

An Indian-Australian research partnership

**Project Title:**

*Enhanced and desirable lipid synthesis in algae for efficient biofuel production*

**Project Number**

IMURA0305

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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](http://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**
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## **Project objectives and Strategy**

The use of microalgae considered as a suitable alternative feedstock for biofuels because certain species contain high amounts of lipids, which could be extracted, processed and refined into suitable fuels. To make this process more efficient and commercially viable, one of the key areas of focus is developing molecular technology which can enhance the capability of the algal strain of interest to produce more lipid and also of specific chain length. But it needs a thorough understanding of the metabolic pathways, especially those associated with lipid synthesis, packaging and secretion for any effort in maximizing the lipid production at the molecular level. The project therefore could involve two parts; one understands the critical metabolic pathways through pathway modeling, studies on regulation of key enzymes involved in lipid production. The second part of the project could be designing specific micro RNAs to manipulate specific pathways which would lead to i) enhanced lipid ii) lipid of desired chain length.

## **Expected outcomes**

To understand lipid biosynthetic pathways in microalgae, identifying key regulatory steps, designing micro RNAs for specific pathways which enables desired lipid and test their validity. The outcome of this project would be algal strains with specific microRNA mode of action enable to produce around 25-30% lipid on dry weight basis.