EuroSciCon

21st Edition of International Conference on

Green Chemistry and Technology

November 12-13, 2018
Edinburgh, Scotland

Trends in Green chem 2018, Volume 4
DOI: 10.21767/2471-9889-C4-018

Novel green technologies: Bio-waste conversion to added value products

Vitaliy Budarin, Alisa Doroshenko and **James Clark**
University of York, UK

It has been shown that two novel green technologies (Low-temperature microwave activation and Starbon® materials preparation) could be efficiently applied for bio-waste utilization. Combination of these processes could help transfer polysaccharide reach biomass to high-value products such as fuels, chemicals, materials, and solvents. Both technologies are scalable and could be applied for multi-tonne processes. The microwave (MW) technology focuses on depolymerization of large organic molecules to high-value products. The most promising from the industrial application perspectives is an ability of MW irradiation to activate lignocellulosic materials at very low temperature. In an inert atmosphere, MW assisted pyrolysis could produce a number of high-value chemicals such as levoglucosan, levoglucosenone, HMF, and furfural. The grade yield and high purity of these products are guaranteed by the low temperature of the process and high controllability of microwave irradiation. In the presence of water solution, the lignocellulosic biomass could be converted to different types of mono- and oligosaccharide. This sugars-reach solution could be used for further biological/enzymatic treatment and production of biogas and bio-ethanol. Starbon® technology is complementary to microwave approach helping to convert helical-structured polysaccharides (starch, pectin, alginic acid, and xylan) to mesoporous carbonaceous materials. Starbon® materials due to its textural properties flexibility and controllable functionality could be applied for recovery and purification of critical metals such as lithium, cobalt, beryllium, silver, and gold from aqueous systems. High degree of mesoporosity and large pore diameter (larger than 5 nm) of Starbon® enables to perform reversible adsorption of bulky industrial days.

vitaliy.budarin@york.ac.uk