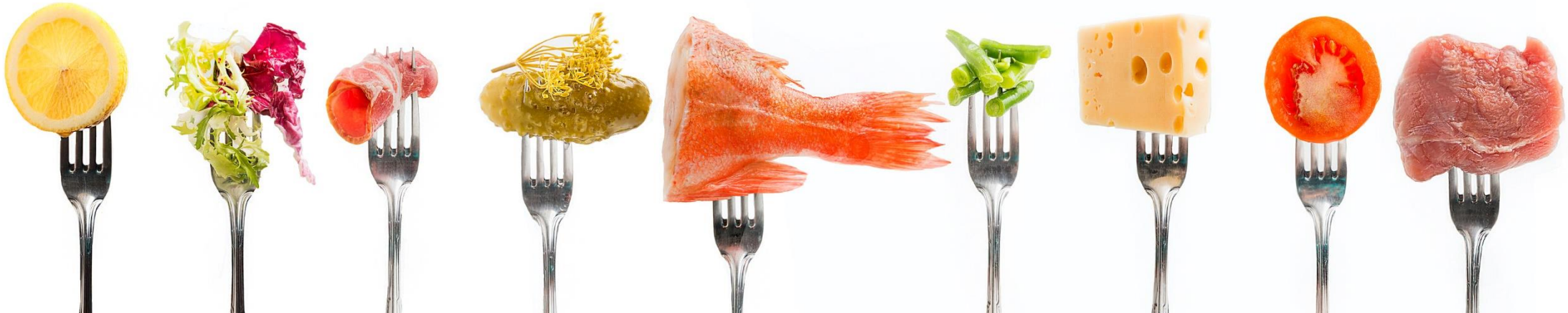
SG Food Story Future Foods: Alternative Proteins
IAF-PP HBMS & AME GRANT CALL

Grant Call Information

SG Food Story R&D Joint Programme Office

14 Nov 2020



SINGAPORE FOOD STORY R&D PROGRAMME

Supporting the "30 by 30" food security goal with scientific excellence

IAF-PP HBMS & AME Grant Call

I. Sustainable Urban Food Production

- Genetics
- Nutrition
- Disease & Health Management
- Nutrient Quality Preservation

II. Future Foods: Advanced Biotech-based Protein Production

- Computational Biology
- Microbial Protein
- Cultivated Meat
- Plant Protein
- Side stream valorisation & Pre-Pilot Solutions

III. Food Safety Science & Innovation

- Food safety science for emerging risks
- Intelligent Supply Chain
- Understanding Consumer Behaviour towards Food
- Future Ready Food Safety Hub (FRESH)

1. Food Security

- Grow the agri-tech and food sector to **strengthen our food security**.

2. Economic Value-Capture

- **Contribute to Singapore's economy.**
- Reap economic benefits for Singapore by developing appropriate segments of the agri-tech and food value chain.

3. Food Safety

- Achieve a **globally respected, future-ready food safety system** that ensures a continual supply of safe food for Singapore and supports the growth of the agri-tech and food sector.
- To enhance our regulatory science capabilities and developing mutually recognised food standards in the global markets.

1st SG Food Story IAF-PP Thematic Grant Call on Future Foods: Alternative Proteins

Event	Submission Deadline
Grant call launch	14 November 2020
Pre-Letter of Intent (LOI)	27 November 2020, 1800H ^
Grant call workshop for Research Institutes/Institutes of Higher Learning	3 December 2020
LOI submission	10 December 2020, 1800H *
Full proposal submission	11 January 2021, 2359H

^ Submission of Pre-LOI to participate in the grant call workshop.
** LOIs deemed meritorious will be notified by 21 Dec 2020 to submit their full proposal to the SFS R&D JPO.*

- **Thematic Areas:**
  - Microbial Proteins
  - Plant-based Proteins/Protein Screening-Discovery, Processing and Formulation Platform
  - Cultivated/Cultured Meat
- **Grant Funding Quantum:** Up to S$15M per programme/proposal (inclusive of 20% indirect cost)

Future Foods: Alternative Proteins Thematic Call

- In this grant call, applicants are highly encouraged to address these thematic areas, although meritorious proposals in other relevant and highly related areas as provided in this deck will also be considered.

- Platform technologies and research programmes that have both industry relevance and commercial viability that contribute towards building food security and resilience in Singapore are considered highly relevant.

- Furthermore, applicants are also encouraged to consider how shifts arising from COVID-19 could be addressed in their applications under these research themes.

Future Foods: Alternative Proteins Thematic Call

- Given that programmes supported by the IAF PP Funding schemes are expected to lead to industry investments, applicants are strongly encouraged to articulate the industry engagement plans, provide industry support/validation, as well as the manpower resources required to drive this industry engagement effort and in executing future industry contracts.

- Should the LOIs be shortlisted for funding, it is highly recommended to provide a full proposal on how the programme intends to drive industry development with commercial viability of the technologies/innovations developed, in order to achieve the dual mission of economic and food security outcomes for Singapore.

A. Microbial Proteins

The immediate **goals** should be to:

- Expedite protein characterization and functionality
- Significantly lower set-up, scale-up and production costs
- Develop food prototypes based on Asian consumers' preference and overall nutritional needs

Sub-Topic / Sub-Theme	Challenge Statements (How can Singapore... ?)
Upstream processing	• Develop tools and technologies to expedite protein characterization and functionality (e.g. using machine learning, in-silico prediction and synthetic biology designs) • Develop other cost effective and efficient modular fermentation system (eg. to circumvent high bioreactor facility CAPEX issues)
Downstream processing and scale-up	• Develop extraction and isolation methods for large scale microbial proteins eg. enhance downstream purification offerings such as chromatography, membrane filtration and other viable methods to increase yield, efficiency and quality • Maintain process performance at scale and ensure its economic viability
Product formulation	• Develop food products (e.g. microbial-based/single cell proteins and/or blended products) based on Asian consumers' preference and overall nutritional needs • Clinically validate the long term health effects of microbial protein on Asian consumers • Address food safety issues, increase consumer's acceptance on fermentation and microbial proteins
Others	• Find other sustainable alternative feedstock that are applicable for use in Singapore, for microbial protein fermentation process (e.g. using food/agrifood side streams) to minimise costs and enhance circularity of economy

B. Plant-based Proteins

The immediate **goals** should be to:

- Support discovery of variety of edible species in the region
- Develop optimum protein extraction and screening methods
- Assess the nutrition value of specific plant-based proteins in the diet and the long-term health impact

Sub-Topic / Sub-Theme	Challenge Statements (How can Singapore... ?)
Raw Materials	• Discover novel plants/vegetables in Asia/SE Asia that are suitable and sustainable for plant-based meat production using high throughput screening of materials with desired functionalities • Develop efficient protein extraction methods from plants/vegetables • Reduce raw material costs by developing new feedstock e.g. using side-streams of crops through upcycling methods • Develop uses for non-protein trimmings of crops/agrifood side streams into plant-based protein products to reduce waste
Product Formulation	• Improve nutritional profiles of plant-based meat analogues • Clinically validate the long term health effects of plant-based meat consumption in replacing animal meat in Asian diets • Localise plant-based product forms/formulation to align with the Asian population's needs and preparation methods associated with conventional animal products
Production	• Minimise high production costs and enable mass product adoption in the mainstream Asia market eg. tackling the issue of processing methods and feedstock/ingredients availability
End-use (Consumer)	• Demonstrate the value of plant-based meat over other conventional products in terms of public health and consumer acceptance • Mine and apply consumer preference data of plant-based meats to derive publicly accepted products/formulation

C. Cultivated/Cultured Meat

The immediate **goals** should be to:

- Significantly lower costs of production
- Accelerate discovery across edible species relevant to the Singaporean/Asian consumer
- Address regulatory and consumer concerns of a Novel Food product

Sub-Theme / Sub-Theme	**Challenge Statements (How can Singapore… ?)**
Culture media development	• Rapidly discover cost-effective, food-safe, animal-free substances that can promote cell growth or differentiation • Support a wide range of startups focusing on relevant species and cell types suited for Asian consumers, while meeting dietary habits and nutritional needs
Tissue acquisition and cell line development	• Develop robust cell lines with sufficient traceability to shorten regulatory timelines and with a sustainable supply to build food resilience for Singapore • Uncover new platform methods for cell line engineering across edible species
Safety, nutrition, organoleptic qualities, and sustainability	• Provide scientific justifications to distinguish actual risks from consumer-perceived risks concerning the safety of cultured meat • Establish evidence-based frameworks to demonstrate the value of cultured meat over other food products in terms of public health and sustainability • Re-create familiar sensory experiences with cultured meat products by cost-effectively combining cultured cells and food-safe ingredients
Processing	• Invent ancillary systems (e.g. microcarriers, scaffolds, encapsulation materials, bioreactors) to enable scale up process, while lowering costs and regulatory barriers for cultured meat production
Consumer acceptance	• Characterize consumer acceptance factors towards different formulations of cultivated meat • Research strategies which address regulatory, safety and consumer acceptance

Overall Criteria

- Feasibility of meeting food security and food resilience goals for SG.
- Competitiveness of the technology at the regional and global levels.
- Viability of the project plans and business model, including plans for productisation and commercialization.
- Careful consideration to developing proteins with enhanced nutrition or health benefits, with deliberation on regulatory approval and consumer acceptance to the technologies/solutions/ products derived from this programme.
- Clarity of the pathway to value capture for SG and possible exportable models.
- Overall attractiveness of the deliverables to the industry with committed support from the industry partners.

Application Process

Pre-LOI and LOIs submissions

- Applicants are to complete and fill out all sections of the enclosed LOI template.
- Both pre-LOI and final LOI submissions will use the same LOI template.
- Please submit via email to: a-star_SFSRND@hq.a-star.edu.sg

Full proposal submission

- All applications must be endorsed by either the Grants Research Office of the Host Institution of the Lead/Corresponding PI. The proof of endorsement should take the form of a PDF copy of the endorsement email.
- All completed and endorsed proposals and applications must be submitted via email to the SFS Joint Programme Office: (a-star_SFSRND@hq.a-star.edu.sg) by **11 Jan 2021, 2359H.** Late or incomplete submission may not be considered.

- More details on the IAF-PP Grant funding scheme are available at: https://www.a-star.edu.sg/Research/funding-opportunities/grants-sponsorship/iaf-pp

- For further enquires, please email: a-star_SFSRND@hq.a-star.edu.sg

FAQ

1. **Who is eligible for the funding?**

   All local (Singapore) public-funded researchers are eligible for the funding.

2. **What is a pre-Letter of Intent (LOI)?**

   Pre-LOI is a high-level version of the actual LOI for the Grant Workshop Committee to cluster similar ideas and interest together. This is to help researchers prepare more holistic IAF-PP full proposal submission at the later stage. This is not a pre-requisite for funding.

3. **Am I able to join the grant call workshop without the submission of a pre-LOI?**

   Yes, you can still join without a pre-LOI. However, due to the limited seating capacity, participation will be on a first come, first served basis, and seats will be prioritised for researchers with a pre-LOI submission.

4. **Am I eligible to submit a full proposal if I did not attend the grant call workshop?**

   Yes, workshop participation does not prejudice eligibility to apply for the grant later, nor confer any advantages in assessment for the full proposals. However, please do note that all applicants are required to submit both LOI and full proposal to be eligible for the grant application.

5. **What will be covered or discussed at the grant call workshop?**

   There will be presentations on the global trends, focused areas, food safety science and industy interest for Alternative Proteins. Attendees will also have the opportunity to brainstorm ideas in a breakout session.

6. **Will my LOI and proposal be evaluated under the HBMS or the AME funding scheming?**

   This SFS IAF PP Grant Call is a joint initiative from both the HBMS and AME domains. Proposals will be evaluated based on the fit-for-scheme for HBMS and/or AME domain.