



SINGAPORE FOOD STORY (SFS) R&D PROGRAMME

Theme 3 Competitive Grant Call on Food Safety and Consumer Science

2021 Call for Proposals

Call Opens: 20 August 2021

Submit by: 4 October 2021 (1800H, SGT)

SFS R&D Joint Programme Office (A*STAR):

Agency for Science, Technology & Research

Food & Consumer Cluster

Email: a-star_SFSRND@hq.a-star.edu.sg

Description	Dates	Comments
Launch Date	20 August 2021	Date of call publication
Deadline for applicants to raise clarifications to the SFS JPO	6 September 2021	Should you have any questions or queries regarding the call, you may address them to: a-star_SFSRND@hq.a-star.edu.sg
Deadline for SFS JPO to reply to clarification question	13 September 2021	Replies to applicants' questions and queries will be returned.
Deadline for proposal submission	4 October 2021	Please submit your completed applications to a-star_SFSRND@hq.a-star.edu.sg by 1800H, SGT
Notification of Evaluation Results	January 2022	Projected Timeline The outcome of the call will be communicated to all applicants via the email address indicated in their proposal. Applicants are strongly encouraged to check their inbox or spam folder regularly for updates.
Letter of Award issuance	March 2022	Projected Timeline Lead Principal Investigators (PIs) and Co-Investigators (Co-Is) are required to provide their endorsement/signatures within 7 calendar days upon the receipt of the LOAs.
Project Start Date	April 2022	Projected Timeline Lead PIs are expected to commence their projects by the project start date indicated in the LOA.

If you have considered applying to this grant call but decided not to do so, your feedback and reasoning for such a decision would be greatly appreciated. Please feel free to email your concerns and considerations to a-star_SFSRND@hq.a-star.edu.sg. Alternative topics relevant to the Singapore Food Story R&D Programme specific to Sustainable Urban Food Production, Future Foods: Alternative Proteins and Food Safety Science, Innovation and Consumer Perception can also be forwarded to us. Your valuable feedback may provide insights for consideration in our subsequent grant calls.

1 BACKGROUND

- 1.1 Singapore imports more than 90% of its food today and is vulnerable to global trends that impact food supply and safety, such as climate change, urbanization, growing complexity of food systems, and new business models and food products.
- 1.2 To ensure food security for Singapore, the Singapore Food Agency (SFA) adopts three broad strategies, called the 3 Food Baskets: Diversity import sources, Grow local, and Grow overseas. The “Grow local” basket helps to mitigate Singapore’s reliance on imports and serves as a buffer during supply disruptions to import sources.
- 1.3 As part of the “Grow local” basket, SFA has set the “30 by 30” goal, to raise local production from less than 10% today, to meet 30% of Singapore’s nutritional needs locally by 2030. This multi-fold increase will have to be achieved despite Singapore’s land and resource constraints. Harnessing highly productive, climate-resilient and resource-efficient technologies through innovation is key to this effort.
- 1.4 Through these efforts, we can reap economic benefits for Singapore as we develop the industry ecosystem and nurture the appropriate segments of the agrifood-tech and alternative proteins food value chain. There are also opportunities for additional value-capture from anchoring alternative protein research, formulation and production activities locally.
- 1.5 To turn food challenges into advantages, SFA and the Agency for Science, Technology and Research (A*STAR) have jointly developed the Singapore Food Story R&D Programme, to build a strong base of R&D capabilities in local research institutions in partnership with industry, and undertake cross-domain research in emerging areas of the agri-tech and food space. It focuses on three R&D themes:
 - a. Sustainable Urban Food Production
 - b. Future Foods: Alternative Proteins
 - c. Food Safety Science and Innovation

2 OBJECTIVES AND SCOPE

- 2.1 This grant call concerns Food Safety Science and Innovation. As Singapore gears up to embrace the fast growing pace of food technology and innovation in a bid to ensure food security and resilience, novel food safety gaps have been uncovered whilst consumer acceptance to such products and their knowledge and capacity to understand these technologies are at risk of falling behind. To ensure that such products and technologies are well adopted, adapted and translated into use to address Singapore’s growing needs, consumers and scientists alike are invited to

challenge, critic and comment on food safety and risk communication issues to allow for better product and technology development in efforts to move Singapore closer to the “30 by 30” goal.

- 2.2 This is a competitive grant call aiming to foster knowledge creation on food safety and consumer sciences. The grant call hopes to raise early conversations on recent global and local developments in the novel food technology and innovation space. Research should aim to address some of the fundamental and upcoming food safety issues faced by the alternative protein industry and relatedly, how these could be better communicated to the consumers for enhanced consumer education and utilization of communication strategies.
- 2.3 Applicants are strongly encouraged to link their proposals to the Singapore Food Story Theme 1 thematic areas on Sustainable Urban Food Production and Theme 2 thematic areas on Future Foods: Alternative Proteins. Please refer to Annex A for the list of projects and PIs for awarded projects under SFS themes 1 and 2.
- 2.4 Applicants are encouraged to engage existing awardees to the Singapore Food Story R&D Programme Themes 1 & 2 to work alongside and develop on the food safety & consumer science aspects as a further complement to the awarded projects. Separately, applicants may also consider working with key companies and industry players in the novel food and alternative protein space.
- 2.5 There are two separate categories in this grant call listed below, with examples of the focus areas in each category.
- 2.6 Category 1: Food Safety Science & Innovation
- 2.7 Applicants may consider the following focus areas in these categories:
 - a. Holistic food safety assessment method sand testing platforms for urban agri- and tropical aquaculture technologies and novel foods (e.g. alternative proteins);
 - b. Toxicity and Allergenicity prediction & management for novel foods (e.g. alternative proteins);
 - c. Risk benefit models and applications to food safety assessment; and
 - d. Comprehensive reviews on scientific basis and justifications for current food safety risk assessments of novel foods.

2.8 Category 2: Consumer Science & Risk Communication

2.9 Applicants may consider the following focus areas in these categories:

- a. Achieve social licensing and public trust;
- b. Novel food risk communication (assessment, mitigation, perception and management) and consumer message mapping to prevent misconceptions, backlash and negative sentiments against foodtech, processed foods, novel foods(e.g. alternative proteins);
- c. Consumer science – behaviour, perception, acceptance, dietary habits, and prediction of consumer sentiments towards novel foods (e.g. alternative proteins). Stratifying consumer risk profiles and demographic influence (social, economic status) on consumer behaviour;
- d. Addressing consumer knowledge gaps in novel food science and consumer sentiments toward naming/marketing/terminologies of novel foods; and
- e. Derivation of socially friendly communication messages that build consumer trust in novel food science.

2.10 The following areas of research will not be funded in this grant call:

- a. Whole-genome sequencing of plants/crops, aquaculture, microbial species and pathogens without direct applications and linkages in food production;
- b. General food safety testing assays and methods (also for food manufacturing);
- c. General food/environmental contamination testing methods & surveys e.g. nanoparticles, microplastics, plasticisers;
- d. Bioinformatics analytics as a standalone technology;
- e. Taste and sensory studies for novel foods (e.g. alternative proteins); and
- f. General standalone consumer perception and behavioural studies in food; linkages to risk communications and communication strategies preferred.

3 ELIGIBILITY CRITERIA

3.1 Researchers who are employees of eligible R&D organisations may apply to this Competitive Grant Call. Funded R&D projects must be conducted in Singapore.

3.2 Eligible R&D organisations include Institutions of Higher Learning (IHLs), public sector agencies, not-for-profit organisations and research laboratories in Singapore.

- 3.3 The Lead Principal Investigator must have a minimum of 0.75 FTE with an eligible R&D organization; possess a good track record of leadership and technical ability in conducting research programmes, providing mentorship for researchers, and having productive research, commercial outcomes and/or publications.
- 3.4 Proposed research should not be already funded by other local or international grants or funding schemes.
- 3.5 Collaboration with foreign organizations and experts in the capacity of a Co-Investigator or a Collaborator is allowed, but no funding will be allocated to the foreign Co-Investigator/Collaborator who are operating out of Singapore. Successful applicants are not allowed to contract out whole or part of the funded research to any Co-Investigator or Collaborator whether they are local or international.

4 PROPOSAL REQUIREMENTS AND FUNDING

- 4.1 Proposed projects are to range from up to 3 years in duration. Each successful project may be granted up to SGD\$2,000,000 (inclusive of 20% indirect costs), subject to the proposals corresponding budget request and project scope.
- 4.2 IHLs, public sector agencies, and not-for-profit organisations and research laboratories in Singapore can qualify for up to 100% funding support of approved qualifying direct and indirect costs of a project. Support for indirect costs is allowed only to IHLs, public agencies and not-for-profit entities, of up to 20% of the total qualifying direct costs. Otherwise, support for indirect costs is not allowable unless specifically justified and approved by the SFS Joint Programme Office based on the scope and projected outcomes of the research.
- 4.3 The funds from this grant call will be disbursed on a **reimbursement basis**. There will be **no advancement of funds** for the awarded projects.
- 4.4 Companies and company-affiliated research entities may not qualify for funding but are encouraged to participate as collaborators with a local lead Principal Investigator.
- 4.5 Final funding support and amount will be at sole and exclusive discretion of the JPO based on the scope and projected outcomes of the research.
- 4.6 Applicants shall comply with national regulations, A*STAR's Grant Terms and Conditions and the National Research Fund Guide.

- 4.7 All R&D work must be conducted in Singapore, and all assets acquitted with the funding must be located in Singapore and maintained within the control of the Institutions.
- 4.8 Intellectual Property (IP) management: All researchers and research organizations shall follow and apply the National IP Protocol principles and framework.

5 APPLICATION

- 5.1 More details including frequently asked questions are available at the following link: Applications shall be submitted via email to a-star_SFSRND@hq.a-star.edu.sg.
- 5.2 The Research Administrative Office from IHLs or the equivalent outfit in companies are responsible for ensuring that information submitted by their respective researchers are compiled according to the requirements set out in this grant call.
- 5.3 All proposals must be submitted by 6.00pm on 4 October 2021 (SGT). All completed applications must be endorsed by the Director of Research or equivalent at the Host Institution for the Lead Principal Investigator. A complete application will consist of the project proposal and supporting documents submitted to the email above.
- 5.4 Late submissions, incomplete submissions, submissions via other avenues (e.g. walk-in), and submissions without proper endorsement will not be accepted.
- 5.5 Applicants may direct queries by email to a-star_SFSRND@hq.a-star.edu.sg if questions are not addressed in the FAQ section of the grant call.

6 SELECTION AND AWARD PROCESS

- 6.1 Submitted proposals will be subject to review by international and local scientific experts, as well as an evaluation panel. Privileged or confidential information shall be clearly marked as such in any of the submission documents.
- 6.2 Applicants shall agree that:
- a. The SFS JPO is under no obligation to award research grant in whole or in part to any proposal;
 - b. All applicants shall abide by the decisions of the SFS JPO. The decision of the SFS JPO shall be final; and
 - c. All applicants shall not take legal action against the SFS JPO and its affiliate organisations, any reviewers, or any member of the

evaluation panel in relation to their role in deliberating project proposals.

- 6.3 Proposal shall be evaluated based on the following criteria:
- a. Potential Contribution to Grant Objectives;
 - b. Addressing existing potential gaps in Food Safety Science and Novel Food Risk Communication; and
 - c. Scientific Excellence, Innovation and Successful Objectives; and
 - d. Relevance to the Singapore Food Story.
- 6.4 All projected output and achievements of the proposed research are expected to be commensurate with the level of funding requested. The SFS JPO may require proposals to be revised or combined as it sees fit to enhance research outcomes, ensure competitiveness, facilitate integration of research concepts and technologies, and optimize resources.
- 6.5 The SFS JPO bears the sole and exclusive discretion for the selection of reviewers and evaluators, and shall not be liable for the release of information concerning proposals to third parties by individuals involved in the review process. Should circumstances arise, the SFS JPO reserves the right to modify the review process.
- 6.6 A Letter of Award will be sent to the Host Institutions of successful applicants, as named in the proposal, and copied to the Lead Principal Investigator(s) and Co-Investigator(s), if any.

7 AWARD, PROJECT REVIEW AND MONITORING

- 7.1 The SFS JPO will oversee the progress of funded projects and provide guidance over research directions, progress and intended deliverables.
- 7.2 Projects will be reviewed at mid-term and annual intervals. Research teams will be required to submit summary reports on their progress toward promised deliverables and information on funding drawdown, at a frequency specified by the SFS JPO.

Annex A

Please refer to the following websites for awardees to the Singapore Food Story:

- Singapore Food Story Theme 1 – Sustainable Urban Food Production

https://www.sfa.gov.sg/docs/default-source/default-document-library/260421_sfa-awards-over-23-million-to-grant-call-for-r-d-in-sustainable-urban-food-production58a092d264c4c91acf57099a12046eb.pdf

- Singapore Food Story Theme 2 – 1st Alternative Protein Seed Challenge

Project Title	Principal Investigator	Institutions Involved
Production of High Purity Insect Protein Hydrolysate	Prof Wang Yulan	NTU
Highly Efficient Microbial Methane Conversion for Single Cell Protein Production under High Pressure	A/Prof Sanjay Swarup	NUS; NTU
A Systematic Approach to Species Selection and Serum-Free Growth Media and Hydrogel Refinement for Cultured Seafood	Dr Mark Richards	NYP Collaborator: Umami Meats Pte Ltd
Modification of Brown Rice Protein Isolate Using Microbial Transglutaminases: Functional Property Enhancement and Nutritional Evaluation	A/Prof Du Juan	SIT; NTU Collaborator: BTI
Engineering Manufacturable Growth Factors for Cultured Meats	A/Prof Bernard Loo Liat Wen	SIT; BTI
Marine Algae Proteins: Isolation, Assessment & Optimisation for Direct Incorporation in High Value Foods	Dr Michael Voigtmann	Wintershine Asia Pte Ltd; SIT; SIFBI
Developing a Scalable Method for Fiber-Directed Differentiation of Muscle Cells	Dr Andrew Wan Chwee Aun	SIFBI
Functionalisation of Plant Proteins by Physicochemical Methods to Improve Food Applications	Dr Shaun Sim	SIFBI Collaborator: Massey University
Decellularised Plant and Fungi Scaffolds for Structured Meat Production	Dr Deepak Choudhury	BTI; NTU

		Collaborator: The Moscow Sechenov Medical University
Develop a Platform for Immortalized Cell Line Media Development for the Production of More Affordable Cultured Meat	Dr Lu Hao Kim	BTI
Food Protein from Algae – Integrated Bioprocess Approach to Sustainable Living	Dr Yvonne Chow Yoong Sien	SIFBI; ICES; BII; Sophie's BioNutrients Pte. Ltd
Low-cost, Edible Fibre Supports, for the Expansion and Differentiation of Myoblasts in Suspension Bioreactors	Dr William Birch	IMRE; SIFBI
Creating a Commercially Feasible Platform for Cultured Meat Production	Prof Teh Bin Tean	IMCB
Characterization and Evaluation of Protein Hydrolysate Supplements as Serum Alternatives in Cultured Meat Production	Dr Ho Yin Ying	BTI
A Multidisciplinary Screening Platform for Functional Proteins for Alternative Foods	Dr Prakash Arumugam	SIFBI; BII
GRAS Platform for Food Protein Production and Screening: A Sweet Concept	Dr Wong Han Teng	IMCB; SIFBI
Alternative Culture Media Components for Fish-derived Fat Cells	Dr Shigeki Sugii	IBN; NTU; RP

➤ Singapore Food Story Theme 2 – Joint HBMS & AME IAF-PP on Future Foods: Alternative Proteins

Project Title	Principal Investigator	Host Institution	Partner Institutions
Red Yeast (<i>Rhodotorula toruloides</i>) cell mass production as a tool to enhance food security and reducing carbon footprint in urban cities	Dr Ji Lianghai	TLL	NTU SIFBI
Understanding the functional and nutritional properties of plant-based proteins: application of mixed protein matrix to develop palatable foods for the Asian consumers – from laboratory to table	Dr Chiang Jie Hong Dr Sumanto Haldar	SIFBI	SP IMCB I2R

CRISP Meats: CentRe of Innovation for Sustainable banking and Production of cultivated meats	Dr Andy Tan Dr Ng Say Kong	BTI	NUS SIT IMRE BII IBN IMCB SIFBI
A Sustainable Bio-platform for High Quality Microbial Protein Production	A/Prof Zhou Yan A/Prof Raymond Lau A/Prof Rebecca Case	NTU	TLL NUS