Biochemical and Bioprocess Engineering

Industrial microbial fermentations

Faculty:
Dr. Michael Gyamerah: TEL: 936-261-9408; E-mail: migyamerah@pvamu.edu

Areas of Research Interest:
• Bio-ethanol and biodiesel production from renewable feedstocks, and development of catalytic conversion processes for upgrading bio-oil (pyrolysis oil) to useful fuels; kinetics of lipase and microbial catalyzed production of biodiesel by transesterification of vegetable oils and bioethanol
• Applied biocatalysis/ biotransformations for the synthesis of chiral synthons of interest to the chemical and pharmaceutical industries using genetically engineered biocatalysts; solvent tolerant enzymes and microbial systems for Aryl oxidations
• Bioprocessing strategies for improving heterologous protein production by filamentous fungi
• Basic and applied research in overproduction of organic acids by Aspergillus species

Current Research Projects:
(i) Solvent tolerant enzyme and microbial systems for Aryl oxidations
(ii) Modeling of biosensors of custom-designed micro-organisms for detection of toxic metals including radionuclides and for organic compounds

Research Facilities:
New Brunswick 3-L Bioflo 110 and 10-L Bioflo IV Fermentor systems
Two New Brunswick Innova 4330 orbital incubators
New Brunswick Innova 3100 Water Bath shaker
Barnstead Distilled Water unit and EasyPure de-ionized water system
Yamoto SM 300 High pressure steam sterilizer
-40 and –80 °C freezers, and two 4 °C Refrigerators
Perkin Elmer Lambda 25 UV-VIS spectrophotometer PC system
Perkin Elmer TCWS 200 HPLC
Shimadzu AA-6200 Atomic Absorption Spectrophotometer
Beckman Coulter Avanti Refrigerated centrifuge
Refrigerated micro-centrifuge
Class II Biological safety cabinet
Barnstead/Thermolyne 30400 furnace
Vacuum oven
Thermostatically controlled circulating water bath
Culture control incubator
Two Microscopes

Biocatalysis and Biotransformations

Collaborators:
Professors Tonya Peeples, John Rossaza and Horacio Olivio at University of Iowa as partners of the NSF CEBC research on microbial systems for aryl oxidations.
Synthetic Biology

Collaborators:
Dr. Raul Cuero of CARC, PVAMU, on modeling of custom-made biosensors, and teaming with partners at the NSF Synthetic Biology Engineering Research Center (SynBERC) with University of California, Berkeley as lead Institution, and Massachusetts Institute of Technology, Cambridge, MA, University of California, San Francisco, CA and Harvard University, Cambridge, MA as Core Partner Institutions.

Publications: