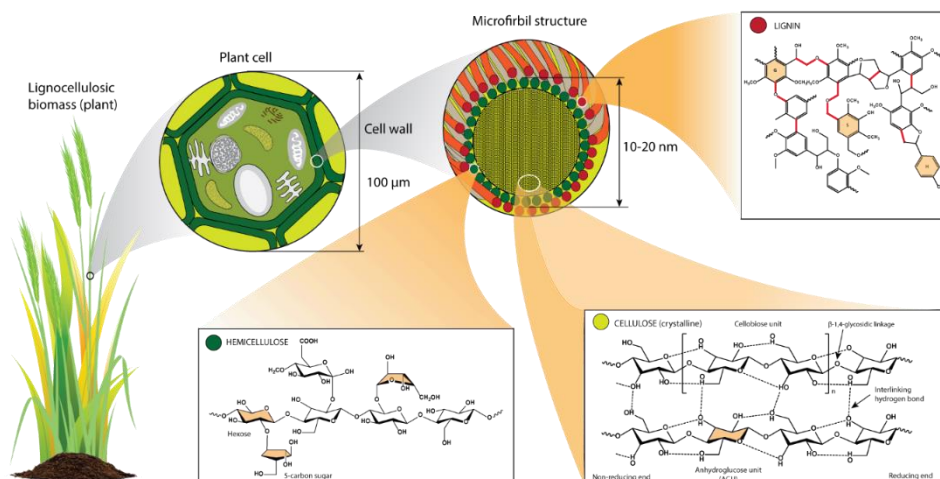


DBT-CIAB develops tech to get an industry grade solvent from crop residue



(Representative picture on the problem of crop stubble burning)

New Delhi, May 20: Crop residues are a highly abundant renewable resource on earth. However, managing them is very complicated. Farmers prefer to burn them in the open-field because it is considered as the cheapest method of disposal. However, this creates a harmful effect on the environment and to humans.

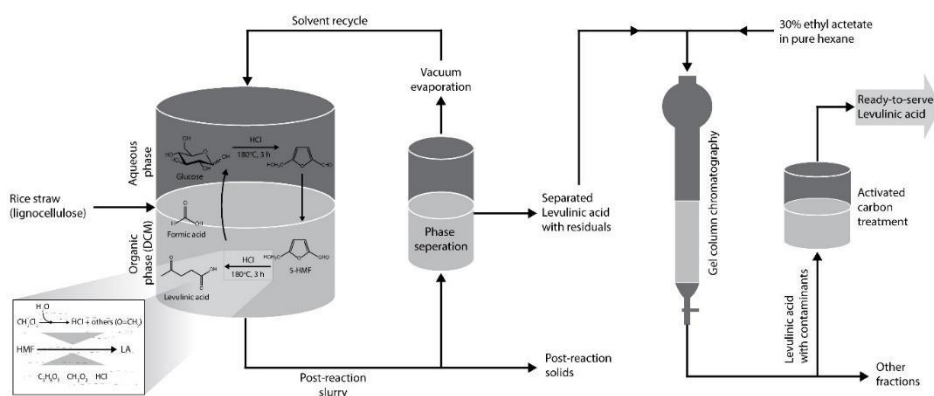


Micromolecular architecture of agri-residue biomass

The residues are mainly composed of carbohydrates (more than 50% wt. in the form of cellulose and hemicellulose polymers), and aromatics (lignin) and ash (silica). Numerous types of chemical compounds can be prepared through chemical or biological digestion of these materials by utilizing the biogenic polymers.

Scientists in the chemical engineering division of the Department of Biotechnology's Center of Innovative and Applied Bioprocessing (CIAB), Mohali have developed a scalable technology for the preparation of levulinic acid, a high-value platform molecule using rice straw (paddy residue).

This compound is widely used as a precursor for pharmaceuticals, plasticizers, biofuels, and various other additives preparations. According to the global market survey report, the demand for this chemical is expected to grow at a CAGR of roughly 12 % over the next 5 years and will reach 250 million US\$ by 2024 from 130 million US\$ in 2019.



“Agri-biomass processing to a high-value platform molecule through facile technique”

The processing technology is simple. The paddy in raw form is digested under hydrothermal conditions in a closed reactor with added solvents, which is a combination of dilute acid and an organic solvent. The product is automatically carried to the solvent stream during the reaction, thereby enabling the improved recovery of levulinic acid. It is followed by a series of evaporation and activated carbon treatment procedures. This leads to the recovery of industrial-grade levulinic acid. The process achieved a decent yield.

The researchers have filed a patent on the technology (Indian Patent Appl. No. 201711010199), and the results have also been published in a peer-reviewed journal (doi: 10.1016/j.biortech.2017.12.033). At present, they are at the technology readiness level-2 (a type of measurement system used to assess the maturity level of a particular technology). They are setting up a pilot plant in the Institute campus to assess the technology scale-up feasibility, along with cost economics.

The technology assumes importance as it provides a solution to crop management and simultaneously offers monetary benefits to the farmers.

The research team included Dr. Sasikumar Elumalai (Lead research scientist), Sandeep Kumar, Dr. Shelja Sharma, Pranati Kundu, Dr. Senthil Murugan Arumugam.

Contact Person & Contact Details:

Chief Executive Officer

Center of Innovative and Applied Bioprocessing (CIAB-DBT)

Knowledge City, Sector 81

Mohali 140306, Punjab

Email: ceo@ciab.res.in

Phone: 01725221400