Sustainable Development Through Renewable Chemicals & Materials

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The Need for Research and Development to Achieve Sustainability:

World Bio-products day is being launched on 7th July by World BioEconomy Forum with a view to increasing awareness about the circular bioeconomy and bio-based products.

Wading through the deluge of debates, articles, and podcasts during the recently concluded COP26, it was striking to note that the current efforts at mitigation are merely reducing the rate of greenhouse gas (GHG) emissions. According to the World Economic forum's Global Risk Report, 2022, five out of the top 10 risks are related to the environment. These include climate action failure, extreme weather, biodiversity loss, human environmental damage, and natural resources crisis.

On the occasion of World Bioproducts Day let us ponder on the need for the inclusion of bioproducts in the economy to ensure sustainable growth. The world is abuzz with themes like sustainable growth, circular economy, net-zero, carbon-neutral/negative technologies, recycling and recovery, and responsible utilization of natural resources. These themes focus on replacing fossil-based products with bio-based products wherever possible, recycling non-biodegradable materials, and using cleaner, greener technologies to make commodities products. These give rise to global socio-economic megatrends related to demographic shifts,

economic outlook, geopolitical issues, technological advances, and environmental challenges. Various industrial sectors respond to these megatrends by investing in the development of green, renewable, biodegradable, and non-hazardous chemicals. Research and development help us discover and evaluate unsustainable patterns, discover sustainable alternatives, provide tools to analyse policy initiatives and develop and demonstrate cleaner technology.

Circular Bioeconomy:

It is estimated that the world sales of renewable chemicals are at $60-65 billion and are likely to increase to 11 per cent of total chemicals sales in the next 10 years to $205-210 billion at a CAGR of 11-12 per cent. According to United Nations Environment Program, the global production of plastics has crossed more than three hundred million tonnes. As per the research conducted by the Center for International Environmental Law, greenhouse gas (GHG) emissions from plastic could represent 10-13 percent of the entire remaining carbon budget by 2050. According to the fortune business insights report, 2021, the global plastic market is projected to grow from $439.28 billion in 2021 to $616.82 billion in 2028, at a CAGR of 5.0 per cent in the forecast period, 2021-2028. As society moves towards sustainable development and a circular bioeconomy, one aspect which needs urgent attention is the use of plastic and plastic-based products. With multiple functions and excellent material properties plastic has become an almost ubiquitous material in our economy and daily lives. The government of India has banned the manufacture, sale, and use of identified single-use plastic items like plates, cups, straws, trays, and polystyrene from July 1, 2022. The government prohibits the manufacture, import, stocking, distribution, sale, and use of all identified single-use plastic items, which have low utility and high littering potential with effect from July 1, 2022.

Sustainability

Various sustainable technologies like cellulosic ethanol, renewable natural gas, and sustainable aviation fuel are available today. All these products use amply available feedstocks like cane juice, syrup, molasses & bagasse, or other agricultural wastes. These technologies are continuously optimised to reduce the consumption of resources like water, reduce the emission of greenhouse gases and improve the profitability of customers. The technology solutions are also aimed toward the generation of least waste streams and recycling of these streams either in the same process or use for the synthesis of new products.

Bioplastics: A greener Solution

The Renewable Chemicals Materials are the key to achieving the global commitment to accelerate climate action into reality. Bioplastics are a sustainable solution to the impending plastic pollution crisis. They are produced from sustainable feedstocks. Bioplastics like polylactic acid (PLA), and polyhydroxyalkanoates (PHA) are biodegradable. They can bring a significant reduction in carbon footprint as compared to traditional oil-based plastics.

Bioplastics development will further consolidate the development and deployment of environment-friendly and sustainable solutions to make the world a better place.

The replacement of 1-5 per cent of plastics with bioplastics will have a significant impact on terrestrial and aquatic ecosystems thereby improving planet & human health. Future technological developments in new bioplastic materials, improving the functionality of bioplastics, and developing the entire ecosystem around bioplastics will pave the way to a

greener world.

The use of bio-products in all spectra of life has become an indispensable goal globally. The development of bioplastics is a pioneering step in attaining this goal and will define the future of the circular bioeconomy.