

Biofuel-directed *Phycoremediation* of air emissions and wastewaters

(a) A short summary of the project (2-3 lines), suitable for inclusion in a newspaper ad:

Phycoremediation refers to the process in which algae are used to remediate environmental contamination. This programme of research proposes the use of algae to remediate gaseous and wastewater emissions from Industrial facilities. The resultant algae have the potential to generate biomass and oil which is suitable for conversion to biofuel.

(b) A description of the project suitable for inclusion in documentation to be sent to applicants:

The overall Aim of the Research Programme is to identify appropriate algal strains and bioreactor technologies from an Irish perspective that are effective in sequestering CO₂ and treating wastewater from industrial and energy generation facilities.

The following Objectives are identified in 2 Phases:

Phase 1 – Research Stage

1. Identify, from a thorough Literature Review, those algal species which are tolerant to energy generation flue gas emissions and have been identified as suited to CO₂ sequestration.
2. Identify, from a through Literature Review, those algal species which are suited to the selected wastewater application.
3. Identify, from a thorough Literature Review, whether the above algal species occur naturally in an Irish context and examine the feasibility of introducing those algal strains that do not occur naturally.
4. Review the growth requirements for selected algal strains.
5. Characterise emissions from Industrial partners.

6. Draw parallels between the selected algal strains growth requirements and the emissions characterisation study to determine appropriateness for phycoremediation.
7. Investigate Bioreactor design based on the requirements identified from the algal strain analysis and the gas characterisation studies.

Phase 2 – Experimental Stage

1. Design and Implement laboratory scale experiments, based on the outputs from above investigations, to assess the rate of carbon mitigation and biofuel production which can be achieved for the selected algal strains.
2. Provide recommendations for Bioreactor design for incorporation within an Industrial scale Facility.

(c) A profile of a suitable candidate suitable for inclusion in documentation to be sent to applicants:

- Applicants for the position should hold or expect to be awarded a 1st class or 2nd class Honours degree (level 8) in Environmental Science, Biological Sciences, Biotechnology, Biochemical Engineering or another relevant discipline.
- The successful candidate will be an enthusiastic self-starter with a capacity to work well on his/her own initiative, as well as working as part of a small team. The candidate will also be expected to contribute to the organic growth of the research programme and team.
- Essential characteristics are: ability to perform laboratory cell culture and biochemical analysis and quantification procedures.
- A commitment to applied research is essential as well as an active interest in supporting the development of carbon sequestration, bioenergy and renewable fuels.
- The research involves investigation that crosses many of the traditional disciplines, so a demonstrated ability to work in such an environment would be an advantage.