香港浸會大學
HONG KONG BAPTIST UNIVERSITY

Institute for
Innovation and Translation
創新及轉化研究院

FOOD TECH AT HKBU

Translating Innovation &
Creativity for Impact

Contents

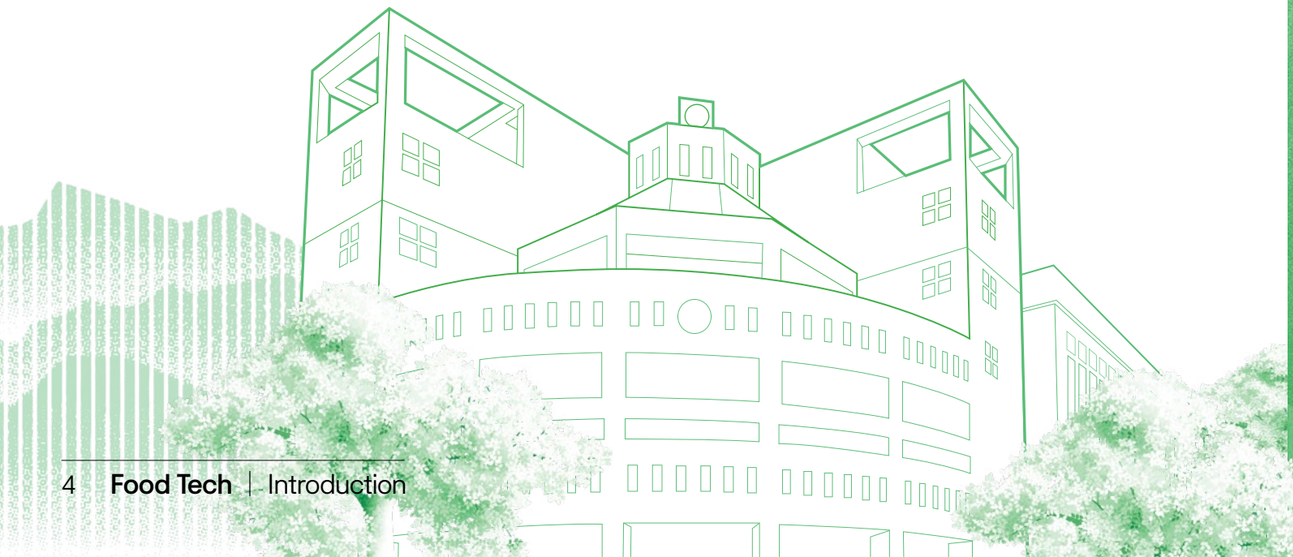
FOOD TECH

innovates for a better tomorrow and leads the society to a safer, healthier, and more sustainable future.

HONG KONG BAPTIST UNIVERSITY

Hong Kong Baptist University (HKBU) is committed to the pursuit of excellence in education, research and service to the community. As one of Asia's finest institutions of higher learning, HKBU is dedicated to nurturing future generations of civically engaged community members, and it provides them with a broad-based, transdisciplinary and creative education. Its seven faculties/schools offer a wide array of programmes across a diverse range of disciplines, from the arts, business, communication, and social sciences to science and technology, Chinese medicine and sport.

HKBU offers an education and research environment that fosters technological progress with a focus on the human dimensions. At the same time, the University is using technology to push the envelope of human imagination in the arts and cultural sphere. Coupled with our unceasing efforts to achieve breakthroughs in science and Chinese medicine, HKBU strives to contribute to the building of a better world and a more compassionate society.



OUR STRATEGIC CLUSTERS

Art, Culture and Creative Media

Film, Literary Arts, Music, Visual/Media Arts

Data Analytics and AI

Enabler for applications such as journalism, business and finance, science and art

Health, Chinese Medicine and Drug Discovery

Chinese medicine, Chemistry, Microbiology, Ageing, Physical Education

Humanities and Cultures

Philosophy, Literature, Geography, History, Political Science, Communication, Economics and the like

TRANSLATING INNOVATION & CREATIVITY FOR IMPACT

Institute for Innovation and Translation
創新及轉化研究院

The Institute for Innovation and Translation (IIT)

at HKBU is dedicated to driving innovations, research and development, technology translation, and applications to enable HKBU to respond to emerging challenges and opportunities globally, nationally, and under the aegis of the Hong Kong Special Administrative Region of the People's Republic of China's top policy priority on innovation and technology development.

We strive to bridge the gap in technology readiness between academic innovation and industry applications in order to bring HKBU's innovations for the well-being of the society.

IIT comprises

Innovation and Entrepreneurship

Technology Translation

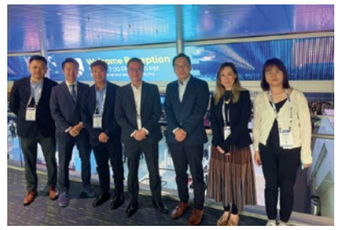
each being instrumental in fostering a vibrant ecosystem at HKBU conducive to technology translation and collaborations.

The all-round business development, scientific, and policy research support will anchor HKBU's robust and sustainable development.

STRATEGIC ALLIANCE AND ENTREPRENEURSHIP

Accelerating Technology Translation and Application

To bridge the gap in technology readiness between academia and industry in technology development, IIT strives to enhance HKBU's innovation capacity and improve our research and technology development capabilities through proactive outreach and engagement with strategic partners and investors. We achieve this by establishing collaborative platforms, engaging stakeholders, facilitating high-impact innovation, and conducting multidisciplinary R&D.



IIT offers support and resources to mature technology and startups of HKBU in realising their potential to generate social, economic, and cultural impacts. To showcase the potential of technology, IIT identifies anchor events in different industries to participate and demonstrate technology applications to industry players and investors.

TECHNOLOGY TRANSLATION

Anchoring Technology Application

IIT offers infrastructure to support HKBU's translational research.

We provide resources and expertise for technology development and demonstration, while we also serve as a training hub to cultivate the next generation of scientists and researchers.

Our aim is to equip them with the necessary skill set and know-how for technology applications. Our flagship translational infrastructures include:

01

Wu Jieh Yee Institute of Translational Chinese Medicine Research (WJY ITCMR)

Located at the Hong Kong Science Park, the primary mission of WJY ITCMR is to become a recognised world-class centre for innovative research in Chinese medicine. Equipped with state-of-the-art research infrastructure, WJY ITCMR supports cutting-edge and cross-disciplinary collaborations with high-quality translational research and deliverables, generating significant regional and global impact in the healthcare industry.

02

CHRYSALIS HKBU Art Tech Incubation Hub

Located at the Jockey Club Creative Arts Centre (JCCAC), CHRYSALIS is dedicated to fostering the incubation of cutting-edge Art Tech projects and entrepreneurial activities by providing a creative environment for our innovators and artists.

We support technology development and streamline the process of translation and demonstration, with the aim to bridge the gap between artistic vision and technological innovation.

PLATFORM AND INFRASTRUCTURE

Food Safety Consortium 食品安全聯盟

NGO observer
CODEX ALIMENTARIUS
INTERNATIONAL FOOD STANDARDS

An affiliate of
International Association for Food Protection

Powering Food Safety & Quality with Science & Technology

Food Safety Consortium (FSC) is a charitable organisation in Hong Kong aiming to address food safety challenges with cutting-edge and applied technology and with timely and in-depth communication on food safety related matters. FSC comprises stakeholders from academia, industry and other organisations and is currently home to over 70 corporate members. FSC is supported by Hong Kong Baptist University's Institute for Innovation and Translation, HKBU academic units and research centres.

Objectives

- To create stakeholder network in food safety and quality
- To provide support to global community with advanced technology and science
- To enhance capability and competence on food safety & quality and related technology developments through university, industry and government collaborations

Our Strengths & Scope

- Food as Medicine
- Innovative technology development
- Functional food development
- Nutrition and public health
- Testing and certification
- Risk Analysis and toxicology
- Food virus testing
- Genetically modified animal and plant testing
- Food authentication
- Application of QA/QC systems
- Novel biological, chemical and physical testing technologies
- Professional education training, and consultancy services

Global Engagement and Recognitions

FSC actively engages with regional, national, and supranational bodies to promote Hong Kong's capabilities and efforts in various areas of food tech. Through relentless efforts in engaging with representative agencies in food safety, such as the Food and Agriculture Organization of the United Nations, WHO/FAO INFOSAN, the China National Center for Food Safety Risk Assessment, Chinese Academy of Agricultural Sciences, Interpol, DG Sante, European Institute of Innovation and Technology (EIT), and the European Food Safety Authority (EFSA), FSC aims to showcase Hong Kong's competence in innovation on a global platform and facilitate collaboration in different fields of food safety, including food authenticity, food fraud, genome sequencing, food safety applications, and antimicrobial resistance.

World Food Safety Day and Senior Advisory for United Nations Project

FSC participated in the inaugural meeting of World Food Safety Day (WFSD) held at the United Nations Headquarters in New York to share the importance of interdisciplinary research driven by academia to address emerging food safety challenges.

Professor Terence Lau, Chairman of FSC, was appointed by United Nations Office for Project Services (UNOPS) as Senior Advisor to facilitate the development of the Asia-Pacific Smart Agricultural and Food Safety Industrial Demonstration Zone, which aimed to enhance capacity-building, promotion, and facilitation of public-private partnerships in Changchun, Chinese Mainland.

IAFP Recognition and FAO/WHO Codex Alimentarius NGO Observer

FSC is the Hong Kong affiliate of the International Association for Food Protection (IAFP), a century-old food association in the United States with over 4,500 food safety professionals from more than 50 countries.

FSC's effort and contribution towards promoting food safety globally has been consistently recognised by the International Association for Food Protection (IAFP). In 2017, FSC became the first affiliate outside of the Americas to receive the "C.B. Shogren Memorial Award," followed by the "Affiliate Communication Award" in 2019 for outstanding outreach and engagement. Most recently, in 2025, FSC was honoured with the "Best Overall Affiliate Meeting Award," celebrating its leadership in hosting a dynamic and comprehensive conference. These awards reflect FSC's enduring commitment to advancing food safety worldwide.

Under the Joint Food Standards Programme of the Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO), the Codex Alimentarius Commission (Codex) was established by FAO/WHO with an aim to develop an international food standard. FSC was the first non-governmental organisation (NGO) from Hong Kong and Chinese Mainland to obtain the Observer status at Codex. Such status creates the channel for sharing concerns and suggestions from FSC, and its members, at supranational level over the standard formulation process of Codex.

Learn More

Situated in Zhuhai city of the Guangdong-Hong Kong-Macao Greater Bay Area (GBA), Beijing Normal-Hong Kong Baptist University (BNBU) was established as a collaborative effort between Beijing Normal University (BNU) and Hong Kong Baptist University – the first full-scale cooperation in higher education between the Chinese Mainland and Hong Kong.

BNBU places great emphasis in promoting collaboration between academia and industry as well as facilitating the translation of research achievements. With invaluable research platforms like the Guangdong Provincial Key Laboratory of Data Science and Technology Cross-Application, BNBU harnesses innovative resources from the GBA to drive forward scientific research that is forward-thinking.

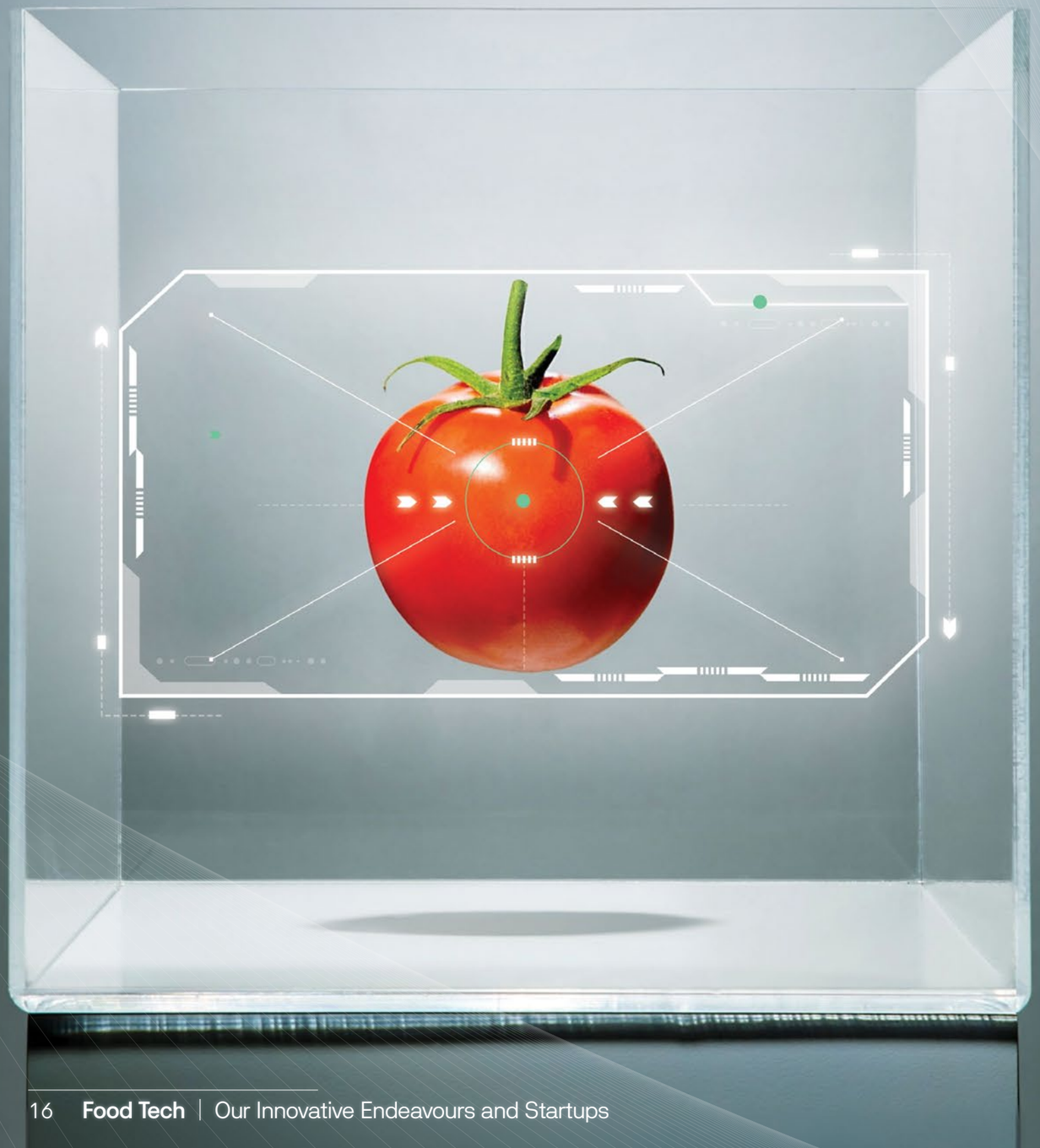
Within the BNBU Department of Life Sciences, the **Food Science and Technology Programme** is offered, which aims to cultivate talents for the food safety industry. This programme encompasses six research major subjects:

- **Biotechnology & food safety**
- **Health promotion effect of bioactive dietary components**
- **Nutrition & health**
- **Food processing, flavour chemistry & sensory science**
- **Biomedical materials & targeted drug delivery**
- **Food packing innovation**

This four-year programme is designed to nurture graduates who possess comprehensive knowledge and competence in addressing issues related to the production, marketing, and management of food and nutritional science. The programme seeks to equip students with the skills and expertise necessary to become food scientists, technologists, regulatory specialists, and professionals in the field of food science.

北师香港浸会大学
BEIJING NORMAL-HONG KONG BAPTIST UNIVERSITY

OUR INNOVATIVE ENDEAVOURS AND STARTUPS



Transcending Traditions, Driving Innovation: HKBU's Interdisciplinary Approach to Food Tech

HKBU recognises the immense potential of food tech in addressing global challenges such as public health, food safety, food authentication, antimicrobial resistance, sustainable development, and food security. To nurture the development of food tech and optimise research impact, HKBU embraces an interdisciplinary approach that transcends traditional disciplinary boundaries by integrating various fields such as biology, chemistry, physics, engineering, computing, and artificial intelligence.

> **“ If it’s not safe, it’s not food. ”**
>
> *FAO, United Nations*

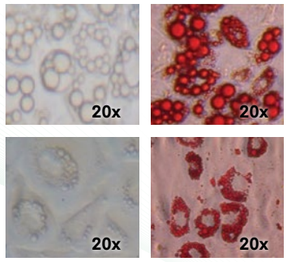
Good food is fundamental to good health, and HKBU strives to generate health benefits for the public. Leveraging the established strengths and advantages of our School of Chinese Medicine, HKBU explores the concept of “Food as Medicine” to encourage a wider application and integration of Chinese medicine and food safety. This will in turn contribute to the internationalisation and standardisation of Chinese medicine.

HKBU strengthens its research, education, and innovation efforts and maximises their impact on the community by collaborating with industry stakeholders, government agencies, and non-profit organisations. These public-private partnerships facilitate the translation of research findings into practical applications and ensure that the benefits of food tech advancements could reach a wider community.

FOOD AS MEDICINE: CINNAMON AND APIGENIN FOR OBESITY PREVENTION

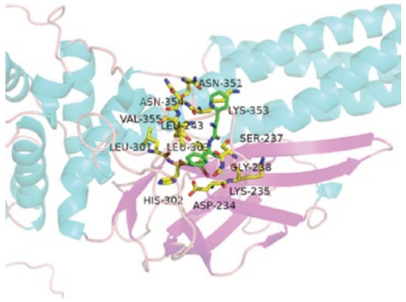
Obesity is a major global health concern linked to type 2 diabetes, cardiovascular disease, sleep apnea, and several cancers, placing substantial burdens on healthcare systems. As food science and technology advance, researchers are exploring the potential of everyday foods and their bioactive compounds as innovative solutions for obesity management. Cinnamon, a widely used spice, is valued not only for flavor but also for its antioxidant and metabolic benefits. Apigenin, a natural flavonoid abundant in fruits, vegetables, and herbs, is emerging as a nutritional ingredient with targeted anti-obesity effects.

Researchers investigated the impact of cinnamon extract (CE) on fat cells, specifically its ability to promote browning of white adipocytes, which are typically associated with energy storage. Browning is the process of increasing the number of brite cells, which helps to increase energy expenditure and reduce obesity. The study showed that CE supports the “browning” of white adipocytes, a cellular transformation that enables fat cells to burn more energy rather than store it. Advanced analysis in both cell and animal models revealed that cinnamon extract increased levels of uncoupling protein 1- a key molecule in the thermogenic, calorie-burning activity of brown fat- leading to reduced body weight in obese mice. These findings highlight the potential of cinnamon, a familiar food ingredient, to act as a natural, non-toxic remedy leveraging the latest scientific techniques to combat obesity.



Access Publication

Another study focused on apigenin, a flavonoid prevalent in many fruits and vegetables, and its effects on visceral fat, which surrounds vital organs and is closely linked to metabolic syndrome and certain cancers. The project team discovered that apigenin supplementation significantly reduced body weight and visceral adipose. Mechanistically, apigenin inhibited the signal transducer and activator of the transcription 3 (STAT 3)/ cluster of differentiation 36 signaling axis, reducing the expression of genes critical for fat cell formation and differentiation. By binding to STAT3 and suppressing its activity, apigenin disrupted the cascade that leads to visceral fat accumulation. These results provide scientific evidence for the potential of apigenin as a therapeutic agent against visceral obesity. This research provides strong scientific evidence for leveraging dietary apigenin as a component of “food as medicine”- highlighting how specific natural molecules from our diet can directly influence metabolic health through targeted biochemical mechanisms.



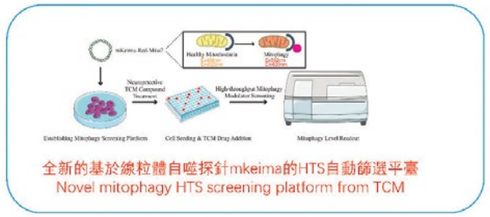
Access Publication

PROJECT-IN-CHARGE

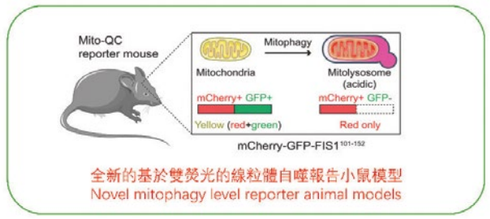
Professor Hiu Yee Kwan
Associate Professor,
Director,
Teaching and Research Division,
School of Chinese Medicine

A HIGH-THROUGHPUT SCREENING PLATFORM FOR MITOPHAGY ENHANCERS: TOWARDS NOVEL THERAPEUTICS FOR AGE-RELATED DECLINE

Global populations are undergoing a profound demographic transition marked by a steadily increasing proportion of individuals aged 65 and over. Currently, approximately 9.6% of the global population (around 760 million people) is over 65, while this figure reaches 15.4% in China, representing a cohort of over 216 million people. This demographic shift underscores the critical need for innovative strategies to address age-related health challenges.



Mitochondrial dysfunction is a core driver of aging, characterised by the accumulation of damaged organelles, leading to energy deficits, oxidative stress, and chronic inflammation. Mitophagy, the selective autophagy of mitochondria, serves as an essential quality control mechanism to maintain mitochondrial function. Improving mitochondrial function through activating mitophagy thus represents a promising therapeutic avenue for combating age-related degeneration.



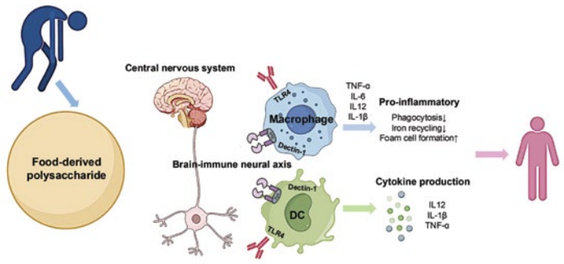
We have developed an integrated platform that accelerates the discovery of mitophagy modulators through a unified "in vitro high-throughput screening-in vivo validation" strategy. The in vitro system employs a novel mKeima fluorescent probe, whose pH-dependent excitation spectrum enables rapid, quantitative screening of thousands of compounds within one week via high-throughput imaging, without complex processing. We also constructed the HTS platform to further evaluate changes in mitochondrial energy production using the ATP/ADP ratio fluorescence indicator Perceval. For in vivo validation, an mCherry-GFP-FIS1 dual-fluorescence reporter system allows real-time tracking of mitophagy dynamics: upon lysosomal engulfment, acidic conditions quench GFP while mCherry persists, enabling real-time monitoring of mitophagy dynamics through the distinct red/green fluorescence patterns. This integrated approach substantially shortens the drug discovery timeline from screening to pre-clinical research, which helps us successfully identify several mitophagy activators from TCM with significant beneficial effects in animal models of neurodegenerative diseases. Additionally, we plan to explore the mitophagy-activating effects of TCM formulas such as Sijunzi Decoction (四君子湯) or Wu Bi Tang (五痹湯) to further investigate the anti-aging potential of TCM through targeting mitochondria. These results validate the reliability and translational potential of our platform, establishing a solid foundation for developing anti-aging therapeutics.

PROJECT-IN-CHARGE

Professor King Ho Cheung
Professor,
Teaching and Research Division,
School of Chinese Medicine

Executive Associate Dean of Graduate School

FOOD-DERIVED POLYSACCHARIDES AS FUNCTIONAL SUPPLEMENTS: MECHANISTIC VERIFICATION AND PRODUCT TRANSLATION



Many foods are considered to have calming and soothing effects in traditional Chinese medicine (TCM). For example, goji berries are commonly used to improve symptoms such as dizziness, insomnia, and excessive dreaming caused by Gān Shèn Yīn Xū—a TCM concept referring to liver-kidney yin deficiency. Contemporary research supports that goji berry polysaccharides can modulate the nervous system, reduce anxiety, and improve sleep quality. Additionally, immune dysregulation and chronic inflammation are closely linked to anxiety-like behaviours via neuroinflammatory processes that impair central nervous system function.

Food-derived polysaccharides exhibit significant immunomodulatory and anti-inflammatory effects and may help improve anxiety-like behaviours by regulating the immune-neural axis. They exert their effect through dual pathways on the brain–immune axis: directly activating shared receptors on immune cells and neurons (such as Toll-like receptors and Dectin-1), and indirectly remodeling the gut microbiota to produce short-chain fatty acids, which modulate receptors such as FFAR2/3. Key nodes in the interaction between stress and immunity, including EGFR, CGRP, and the CSF1–monocyte–TNF axis, provide mechanistic targets for intervention.

This study explores the therapeutic potential and mechanisms of food-derived polysaccharides in alleviating anxiety-like behaviours. Ultimately, the goal is to translate these insights into practical applications by developing a daily supplement or other polysaccharide-based products, or polysaccharide-based products, focused on supporting stress management and immune health. Target users include individuals experiencing chronic stress and anxiety, those with suboptimal health due to frequent overtime at work or long study hours, and populations susceptible to immune imbalances.

Building on substantial experience in translational research, Professor Chong brings extensive expertise to this project. Previously, he was awarded over HK$2.4 million from the Innovation and Technology Support Programme (Mid-stream, theme-based) for his pioneering investigation into "The Role of Interleukin 24 in Regulating Ocular Inflammation: A Novel Cytokine for the Treatment of Autoimmune Uveitis." This project explored the potential of Interleukin 24 (IL-24) in mitigating eye inflammation and preventing vision loss caused by immune-mediated disorders. These accomplishments have laid the groundwork for future clinical trials and exemplify the School's commitment to advancing biomedical research and developing interdisciplinary solutions to complex health challenges.

PROJECT-IN-CHARGE

Professor Wai Po Chong
Associate Professor,
Teaching and Research Division,
School of Chinese Medicine

DISCOVERY OF NOVEL GENES FOR THE BIOSYNTHESIS OF VALUABLE MONOTERPENES THYMOL, CARVACROL AND THYMOHYDROQUINONE FROM MEDICINAL PLANTS

The research identified and characterised enzymes involved in thymol, carvacrol, and thymohydroquinone biosynthesis in the Lamiaceae family, determining a unique pathway that commences with the formation of y-terpinene from geranyl diphosphate. The entire pathway was successfully reconstituted in tobacco, thereby validating the work's experimental model.

Long esteemed for their aroma and flavour, thymol and carvacrol, besides exhibiting antibacterial and anti-spasmolytic properties, are also precursors to thymohydroquinone, a substance with anti-inflammatory, antioxidant and anti-tumour activities. Understanding the biosynthesis of these phenolic monoterpenes enriches the understanding and opens new opportunities in studying complex biochemical processes.

Results have been published in PNAS titled "The biosynthesis of thymol, carvacrol, and thymohydroquinone in Lamiaceae proceeds via cytochrome P450s and a short-chain dehydrogenase".

The findings from the project can be applied in metabolic engineering to produce high-value terpenes in plants and microorganisms. Given the diverse therapeutic activities, large-scale biosynthesis could greatly benefit medicine, nutrition and aromatherapy. By demonstrating a novel mechanism for the formation of phenolic monoterpenes contrary to previous predictions, the research enhances techniques for creating these metabolites, potentials for further industrial application.

PROJECT-IN-CHARGE

Professor Pan Liao
Assistant Professor,
Department of Biology

Access publication

EC BOT LIMITED

An HKBU startup

Chinese medicine remedial soup system for suboptimal health and post-COVID conditions

Chinese medicine and remedial food have long been essential to the Chinese culture, and Hong Kong is renowned for the development of this industry. EC Bot has crafted a comprehensive range of remedial soup packages, designed to address a broad spectrum of suboptimal health concerns as well as post-COVID conditions, which are available in two formats: crude herbs and herbal granules.

The crude herbs package is designed to pair with meat as a traditional way to prepare medicinal soups. Taking a leap forward and adopting the principles of Chinese medicine granules, EC Bot also turns the remedial soup into herbal granules which retain both the genuine flavors and nutritional values of the ingredients, providing a contemporary, convenient, and tasteful solution to those inclined towards vegetarianism. Both package variants are specially curated not only for their medicinal properties but also for their palatability, appealing to individuals who are exploring Chinese medicine alternatives but may find the traditional taste challenging.

Alongside these encapsulated wellness soups, EC Bot also offers an online recommendation system to better aid international customers, thereby making them conveniently available to a global audience seeking the benefits of Chinese medicine, especially for suboptimal health conditions and post-COVID recovery.

FOUNDER

Professor Shi Ping Zhang
Associate Professor,
School of Chinese Medicine

HIGH-PRESSURE HOMOGENISATION IMPROVES FOOD QUALITY OF PLANT-BASED MILK ALTERNATIVES

The increasing demand for plant-based milk alternatives, driven by health, environmental, and ethical considerations, has led to the exploration of diverse ingredients such as adzuki bean, adlay, and oat- traditional Chinese grains with medicinal properties. However, consumer acceptance of these products remains limited, primarily due to differences in texture and flavour compared to dairy milk. This project investigates the potential of high-pressure homogenisation (HPH) to enhance the physiochemical and sensory qualities of plant-based milk.

HPH is an innovative food processing technology that applies intense pressure to modify the structure of proteins, polysaccharides, and lipids, resulting in improved beverage stability and mouthfeel. In this study, formulations of plant-based milk, made from adzuki bean, adlay, oat, and their mixtures, were processed using both household homogenisers and HPH. Comprehensive analyses included assessments of colour, pH, Brix, suspension stability, total solids, soluble protein, particle size distribution, rheology, microstructure, and sensory attributes. Sensory analysis involved structured taste panels evaluating appearance, flavour, texture, and overall acceptability.

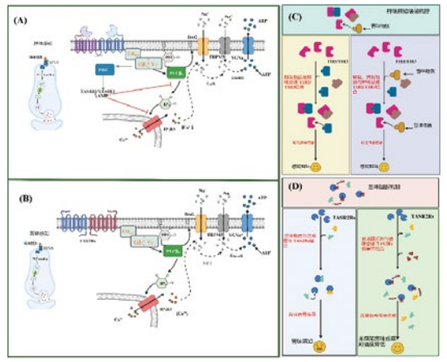
Results demonstrated that HPH increased lightness and Brix values, reduced particle size by over 50%, and improved viscosity, indicating enhanced protein solubility and starch release. While overall acceptability did not differ significantly between household and HPH samples, variants containing adzuki bean and oat were preferred. These findings highlight HPH as a promising approach to improving texture, stability, and consumer acceptance of plant-based milk alternatives, paving the way for further product development in the food industry.

PROJECT-IN-CHARGE

Professor Baojun Xu
Chair Professor, Department Head,
Programme of Food Science and Technology,
Department of Life Sciences,
Faculty of Science and Technology,
BNBU

Access publication

UNCOVERING THE BITTERNESS MASKING POTENTIAL BY UMAMI PEPTIDE



PROJECT-IN-CHARGE

Dr Wenmeng He
Assistant Professor,
Programme of Food Science and Technology,
Department of Life Sciences,
Faculty of Science and Technology,
BNBU

In view of the strong bitter taste and low content of small peptides, the product development and utilisation of bioactive peptides of wheat gluten are restricted. As a result, the screening for food source-derived peptide bitter taste receptor blockers has become a research hotspot. Previous studies have proven that umami peptide can effectively inhibit bitter taste, but the mechanism involved is still unclear.

The research aims to explore the mechanism of taste peptides releasing and umami peptide masking bitterness. The result lays a theoretical foundation for using umami peptides to mask the bitter taste and hence solves the bottleneck problems of debittering technology.

Based on traditional enzymatic hydrolysis and *In-silico* analysis, this study uses papain to hydrolyse wheat gluten protein. The research team took a sequence of procedures to obtain the structure of the taste peptides, verify the taste peptide releasing mechanism and determine the structures of umami peptides and bitter peptides. Finally, the combined use of electronic tongue, sensory evaluation, molecular docking, and HEK293T cell model experiments determined the bitter taste masking mechanism of the umami peptides.

The umami peptides are being developed into products to serve as bitter masking ingredients. It is expected that these compounds will have widespread applications in both the food and medicine industries, particularly for debittering purposes.

REVOLUTIONISING HEALTH MANAGEMENT: PERSONALISED NUTRITION RECOMMENDATIONS THROUGH AI

This groundbreaking research is dedicated to crafting a cutting-edge artificial intelligence system that tailors personalised nutrition recommendations using large language models. The system's primary goal is to deliver users with scientific and customised advice for their daily dietary needs, revolutionising the landscape of health management.

At the core of this innovative system is an intelligent health management application that harnesses advanced large language model technology to meticulously analyse user data. By integrating inputs from detailed questionnaires and thorough physical examination reports, the system can paint a comprehensive picture of each user's health status and needs. Collaborating with seasoned nutritionists and drawing insights from an extensive healthy meal database, the system formulates tailored dietary packages and lifestyle adjustments aimed at steering users towards their health aspirations.

The research's scientific mechanisms are multifaceted and impactful. Through intelligent questionnaire analysis, the AI health assistant delves into users' eating habits, lifestyles, and health conditions, laying the groundwork for personalised nutritional assessments. The interpretation of physical examination reports using AI technology identifies potential health risks and nutritional deficiencies, ensuring the efficacy of the recommended plans. Additionally, the incorporation of a "Nutritionist Database" guarantees that the system's diet plans are both scientifically sound and practical.

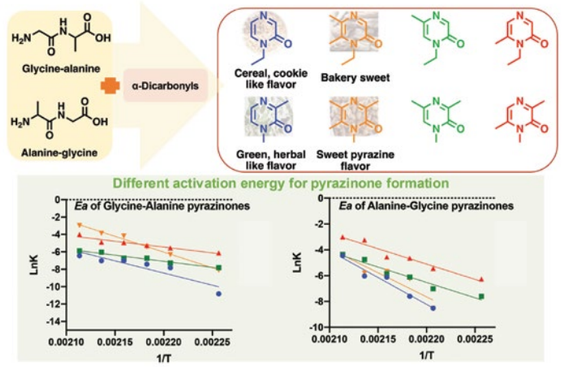
The real-world applications of this research are vast and transformative. Already operational in Hong Kong through an online food ordering platform, the system has the potential to provide valuable health data to insurance organisations for risk reduction strategies. Moreover, by offering tailored nutrition guidance, the system can impact personal health management, chronic disease prevention, and health education, enhancing public health awareness and self-management skills for a healthier society.

PROJECT-IN-CHARGE

Dr Wenmeng He
Assistant Professor,
Programme of Food Science and Technology,
Department of Life Sciences,
Faculty of Science and Technology,
BNBU

SCIENCE OF AROMA: PIONEERING PYRAZINONE FORMATION FOR ENHANCED FOOD FLAVORS

The Maillard reaction is fundamental to food technology, shaping the aroma and flavor profiles of countless foods through complex interactions between amino compounds and sugars. This project explores the formation and sensory properties of eight novel pyrazinones—an emerging group of Maillard reaction products- in Glycylalanine (Gly-Ala) and Alanylglycine (Ala-Gly) systems. Using advanced analytical techniques, including gas chromatography-mass spectrometry and nuclear magnetic resonance, the project team identified, purified, and characterised previously undetected pyrazinones.



For the first time, sensory evaluation of purified pyrazinones uncovered a diverse range of desirable flavors: cereal, cookie-like, bakery sweet, green herbal, and sweet pyrazine notes. These findings open new possibilities for flavor innovation in processed foods, snacks, and bakery products, enabling targeted flavor enhancement through controlled Maillard reactions.

Further, the project team determined the activation energies required for pyrazinone formation, with methylglyoxal facilitating their synthesis at lower temperatures. The differences observed between Gly-Ala and Ala-Gly systems highlight the importance of peptide structure in flavor compound development.

Understanding the formation pathways, activation energies, and sensory attributes of pyrazinones enables food scientists and technologists to better control and optimise flavor generation during food processing. For instance, manufacturers can tailor cooking conditions (such as temperature and ingredient selection) to maximise desirable flavors or minimise unwanted ones. This pioneering research not only expands our understanding of Maillard chemistry but also lays the groundwork for future applications of novel pyrazinones and drives the development of foods with enhanced sensory qualities and health benefits.

PROJECT-IN-CHARGE

Dr Yue Luo
Assistant Professor,
Programme of Food Science and Technology,
Department of Life Sciences,
Faculty of Science and Technology,
BNBU

Access publication

CRIMSON VISION TECHNOLOGY LIMITED

An HKBU startup

Crimsonvision

Empowering industries with instant portable material analysis solutions through NIR and IoT technologies

Crimson Vision is committed to the development of near-infrared (NIR) detection and visualising technologies for fast and portable authentication and detection services for fruit in the commercial and retail market.

Through the patented Near-Infrared (NIR) detection and visualising technologies, it has achieved fast and accurate material analysis capabilities with the portable detector, all in a non-destructive manner. Currently, fruit sugar levels are predominantly measured using intrusive methods such as reflectometers and liquid chromatography, which can damage the fruits during the measurement process. Other non-destructive methods, like spectrometers, are limited, complex, bulky, and expensive.

By utilising NIR technology, which is absorbed and reflected within the fruit, its organic photodetector can capture the signal with exceptional sensitivity and accuracy. By measuring the absorbance after diffuse reflection and comparing it with our extensive database using sophisticated algorithms, various qualities of the fruit, including sugar level, water content and acidity, can be discerned in a non-invasive manner.

With Crimson Vision's solution, the portable fruit quality detector can authenticate fruit species and assess fruit qualities faster and more affordably. By capturing the sugar level (Brix), acidity, and water content of the fruit, swift and cost-effective fruit authentication and quality detection can be achieved.

FOUNDER

Professor Furong Zhu

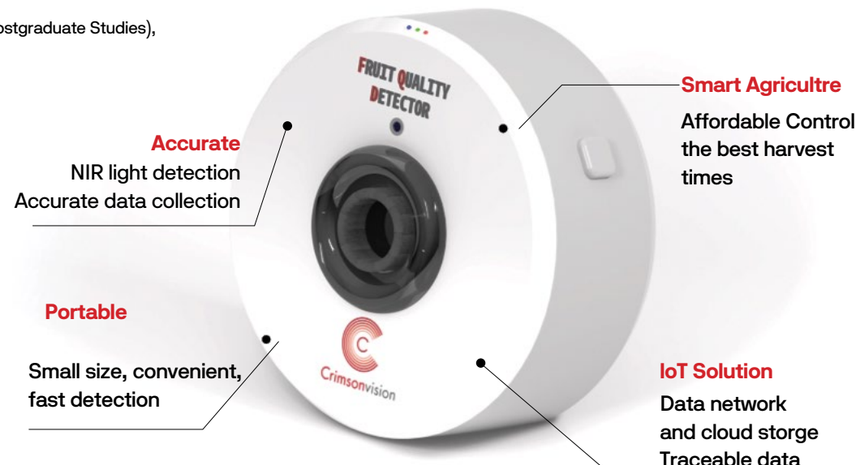
Associate Dean (Reserch and Postgraduate Studies), Office of the Dean of Science

Chair Professor in Physics, Department of Physics

Director, Institute of Advanced Materials

Learn More

Traceable fruit quality detection technology and IoT solution



HONG KONG AUTHENTICATION CENTRE OF VALUABLE CHINESE MEDICINES LIMITED

Ideal cost-effective routine testing for valuable Chinese Medicine authentication

An HKBU startup

香港名貴中藥檢定中心
HK Authentication Centre of Valuable Chinese Medicines

With the increasing popularity of traditional Chinese Medicine (TCM), the authentication and quality analysis of valuable Chinese medicines like Tiepi Shihu, Cordyceps, Edible Bird's Nest (EBN), and Ejiao have become crucial to ensure their safety and efficacy.

These valuable CM products are traditionally used for toning purposes. However, the presence of numerous counterfeit products poses significant health risks to consumers.

Current authentication methods for valuable CM are complicated and time-consuming, requiring the expertise of botanical experts. Even with DNA technology, it is unable to distinguish the specific medicinal parts of the genuine species. To address this problem, innovative patented technologies have been developed, which targeting unique polysaccharide and oligomer markers for authentication and quality control purposes. By high-performance gel permeation chromatography (HPGPC) and mass spectrometry (MS), researchers have identified unique markers for each valuable CM.

These technologies offer new detection methods which are highly specific, efficient, and cost-effective. These methods are suitable for large-scale detection by enterprises due to high throughput detection. They help prevent the occurrence of counterfeit and adulterated products, ensuring the safety and efficacy of TCM products.

FOUNDER

Professor Simon Han
Professor,
Teaching and Research Division
School of Chinese Medicine

Associate Director (Research),
Research Centre for Standardization of Chinese Medicines

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ECONOMICALLY MOTIVATED ADULTERATION (EMA)

Non-targeted detection of food adulteration using AI and big-data enabled collaborative database

Economically motivated adulteration (EMA) is an act of intentional food adulteration and a major public health risk. It is an act of deceiving food buyers motivated by economic gains, which contributes significantly to broader issues related to food safety compared with other traditional threats as the contaminants are often unconventional with unknown effects on human health. Recurrent incidents of economically motivated adulteration such as the Melamine incident in 2008, Horsemeat scandal in 2013, Counterfeit olive oil in 2009, and the plastic rice scandal have long-lasting and devastating effects on public health, economy, and society.

With current detection methods being target-oriented as per the regulations of local legal authorities, that is, the testing ensures that a list of specific substances does not exceed the maximum residual limits, newly engineered and unencountered adulterants are designed to evade existing, target-orientated testing methods. With unlimited unknown targets, it is impractical to test every product with all available quality evaluation methods, which are often expensive and labour-intensive. The complex, global food supply chain further creates numerous opportunities for unscrupulous suppliers to commit food fraud.

Using historical industrial data that have been amassed over time but filtered out, we have developed an alerting system that enables non-targeted detection of food adulteration without additional testing, powered by artificial intelligence (AI) and big data enabled collaborative database. Using our alerting system, the industry can continuously monitor and flag suspicious samples for further in-depth testing. Starting with mid-infrared spectroscopy data of raw milk as a pilot, the system can be extended to other food commodities prone to fraud as well as linking up other ingredients along the supply chain and manufacturing process for prediction, and thus become an important contributor for safeguarding public food safety.

Results have been published in Scientific Reports titled “Non-targeted detection of food adulteration using an ensemble machine-learning model”.

PROJECT-IN-CHARGE

Professor Terence Lau
Interim Chief Innovation Officer

Honorary Professor,
School of Chinese Medicine

Access Publication

JUSTICIA CHINESE MEDICINAL PLANTS: INNOVATIVE FOOD-BASED SOLUTIONS FOR ANIMAL HEALTH AND FOOD SAFETY

Safeguarding the health of livestock is crucial for food safety and sustainable agriculture. The research team has studied over 3,000 plant extracts from the Lingnan region, identifying *Justicia* plants as a promising food-based solution to combat viral threats in animals. Traditionally valued in Chinese medicine for its ability to clear toxins and support overall wellness, *Justicia* plants are now being developed as a natural feed additive to enhance animal health.

Extracts from *Justicia* plants can effectively inhibit H5N1 virus replication without harming host cells. The active compounds showed broad antiviral activity at low concentrations, targeting viruses such as H5N1, Japanese encephalitis, Zika, HIV, SARS-CoV-2, and Ebola. The active plant compounds, including patented aryl-naphthalene lignans, demonstrated an impressive 99% inhibition rate against H5N1 in safety-tested animal models. These botanical ingredients work by blocking viruses from entering cells, offering broad protection with minimal risk.

Incorporating *Justicia* plants-based formulations into animal feed not only helps prevent disease outbreaks, but also reduces the need for culling, supporting both animal welfare and food security. This innovative approach highlights the potential of food as medicine, delivering safe, natural, and cost-effective solutions to protect our food supply chain and promote sustainable livestock production.

In recognition of its impact and innovation, this research project was recently awarded the Silver Medal at the Silicon Valley International Invention Festival 2025, a testament to its global significance and potential.

PROJECT-IN-CHARGE

Professor Hongjie Zhang
Chair Professor,
Associate Dean (Teaching and Learning),
Office of the Dean of Chinese Medicine,
Cheung On Tak Endowed Professor in Chinese Medicine,
School of Chinese Medicine

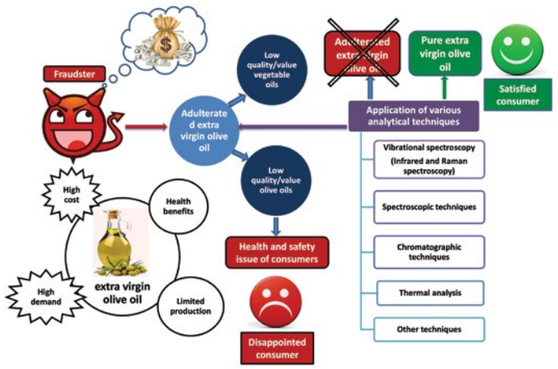
Access publication

DETECTING ADULTERATION IN EXTRA VIRGIN OLIVE OIL: ANALYTICAL ADVANCES IN FOOD TECHNOLOGY

Extra virgin olive oil (EVOO) is highly valued for its exceptional nutritional and sensory qualities, making it a staple in healthy diets worldwide. However, its high value and limited production render it vulnerable to adulteration with lower quality oils, posing significant challenges for food safety and authenticity. Traditional official analytical methods—such as gas and liquid chromatography—are effective but often labour-intensive, requiring complex sample preparation and hazardous chemicals. In response, food technologists are actively developing rapid, precise, and environmentally friendly techniques to safeguard EVOO integrity.

The research team highlights that advances in vibrational spectroscopic methods (including fourier transform infrared spectroscopy, near-infrared spectroscopy, Raman spectroscopy, nuclear magnetic resonance, and mass spectrometry are paving the way for more efficient and non-destructive analysis of EVOO. Additionally, studies suggest that cutting-edge approaches—such as electronic nose technology, digital imaging, and DNA-based assays—offer significant improvements in sensitivity and accuracy, enabling the detection of even minimal levels of adulteration.

Overall, the research indicates that while chromatographic methods remain the standard, a transition towards chemometric interpretation and green technologies is vital for real-time, on-site screening. The team recommends that official procedures be updated and aligned with recent advances, ensuring enhanced sensitivity and reliability in EVOO authenticity testing, ultimately protecting consumers and supporting quality assurance in the food industry.



PROJECT-IN-CHARGE

Professor Baojun Xu
Chair Professor, Department Head,
Programme of Food Science and Technology,
Department of Life Sciences,
Faculty of Science and Technology,
BNBU

Access publication

APPLYING INKJET-PRINTED NATURAL COLORIMETRIC INDICATORS AS INTELLIGENT PACKAGING WITH MONITORING THE FRESHNESS OF WHITELEG SHRIMP AS AN EXAMPLE

Food quality control throughout the food supply chain is crucial for maintaining the safety, integrity, and quality of food products from production to consumption. It plays a key role in identifying potential hazards, preventing contamination, and ensuring compliance with regulatory standards at every stage of the supply chain.

In this research project, a real-time food quality monitor has been developed using inkjet-printed natural colorimetric indicators. The study focuses on understanding the changes in whiteleg shrimp quality during cold storage and the colour responses of the inkjet-printed indicators. By investigating the correlations between the colour responses of the printed indicators and various shrimp quality parameters, valuable insights can be gained.

Whiteleg shrimp, native to Zhuhai and the Great Bay Area, is highly perishable during storage, transport, and distribution. Therefore, there is a significant industry interest in developing intelligent packaging solutions that can accurately indicate the real-time freshness of whiteleg shrimp throughout the supply chain. An innovative intelligent packaging system integrates colour-responsive components that exhibit real-time colour changes in response to food deterioration, providing valuable information to stakeholders.

With better understanding of the colour response mechanism of the inkjet-printed colorimetric indicators, large-scale production of such intelligent packaging labels can be achieved in the near future. The utilisation of this developed colour-responsive indicators can inform all stakeholders in the seafood supply chain of the real-time product quality, hence potentially reduce the domestic food waste. In addition, the use of inkjet printing technology introduces the possibility for printing multi-function labels on various types of packaged products beyond food products, such as cosmetic and medicinal products.

This study also poses long-term significance on environmental protection. For instance, via the use of such packaging labels, food waste reduction achieved at manufacturing and retail levels can in turn reduce the environmental burdens. Part of the raw materials used in this study are industrial by-products and this is also a potential way to reduce gross economical loss in the whole food industry.

The relevant research results have been published in Food Packaging and Shelf Life.

PROJECT-IN-CHARGE

Dr Raymond Luo
Assistant Professor,
Programme of Food Science and Technology,
Department of Life Sciences,
Faculty of Science and Technology,
BNBU

Access Publication

A.I. SAFE FOOD LIMITED

Revolutionising food safety with machine learning

An HKBU startup

A.I. SAFE FOOD LTD.
人工智能食品安全有限公司

In a world where food fraud poses a significant threat to consumer safety and industry integrity, A.I. Safe Food is pioneering a groundbreaking solution. The business objective of this innovative company is to combat food fraud by leveraging artificial intelligence. Recognising the vulnerabilities within the complex food supply chain, the company has developed a proprietary non-targeted machine learning alerting system designed to detect and prevent fraudulent activities in the food industry.

A.I. Safe Food offers distinct advantages to both the food industry and governmental testing laboratories. By utilising advanced machine learning algorithms, this system enables the non-targeted detection of unknown food adulterants without the need for additional testing. For food industry customers, A.I. Safe Food can tailor the detection system to their specific needs, solving the long-unmet industrial concern of preventing the next food fraud event, and to protect the brand from fraudster.

Initially based on dairy products, the company is working with industry leaders to establish their own detection system for avoiding the next melamine-like incident. This alerting system can also be applied to other food commodities as well as food quality monitoring associated with seasonal and annual changes. By collaborating with key organisations and stakeholders in the food safety sector, the company aims to contribute itself in the fight against food fraud.

Through its industrial-friendly alerting system, A.I. Safe Food offers a cost-effective, versatile, and highly accurate solution to safeguarding food safety. With a strong foundation in data-driven insights and industry endorsements, this company is poised to revolutionise the landscape of food safety testing and ensure consumer protection for years to come.

Learn More

FOUNDER

Professor Terence Lau
Interim Chief Innovation Officer

Honorary Professor,
School of Chinese Medicine

MICROFLOW INNOVATION LIMITED

An HKBU startup

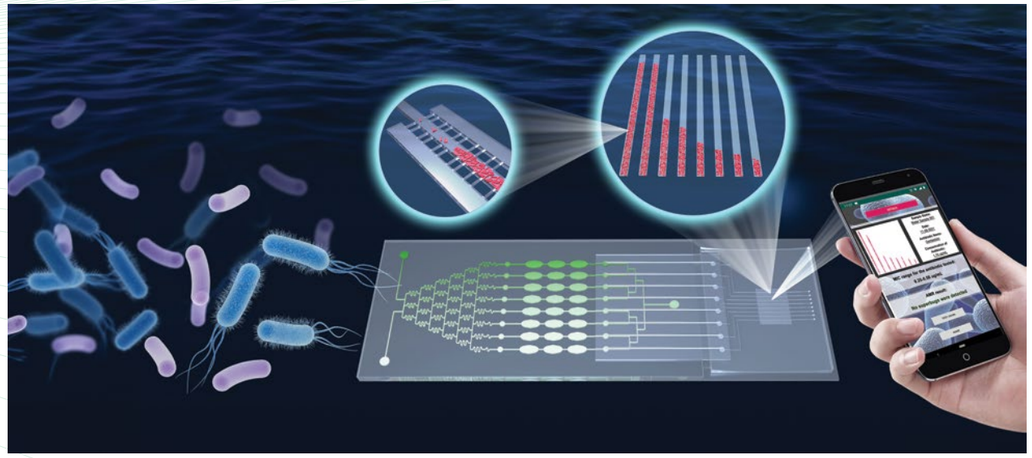
MicroFlow

“Barcode” cell sensor microfluidic system: Rapid and sample-to-answer antimicrobial susceptibility testing applicable in resource-limited conditions

MicroFlow Innovation Limited is dedicated to improving the antimicrobial susceptibility tests (ASTs), surveillance of antimicrobial resistance (AMR) in resource-limited environment.

With a mission to bring microfluidic techniques into point-of-care-tests (POCTs) development and analysis of drug-resistant bacteria, Professor Ren has developed the antimicrobial susceptibility testing (AST) system, which includes a whole-polypropylene chip and a “barcode” cell sensor as the key parts. This novel system is designed for mass screening of antimicrobial bacteria in the environment and food.

This platform can serve as a cost-efficient sample screening tool to quickly detect any sample with potential drug-resistant bacteria, which can then be sent for subsequent advanced analysis. It is expected this system will become a useful tool for the routine screening of drug-resistant bacteria in different situations, such as the food industry, public areas, and healthcare facilities, which can be applied without advanced clinical assay facilities or operator skill.



FOUNDER

Professor Kangning Ren
Professor,
Associate Head (Research),
Department of Chemistry

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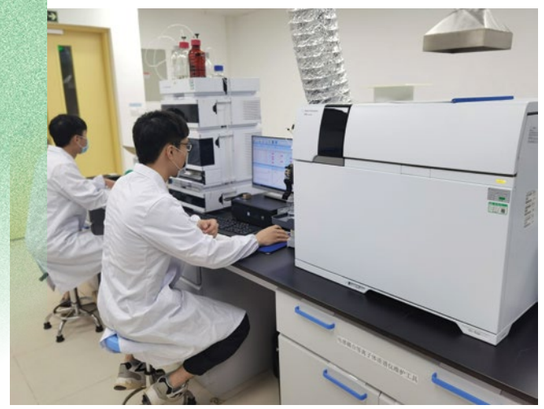
ZHUHAI GUANGDONG-HONG KONG FOOD SAFETY TESTING CO LIMITED

珠海粤港食品安全检测有限公司

Zhuhai Guangdong-Hong Kong Food Safety Testing Co.Ltd



Established in 2018, the food testing centre is a leading facility in the Greater Bay Area that provides third-party testing and analytical research experiments on food safety and agricultural product safety. The testing services adhere to national regulations in China, ensuring compliance and accuracy.

Through collaboration with esteemed institutions such as the State Key Laboratory of Environmental and Biological Analysis of HKBU and Zhuhai Key Laboratory of Agricultural Products Quality and Food Safety of BNBU, the centre offers a comprehensive range of testing services. This includes contaminant testing, microbiological testing, and residue testing for various food products, including meat products, dairy products, and processed foods in addition to raw agricultural products.

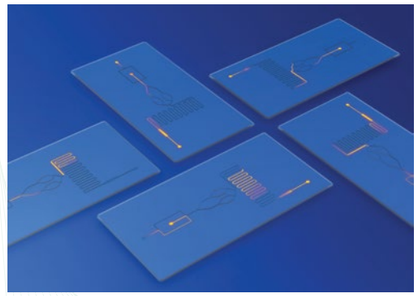
Currently, the centre holds 5,585 qualifications under the CMA (China Metrology Accreditation for Food) and CNAS accreditation in the field of food testing. Additionally, it possesses 2200 qualifications under the CATL testing for agricultural products. These accreditations demonstrate the centre's commitment to maintaining high standards and providing reliable testing services in the field of food and agricultural product safety.

Learn More

ZHUHAI SILVER ARK BIOCHIP CO LIMITED

Established in 2021, Zhuhai Silver Ark Biochip Co Limited is an integrated company that focuses on the research, design, manufacturing, and application of microfluidic chip based analytical instruments. Located in Zhuhai, the company specialises in the R&D, sales, and marketing of microfluidic chips and molecular diagnostic technologies in the field of food safety testing.

银方舟生物芯片
Silver Ark Biochip



The team of core technical team members have extensive experience leading and participating in numerous national key research and development projects, as well as projects of the Ministry of Science and Technology. They have successfully obtained multiple invention patents and achieved various technology transfer outcomes.

Currently, a range of products are available, including handheld pesticide residue detectors, microfluidic intelligent pesticide residue detectors, microfluidic intelligent cell counters, supporting chip reagents, and aquaculture disease detection reagents. These products showcase the company's commitment to providing innovative solutions in the field of microfluidic technology and contribute to the advancement of food safety testing.

FOUNDER

Professor Bo Lei
Adjunct Professor,
Department of Chemistry

BREAKTHROUGH IN THE PRODUCTION OF HYBRID RICE SEEDS

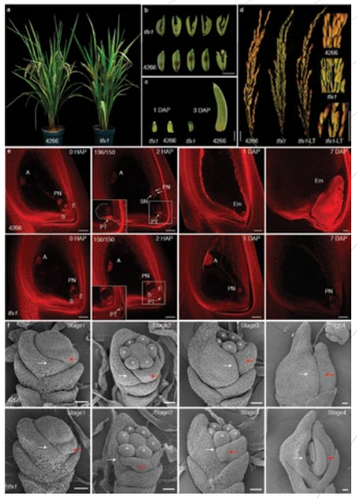
The research led by HKBU represents a significant advancement in hybrid rice seed production, offering the potential for increased efficiency and reduced costs. By addressing the limitations of the male sterility technique and harnessing the TFS1 gene mutation, the researchers have paved the way for mechanised hybrid rice breeding with commercial applications.

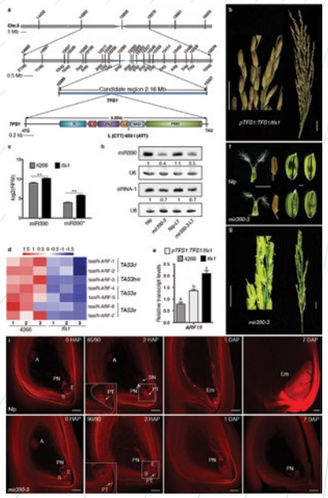
The commonly used “three-line” male sterility technique in hybrid rice seed production involves breeding male-sterile lines as pollen receivers and restorer lines as pollen donors. However, restorer lines can also produce self-pollinated seeds, which need to be manually removed to ensure seed purity. The research aims to address this limitation by introducing a sterile female rice as the restorer line.

The research team led by Professor Zhang has identified a gene mutation called “spontaneous thermo-sensitive female sterility 1” (TFS1) in an elite rice cultivar. This mutation causes female sterility under regular or high temperature conditions and resumes fertility under low temperature conditions. The team found that the TFS1 mutation affects the pollen tube entrance into the partially embryo sac, resulting in failed fertilisation and seed production under certain temperature conditions.

With the pioneering female sterility technique, the researchers achieved a breakthrough in the production of hybrid rice seeds and have enhanced the efficiency of hybrid rice production by eliminating self-pollinated rice seeds. This novel technique allows for fully automatic harvesting of hybrid seeds, reducing harvesting costs.

The research results have been published in Cell Research, a top-ranking international scientific journal.





Access Publication

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PROJECT-IN-CHARGE

Professor Jianhua Zhang
Chair Professor of Plant Biology,
Department of Biology

SEARCHING FOR IMPORTANT GENES THAT AFFECT CROP OIL PRODUCTION

Genetically modified B. napus lines, overexpressing critical enzymes for triacylglycerol formation, exhibited differences in lipid accumulation, PC (phosphatidylcholine) and TAG (triacylglycerol) distribution. These variances emphasise the need for continued research in this field to fully comprehend and manipulate the lipid metabolism of this vital oil crop. Such findings have a profound impact on understanding the world’s most crucial oil crops.

B. napus is the third most essential oil crop globally, contributing around 16% of plant oil production. Understanding its lipid metabolism could lead to the modification of oil content and quality, contributing to improved crop yields. Enhanced knowledge allows for better prediction of the implications in lipid accumulation, distribution, and functional shifts associated with transgenic alterations.

Insights from this study could transform agricultural practices and oil production, allowing for an increase in oil yield from B. napus. By improving understanding of how oil accumulation is regulated in the plant, researchers could engineer lines with a higher oil content, benefiting biofuel production and the food industry. This could also lead to the modification of oil quality tailored for either human consumption or industrial use.

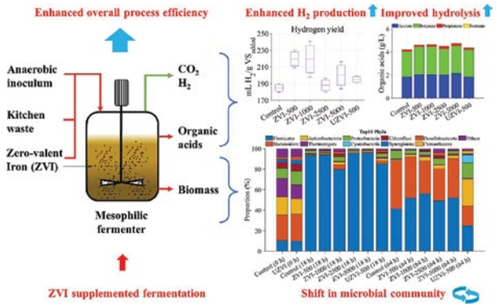
Results have been published in Scientific Reports titled “Transgenic manipulation of triacylglycerol biosynthetic enzymes in B. napus alters lipid-associated gene expression and lipid metabolism”.

PROJECT-IN-CHARGE

Professor Pan Liao
Assistant Professor,
Department of Biology

Access publication

ZERO-VALENT IRON NANOPARTICLES BOOST HYDROGEN PRODUCTION FROM KITCHEN WASTE



The research team investigated the effects of adding different amounts of zero-valent iron (ZVI) to kitchen waste affected the production of hydrogen gas (H_2) through dark fermentation. The researchers found that adding 500 mg of ZVI per liter resulted in the highest yield of H_2, which was 19% more than the control. Analysis of the metabolic pattern and metalloenzymes revealed that acetic and butyric acid production played a crucial role in generating H_2.

Additionally, the study found that certain bacterial groups, specifically phyla Firmicutes and genera Clostridium sensu stricto 1, were predominant during the gas production phase, indicating their involvement in the production of various organic acids. These findings suggest that ZVI supplementation can boost H_2 production from organic waste and influence the composition of the metabolic and microbial community.

The study provides an in-depth understanding of microbial community structure at a temporal scale and demonstrates its impact on H_2 production using kitchen waste as a substrate and variations in the key metalloenzymes at different stages of fermentation. Further, the findings offer an improved state-of-the-art technology for manipulating microbial community structures to improve H_2 yield and production rate.

The article titled “Effect of zero-valent iron nanoparticles on taxonomic composition and hydrogen production from kitchen waste” was published in Bioresource Technology.

PROJECT-IN-CHARGE

Professor Nirakar Pradhan
Assistant Professor,
Department of Biology

Access Publication

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ENHANCING SUSTAINABILITY OF CHITIN ISOLATION BY RECYCLABLE SUPERBASE-BASED PROTIC IONIC LIQUID

Chitin and its derivative, chitosan, are immensely promising renewable materials, especially for applications in biomedicine, biotechnology, and the food industry. Particularly noteworthy is chitin’s role as a source of insoluble fiber and food additive. Traditionally sourced as a minor component within the shells of crustaceans like shrimp, the isolation of chitin has historically been a chemical-intensive process, resulting in substantial resource consumption and structural compromise to the chitin itself. Consequently, significant efforts have been directed toward enhancing the chitin purification process.

In this research project, a novel technique that reduces the chemical consumption of chitin isolation has been developed. This innovative approach utilises a pulping liquor consisting of an ionic liquid, thereby streamlining the purification of chitin. The ionic liquid employed in this process proves to be recyclable, offering a sustainable pathway for its reuse. In addition to the simplicity of the isolation process, the resultant chitin boasts superior quality and structural integrity compared to its commercially obtained counterparts.

The chitin generated by this innovative process exhibits distinct properties compared to that obtained by traditional methods. The research team is currently exploring the application of the chitin samples for various food-related uses.

The article titled “One-pot chitin pulping using recyclable superbase-based protic ionic liquid” was published in Carbohydrate Polymers.

Access Publication

PROJECT-IN-CHARGE

Professor Matthew Lui Yuk-Yu
Assistant Professor,
Department of Chemistry

HKBU LABORATORIES, INFRASTRUCTURE AND FACILITIES

Wu Jieh Yee Institute of Translational Chinese Medicine Research

Funded by the Wu Jieh Yee Charitable Foundation, Wu Jieh Yee Institute of Translational Chinese Medicine Research (WJY ITCMR) is set to be a modern Chinese medicine development platform equipped with advanced research infrastructure, dedicated to translating research outcomes into clinical applications and commercialisation, to drive the standardisation and internationalisation of Chinese medicine.

Located at Hong Kong Science Park, the Institute focuses on four specialised research areas:

01 **Phenomics Research**

02 **Smart Medical Device and Bioengineering Technology**

03 **Herb-drug Interaction Analysis**

04 **Clinical Data Science**

The Institute also strives to advance 'Food as Medicine' initiative by leveraging HKBU's strengths in Chinese medicine, providing support to drive translation and commercialisation of research outcomes.

Learn More

By leveraging cutting-edge equipment, information and intelligent database, diagnosis and prescriptions assisted by artificial intelligence, and personalised medical management systems, the Institute is committed to advancing smart Chinese medicine, fostering more interdisciplinary and cross-industry collaborations, and exploring cooperation opportunities between Guangdong and Hong Kong, with the aim to position Hong Kong as a modern and international hub for Chinese medicine for the betterment of society.

Case of Berberine Nutraceuticals:

Combining a time-honoured medicinal plant-based product with contemporary food technology – the process of transforming ancient wisdom into contemporary functional food supplement

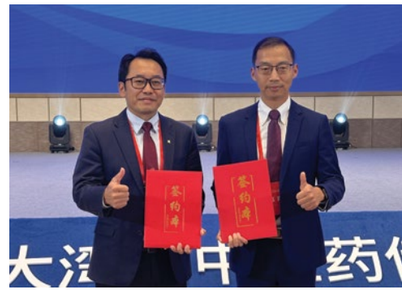
At WJY ITCMR, our pioneering research in berberine nutraceuticals is a testament to our unwavering dedication to the innovative transformation of food into functional medicinal products. Berberine, a golden-yellow alkaloid compound derived from traditional medicinal plant, the Berberis species, represents a paradigm shift in functional food development. Our interdisciplinary research demonstrates the remarkable potential of berberine as a nutraceutical ingredient, with scientifically validated health benefits.

Berberine activates AMP-activated protein kinase (AMPK), often referred to as the body's "metabolic master switch". This results in significant effects on glucose metabolism, lipid regulation, and cellular energy production. Clinical studies have shown that berberine supplementation can reduce blood glucose levels and improve long-term glycemic control, already demonstrating its efficacy comparable to that of conventional diabetes medications. The major challenge is its very poor absorption (around 0.5% in human subjects) and its accumulation in the GI tract can lead to diarrhea in around 30% of the subjects receiving oral berberine.

In addition to its metabolic health benefits, HKBU's research programme is investigating berberine's potential as a neuroprotectant, with a particular focus on its application in the prevention of Alzheimer's disease. Our studies already demonstrate that our novel approach enhanced berberine's penetration to cross the blood-brain barrier, and this can potentially modulate the various pathological processes demonstrated by others, including the reduction of amyloid-β production, the inhibition of tau hyperphosphorylation, and the attenuation of neuroinflammation. A meta-analysis of preclinical studies has confirmed significant improvements in learning and memory function, positioning berberine as a promising therapeutic agent for neurodegenerative conditions.

WJY ITCMR uses these findings to integrate biotechnology, food safety protocols, and targeted delivery systems to maximise bioavailability and therapeutic efficacy. Through partnerships with industry leaders and regulatory bodies, we are translating berberine research into commercially viable products that meet international food safety standards while delivering measurable health outcomes. This research exemplifies HKBU's strategic focus on health-promoting bioactive dietary components and positions the university as a leader in evidence-based functional food innovation. By integrating traditional Chinese medicinal knowledge with state-of-the-art food technology, we are developing cutting-edge nutraceuticals that tackle global health issues while adhering to the highest safety and quality standards.

HKBU-Infinitus Joint Lab of Polysaccharide Research



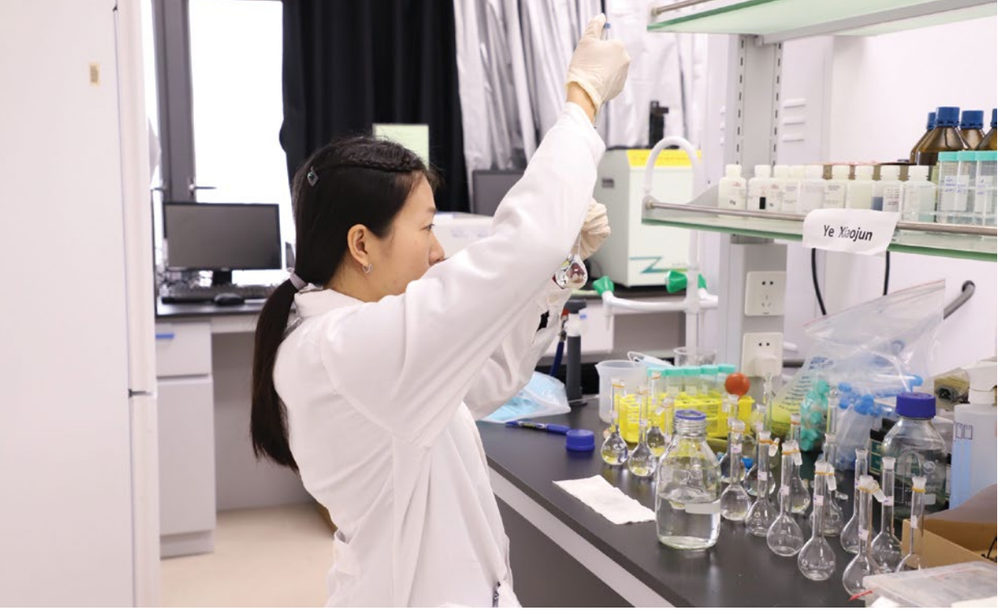
Herb polysaccharides, being safe and effective, show great medication potential. However, few polysaccharide-based new medicines have been developed because polysaccharides are hardly absorbed into blood and their bioactivities are widely doubted. Following the Memorandum of Understanding signed between HKBU and Infinitus (China) Company Limited, the HKBU-Infinitus Joint Lab of Polysaccharide Research is established for exploring the potential health benefits of herb polysaccharides and their applications in the field of nutrition and Chinese medicine.

The mission of this joint laboratory is to explore the potential health benefits of herb polysaccharides and their application in the field of nutrition and Chinese medicine by:

1. Establishing a platform for polysaccharides structure research and quality control to improve the quality of polysaccharide products.
2. Investigating the pulmonary immune enhancing function and mechanism of action of polysaccharides to provide new sources for composite polysaccharide products.
3. Screening herb polysaccharides with potential inhibitory effect on intestinal polyp growth to provide new sources for composite polysaccharide products.
4. Developing composite polysaccharide products as health products to enhance health and nutrition practice and strengthen the collaboration between academia and industry in addressing contemporary health challenges.

The objectives of this Joint laboratory are:

1. To conduct in-depth research on herb polysaccharides
2. To enhance long-term collaboration between HKBU and Infinitus for translating research findings into practical applications



Zhuhai Key Laboratory of Agricultural Products Quality and Food Safety

The Zhuhai Key Laboratory of Agricultural Products Quality and Food Safety was established as Zhuhai's key laboratory in 2015. The laboratory's primary focus is to promote food nutrition and health, prioritise food safety, and undertake targeted research and development of products.

In response to the advancements in food safety testing technologies, BNBU has collaborated with the Wang Lab of Molecular Food Safety at the University of British Columbia in Canada. Together, they are establishing key safety control points in the production, preservation, and transportation processes of sea bass. By integrating modern molecular detection and strain typing technologies, BNBU is developing innovative molecular detection methods to enhance the monitoring and control of food safety. Additionally, BNBU is working in partnership with the Technical Centre of the General Administration of Customs to jointly develop rapid food safety testing technologies and instruments. This collaborative effort improves the efficiency and accuracy of food testing, ensuring the timely detection and resolution of food safety issues.

Through the collective efforts of the government, industry, academia, and research institutions, along with international and local collaborations with experts and institutions, BNBU can leverage advanced research experience and technology in the development of new food safety testing technologies. This enhances the laboratory's research capabilities and enables it to make significant contributions to the field of food safety.

Food Science and Technology Laboratories in BNBU

There are 13 food related laboratories in BNBU which are well-equipped with advanced facilities for cell culture, biochemistry and biotechnology, chemical and food analysis, and food processing.

The Food Science and Technology labs are the key developing labs in BNBU, which consist of **three teaching laboratories** (Food Processing Laboratory, Food Analysis Laboratory, Chemistry Lab), **six research laboratories** (Health Food Lab, Laboratory Kitchen, Food Sensory Evaluation Lab, Molecular Biology Lab, Animal Cell Culture Room, Microbiology Lab) and **four supporting functional laboratories** (Walk-in Cooler and Freezer, Weighing room, Sample Retention Room, Water Purification Room), as well as the BNBU Food Safety Testing Centre, with a total of 1,500m^2.

The labs in BNBU focus on 6 major research areas: ·

Biotechnology and Food Safety

Health Promoting Effects of Bioactive Dietary Components

Nutrition and Health

Food Processing, Flavour Chemistry & Sensory Science

Biomedical Materials and Targeted Drug Delivery

Food Packaging Innovation

FOOD TECH RELATED FACULTIES AND DEPARTMENTS

Faculty of Science

Department of Biology

Department of Chemistry

Department of Computer Science

Department of Mathematics

Department of Physics

School of Chinese Medicine

Beijing Normal-Hong Kong Baptist University (BNBU)

Faculty of Science and Technology

Department of Life Sciences – Food Science and Technology

Department of Life Sciences – Environmental Science

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Institute for Innovation and Translation
創新及轉化研究院

(852) 3411 8319
iit@hkbu.edu.hk
https://iit.hkbu.edu.hk/

IIT Website

@hkbuiit

浸大科创

@hkbuiit