Project Details

Project Title
Development of downstream process for the recovery of furfural, acetic acid and 5-HMF from the torrefaction process

Project Summary
The agriculture waste residue such as rice straw, rice husk, bamboo waste, barley residues are typically burned for energy recovery. This not only causes air pollution but is also wasteful utilization of the resources. Torrefaction process can be utilized to convert these waste residues to bio-coal and volatile fractions that are again burned to provide energy to the torrefaction process. However, the process is not economical feasible due to lack of valorization of all the components. In this proposed project, uncondensed volatile compounds will be condensed. Upon condensation, downstream unit operations such as adsorption, distillation, solvent extraction will be applied for the recovery of furfural, acetic acid and 5-HMF. The application of the chosen unit operation will be dependent on the nature of the condensed fraction which is in turn dependent on the residue and torrefaction temperature. Hence, certain optimization in the torrefaction temperature, time of heating, temperature gradient will also be optimized.

PhD Supervisors

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<th>Role</th>
<th>Faculty</th>
<th>Academic Unit in IITD</th>
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Project requirements (Student qualifications, experience required, etc.)

- M.Tech in / Chemical Engineering / Biochemical Engineering/Biotechnology with CGPA > 8.0
- Applicant with sufficient knowledge in the area of downstream process including solvent extraction, adsorption, distillation

Source of funding (IRD/FITT Project details, if any)

Sponsored project / fellowship from any government (like, valid JRF CSIR-UGC; valid DST-Inspire Fellowship; etc.) or private recognized funding agency.

Role of Faculty Members involved

The proposed work is truly an interdisciplinary task where the expertise of the collaborators can be complementary. There are clearly two distinct segments of the entire research work. Firstly, the optimization in the process of the torrefaction and collection of volatile fractions where Dr. Priyanka Kaushal from Centre of Rural Development and Technology would play major role. On the other hand, the separation of the collected fractions through different downstream unit operations would be the key role for Dr. Rohan Jain from the Dept. of Biochemical Engineering and Biotechnology.