

Smart Bio-Waste Management as a Tool for High Value Chemicals Isolation

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Abstract

Bio-waste is bio-degradable part of biomass produced in agriculture, forestry, food industry, wood industry etc. The amount of this waste is huge and it is estimated that with rapid population growth and urbanization, annual bio-waste generation will increased creating management problems. Most part of bio-waste is disposed in landfills, in which it may transform into contaminants, pollute the surrounding environment, and produce the methane and carbon dioxide that cause global warming. Managing of bio-waste in a cost-effective manner may protect the environmental but also can improve the standards of living. One way for smart bio-waste management rely on the fact that it can be used as alternative energy source. It was estimated that more than 146 billion tons of biomass is produced a year worldwide, and just 1/8 of this amount is enough to meet the world's energy needs. Today global market for biowaste-to-bioenergy technologies increases and expected to increase by US \$ 40 billion in the next few years. Apart of its utilization for the energy production, bio-waste can be used as a source of high value chemicals such as monosaccharides (glucose, xylose, fructose, galactose, arabinose, etc.), oligosaccharides (fructo-oligo, galacto-oligo, lactosucrose, etc.), nanocellulose (cellulose nanofibers, cellulose nanocrystals, etc), lignin by-products (carbon fibers, activated carbon, benzene, toluene, etc.), bioactive molecules (phenolic acids, phenols, flavonoids, terpenoids, carotenoids, etc.). Bioactive molecules obtained from bio-waste can be used in myriad of products for pharmaceutical, cosmetic and food industries. In order to meet trends and needs of sustainability, green extraction technologies acceptable from the environmental point of view is used for their isolation.

Keywords: Bio-waste, sustainable technologies, bioactive compounds, green technologies.