

An Indian-Australian research partnership

Project Title:	Development of Health foods from xylan rich sources	
Project Number	IMURA0444	
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Research Academy Themes:

Highlight which of the Academy's Theme(s) this project will address?

(Feel free to nominate more than one. For more information, see www.iitbmonash.org)

1. Advanced computational engineering, simulation and manufacture
2. Infrastructure Engineering
3. Clean Energy
4. Water
5. Nanotechnology
6. **Biotechnology and Stem Cell Research**

The research problem

Growing demand of customers for natural ingredients in health products has given push to functional foods, food supplements and nutraceuticals market. Prebiotics are rapidly rising in popularity within the functional food market due to its vast applications in food and beverages sector and has huge potential to cross billion dollar figure. Prebiotics were originally defined as non-digestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activities of one or a limited number of bacteria in the colon, thereby improving host health. Biomass rich in lignocellulosic material (LCM) are composed of cellulose, hemicellulose and lignin which are potential raw material for production of higher value added products including prebiotics. Polymerized monosaccharides having a degree of polymerization (DP) between 2 and 10 are defined as oligosaccharides which mostly come from cellulose and hemicelluloses and are reported as excellent prebiotics. Due to their various health benefits, oligosaccharides are used in pharmaceutical and food industries.

Recent studies on the utilization and the physiological functions of new types of mono- and oligo saccharides and dietary fibers show that the nondigestible and/or the nonabsorbable saccharides are metabolized by the intestinal bacteria, and these properties are closely related to their special physiological functions.

This project will focus on xylo-oligosaccharides (XOS) based product development for production of healthy foods from agro and horticultural processing waste.

Project aims

1. Development of optimum bio-technological processes for efficient recovery of xylan and XOS
2. In- vitro study of utilisation of XOS of different DP as well as of cocktail of XOS by gut bacteria
3. To undertake and in- vivo study in human volunteers to demonstrate that the XOS preparation is metabolised by the human gut microflora.
4. Food Product development based on XOS
5. Assessment of techno-economic feasibility of the developed processes

Expected outcomes

The project will deliver following outcomes:

1. Protocols for optimal recovery of functional oligosaccharides from selected agro and horticultural processing waste
2. XOS based food product development
3. Through proper information dissemination, it is expected that the project outputs will increase interest in potential stake holders such as pharmacy and nutraceutical industry.

How will the project address the Goals of the above Themes?

The proposed project is 'right on spot' in the domain of 'Biotechnology research' theme. It directly addresses importance of prebiotics in human health through the intervention of bioprocesses to deliver safe and nutritious health foods economically by the utilization of agro- and horticultural processing waste.

Capabilities and Degrees Required

Candidate should have at least one degree in Chemical engineering/ Pharmaceutical Sciences (M.Pharma With Thesis)/M.B.B.S/Biotechnology. This project requires strong understanding of biochemistry and biochemical engineering principles. Hands on experience with analytical instruments such as HPLC, Gas Chromatography and FTIR are desirable.

Candidate required to have excellent communication skills both written and verbal. The successful candidate will need to interact with large multi-disciplinary teams

Potential Collaborators

Dr Jane Muir and Prof Peter Gibson
Department of Gastroenterology
Central Clinical School
Monash University

Please provide a few key words relating to this project to make it easier for the students to apply.

Functional foods, Prebiotics, Health Foods, Xylo-oligosaccharides