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Promoting the Use of Biomass for Petrochemicals Production Post the Covid-19 Era

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Abbreviations: R&D: research and developments

Opinion

During the global lockdown to tackle the transmission of the COVID-19 pandemic, air pollution was reported to have reduced to a level that has not been recorded since the end of World War (II), and this was largely due to the many restrictions in transportation, industrialization and utilization of fossil fuels and chemicals for the various applications in running the day-to-day activities of life. It was observed in most cities of the world, that the impact of climate change, global warming and other environmental consequences associated to air pollutants, CO_2 majorly, significantly declined, and this was an eye opener into the possibilities for a cleaner, safer, and less polluted environment [1]. Synergistically, the production of petrochemicals, which accounts for an estimated 10% of fossil fuels as feedstock worldwide, coupled with the energy intensive nature for the utilization of the petrochemicals, which also stands at about same percent, is also a serious concern for the environment due to the enormous amount of carbon (iv) oxide been emitted along the line [2], with a reported emission of about 200 million tons of CO_2 in 2014 [3].

This poses yet another risk to the global climate and safety, in terms of pollution and the subsequent consequences. From the lessons learnt during the COVID-19 global lockdown, it is apparent that there is a greater and significant need for sustaining the tempo for a clean atmosphere and clean environment post the COVID-19 era to avoid having the equilibrium shifting yet again towards another catastrophic global climate crisis and pollution challenges. This warrants for certain policies, decisions and even regulations to be enacted and put in place to not only checkmate the vast pollution generated through the usage of fossil fuels, but to also minimize to the barest minimum, the resulting consequences to the environment and its inhabitants [1].

The world's increasingly insatiable hungriness for fossil fuels is driven by fast-growing populations and ever-rising ambitions for the lifestyles and standard of living typified in the developed world. Predictions for higher electricity consumption, more comfortable living environments (via heating or cooling) and greater demand for transport fuels are well known. Similar growth in demand is projected for petrochemical-based products in the form of man-made fibers for clothing, ubiquitous plastic artefacts, cosmetics, etc. All drawing upon fossil fuels/crude oil as feedstock. Biomass can, in principle, substitute for the fossil fuels feedstock. Although ultimately limited, biomass resources can be long-drawn-out and transformed to attain societal priority. The projected growth of an energy-intensive international petrochemicals industry reflects its demand for both utilities and feedstock and cogitates the extent to which biomass can substitute for fossil fuels. The scope of this paradigm shift would include biomass component extraction, direct chemical conversion, thermochemical conversion, and biochemical conversion [2].

Energy and the environment are intimately related and hotly debated issues. Today's crude oil-based economy for the manufacture of fuels, chemicals and materials will not have a sustainable future. The over-use of oil products has done a great damage to the environment. Confronted with the twin challenges of sustaining socioeconomic development and shrinking the environmental footprint of chemicals and fuel manufacturing, a major emphasis is on either converting biomass into low-

value, high-volume biofuels or refining it into a wide spectrum of products. Synergistic use of crude oil and biomass to produce not only value-added chemicals and commodity chemicals, but also fuels, can promote the minimization of emission of harmful pollutants and reduce the implications of climate change and the resultant consequences of global warming [4].

However, the use of biomass as feedstock (raw materials) for petrochemicals brings the chemical industry also in competition with nutrition for man and animal. Great interest should be centered around the use of "non-food-biomass" (lignocellulose), which is available in nearly abundant amounts, even though enough routes for chemical utilizations are lacking. Biotechnological, chemical, and engineering solutions are needed for utilization of this second-generation bio-renewable based supply chain. One approach consists of the concept of a bio-refinery [5]. Also, gasification followed by liquefaction is a promising pathway. Short and medium term a feedstock mix with crude oil and natural gas dominating can most likely be expected. Very long term, due to the final limited availability of oil and gas, biomass will prevail. Prior to this change to occur, great research and developments (R&D) efforts must be designed and promoted to have the necessary technologies available, (across both biological and non-biological processes) when needed [5,6]. This could lead to better energy and material policy across the world [4]. Many chemicals used by the chemical industry can be derived from biomass, potentially reducing the industry's reliance on petroleum [6].

The transition of industrial chemical production from petrochemical to biomass feedstock faces real hurdles. Biological processes do not require the high pressures and temperatures associated with most non-biological chemical processes and therefore have the potential to reduce costs. However, current processes for production of commodity chemicals have evolved through considerable investment to become highly efficient, often continuous, and well-integrated. To be successful, new biological processes must rapidly approach similar levels of efficiency and productivity. Nevertheless, economic opportunities, available technologies, and environmental imperatives make the use of biomass and biological methods for industrial chemical production not only feasible but highly attractive from multiple perspectives [6].

It could therefore be apparently concluded that, the adoption of biomass as an alternative to crude oil/fossil fuels as feedstock for petrochemicals production could go a long way in minimizing the consumption and possible consequences of air pollution associated with the utilization of fossil fuels as feedstock for petrochemical production, post the era of COVID-19 global pandemic. Going forward, global commitment should therefore be in the frontline for more R&D, as well as policies and implementable regulations towards achieving a cleaner and inhabitable environment by adopting biomass as an alternative and substitute feedstock for petrochemicals production and utilization.

References

1. Kangiwa IA, Mohammed MI (2020) Impact of COVID-19 Induced Lockdown on Air Pollution and Remediation Measures. Asian Journal of Applied Chemistry Research 7(1): 43-52.
2. Roddy DJ (2013) Biomass in a Petrochemical World. Interface Focus 3(1): 20120038.
3. Ren T, Daniels B, Patel MK, Blok K (2009) Petrochemicals from oil, natural gas, coal and biomass: Production costs in 2030-2050. Resources, Conservation, and Recycling 53(12): 653-663.
4. Yadav VG, Yadav GD, Patankar SC (2020) The production of fuels and chemicals in the new world: Critical analysis of the choice between crude oil and biomass vis-à-vis sustainability and the environment. Clean Technologies and Environmental Policy 22: 1757-1774.
5. Keim W (2010) Petrochemicals: Raw material change from fossil to biomass? Petroleum Chemistry 50: 298-304.
6. Dodds DR, Gross RA (2007) Chemicals from Biomass. Science 318(5854): 1250-1251.

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