service development, as well as planning of sales promotion. The development plans, formulated based on the customer satisfaction evaluation in 2021 can be summarized as follows:

Development and Improvement Plan Year 2022



Furthermore, the Company also has online channels in communicating with consumers through Facebook pages of Double Dragons and Double Kirins. In 2021, the Company has adjusted the format of prize-winning activities to be in the form of accumulated scores through the Line official account, under the name of “Thai Wah, Noodle Lovers,” in order for customers to participate in the activities more conveniently. This Line official account is also another channel for the Company to use in communicating and disseminating different stories to customers. All customer data will be strictly kept confidential according to the Company’s security maintenance policy.

- **Improvement of Product Quality and Service from Evaluation Results**

From the results of the Customer Satisfaction Survey, the topic which customers would like to have improved is the long waiting period for product pickup at the factory. The warehouse department and sale department have planned to improve this matter by creating a system in which appointment can be made in advance. Date and time for product pickup can be specified and there will be no more waiting. The number of personnel will be managed appropriate to the quantity of products that have to be loaded onto the vehicles each day. In the case where customers have to actually wait for the products, a separate reception room has been prepared for convenience during the wait for product pickup. As for the packaging, of which the bag type has the problem of being ripped or broken, a test for the bag’s transportation has been performed. Another drop test also has been performed in order to ensure that the packaging can withstand the actual working condition.

Customers can be divided into 5 groups

Wholesales

Van Sales

Industrial

Indirect – Export

Modern Trade

Questionnaire Topics



Overall satisfaction of the product



Overall quality of the product



Overall quality of the packaging



Overall satisfaction of product delivery



Overall satisfaction of service and coordination from sale employee



Overall satisfaction of marketing activities



Overall satisfaction of sale promotion program



Prize winning activities, The more you buy, the more you earn, The more it is sold, the more it is worthwhile, 2021

- Customer satisfaction scores

	2018	2019	2020	2021	Target 2022
Starch Business	86	90	83	83	84
Food Business	85	84	86	86	Increase the level of customer satisfaction by being at least 88.5%

- Food Business

	2018	2019	2020	2021	Target 2022
Brand Awareness	43% / 22%*	35% / 20%**	33% / 19%***	37%/23%****	Maintain
TOM Brand Penetration (share)	66% / 31%*	47% / 33%**	56% / 40%***	70%/39%****	Maintain

* Double Kirin in fresh vermicelli / Double Dragon in dry vermicelli brand measure from U&A Consumer Study by Nielsen Research in 2016

** Double Kirin in fresh vermicelli / Double Dragon in dry vermicelli brand measure from U&A Consumer Study by Nielsen Research in 2019

*** Double Kirin in fresh vermicelli / Double Dragon in dry vermicelli brand measure from U&A Consumer Study by Nielsen Research in 2020

**** Double Kirin in fresh vermicelli / Double Dragon in dry vermicelli brand measure from U&A Consumer Study by Nielsen Research in 2021

- An Increase of Customer Engagement for Sustainable Growth

Public relations assistance provided to restaurant entrepreneurs

In 2021, Double Kirin brand of Thai Wah PCL. has an idea wanting to help promote street food operators that are our customers by having them share their stories of how they were able to overcome difficulties during the COVID-19 crisis, as well as their success secrets in operating restaurants. By sharing their experiences, this will help to encourage one another. This is because it is the belief of Thai Wah that learning from actual experiences will help other entrepreneurs to be able to build on their existing street food businesses. In addition, it is another channel of public relations that will help promote the restaurant to be widely recognized.

One of the clips of the success cases that Thai Wah has supported is “Silent Phad Thai” or “Phad Thai ROne of the clips of the success cases that Thai Wah has supported is “Silent Phad Thai” or “Phad Thai Rai Seang,” in which its owner has physical disabilities of being deaf and mute. However, the disabled owner was able to open the Phad Thai restaurant and has been successful for more than 8 years. It is an experience that may create good inspiration for entrepreneurship or doing business during the crisis.



<https://www.facebook.com/DoubleKirinThailand/videos/143958500589619>

Webinar by Rose Brand



Our first webinar has been successfully launched to share with our valued customers as well as support our sell team to obtain a deeper understanding of the products. In 2021, there are 3 webinars with the topic as follows:

- **Waxy Tapioca Starch:** ROSE BRAND AMYROSE series, the most sustainable and versatile, natural ingredient around
- **Rice Flour & Rice Starch:** A natural based ROSE BRAND AMYROSE rice product series
- **The Future Alternative of Free-From:** ROSE BRAND simple & natural cassava flour, CASSBAKE101

Our first webinar has been successfully launched to share with our valued customers around the world from the USA, Thailand, Vietnam, Malaysia, Cambodia, Canada, Indonesia, Netherlands, Singapore and France. A great event for our new and longstanding valuable customers to obtain a deeper understanding of the properties and benefits of Waxy Tapioca Starch, Rice Flour & Rice Starch, and Cassava Flour which are new and innovative, naturally, sustainably sourced ingredient. This webinar provides product information to customers, thereby increasing the engagement of customers and consumers. The company also bring suggestions for further research and development of products to meet consumers' needs.

Moreover, Thai Wah also exchanged insights on innovations, trends and opportunities, which are important for the food and beverage industry. We have gained an in-depth understanding to drive the business forward. We had an opportunity to connect with other participants and exhibitors, including people who are interested in our products. We will continue to develop innovative ROSE BRANDS products and will continue to launch a webinar program to share our knowledge with customers and to support our sales team.

Thai Wah we also join and contribute in several global event

In addition to the events organized by the company, Thai Wah also participated in various events related to the Company's business to be part of food development and innovation, exchange knowledge and experience with many experts, including creating ecosystems and expanding food business networks to move towards sustainable food development and food security around the world.

The image consists of three promotional banners from global food events, connected by dotted lines to a central globe icon.

Food ingredients Asia

Featuring

- Bi** Beverage ingredients
- Ni** Natural ingredients
- Hi** Health ingredients

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