May 15, 2020

Zaida I. Figueroa Correa, DrPh, MSc
U.S. Environmental Protection Agency
Science Advisory Board Staff Office
1200 Pennsylvania Avenue, NW (MC-1400R)
Washington, DC 20460

Dear Dr. Figueroa:

The Biotechnology Innovation Organization (BIO) is pleased to provide comment regarding **U.S. Environmental Protection Agency's (EPA) Scientific Advisory Board (SAB) COVID-19 Review Panel on April 30, 2020.**

Introduction

BIO is the world's largest trade association representing biotechnology companies, academic institutions, state biotechnology centers and related organizations across the United States and in more than 30 other nations. BIO members are involved in the research and development of innovative healthcare, agricultural, and industrial and environmental biotechnology products. BIO represents more than 70 leading technology companies in the production of conventional and advanced biofuels, renewable chemicals, bioplastics, and other bioproducts, bioprocesses, and biocatalysts, among other sustainable solutions to energy and climate challenges.

BIO appreciates the opportunity to provide comment on the SAB COVID-19 review panel. After reviewing the document "Review of COVID-19 Pandemic Scientific and Technical Issues to Inform EPA's Research Actives" BIO believes there are several laudable research questions that the SAB should examine. Furthermore, our member companies offer several solutions that can not only help combat this pandemic, but also lessen the impact of a future pandemic by helping to establish a resilient, sustainable bioeconomy. The focus of our comments will highlight what BIO believes are the important research categories contained in the charge document.

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Comments

Environmental Factors Affecting Transmission and Severity of COVID-19

Does exposure to air pollutants, including wildland fire smoke or other air pollutants (e.g. ozone, particulate matter, diesel exhaust, pollen) increase the susceptibility to respiratory viruses like SARS-CoV-2? Or exacerbate existing COVID-19 infection?

This research question is particularly important for EPA to consider given their authority in regulating air pollution and protecting human health. Undertaking this research would also have the effect of helping EPA validate the economic impact air pollution can have on human health as it directly effects the economic considerations of current and future rulemakings. As it relates to the present challenge, this research would help validate the link between air pollution and severe COVID-19 cases suggested by several recent studies[1][2][3]**.** BIO strongly believes that as more research is completed on this topic, a more definitive link will be established between severe COVID-19 symptoms and elevated levels of air pollution.

BIO's members have several commercially available solutions which are ready to be deployed in the fight against air pollution. It is worth reminding the SAB that the environmental benefits of biofuels go beyond greenhouse gas reductions. According to the National Bureau of Economic Research, the United States saw fine particulate pollution increase 5.5 percent between 2016 and 2018.[4] According to the American Lung Association, State of the Air report for 2019, more than four in 10 Americans live in counties that have monitored unhealthy ozone or particle pollution.[5] The health impacts of air pollution are catastrophic. According to the World Health Organization, 4.2 million deaths occur every year as a result of exposure to ambient (outdoor) air pollution.[6]

Biofuels reduce tailpipe emissions of both hydrocarbons and carbon monoxide, which helps prevent the formation of ground-level ozone. Data from 222 EPA sensing sites show that ozone levels have fallen during the period in which ethanol

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[1] Exposure to air pollution and COVID-19 mortality in the United States. Xiao Wu, Rachel C. Nethery, Benjamin M. Sabath, Danielle Braun, Francesca Dominici. medRxiv 2020.04.05.20054502; doi: https://doi.org/10.1101/2020.04.05.20054502

[2] Travaglio, M., Yu, Y., Popovic, R., Santos Leal, N., & Martins, L. M. (2020). Links between air pollution and COVID-19 in England. *MedRxiv*. doi: https://doi.org/10.1101/2020.04.16.20067405

[3] Conticini, E., Frediani, B., & Caro, D. (2020). Can atmospheric pollution be considered a co-factor in extremely high level of SARS-CoV-2 lethality in Northern Italy? Environmental Pollution, 114465. doi: 10.1016/j.envpol.2020.114465

[4] Schumaker, E. "US air quality declines after years of improvement." ABC News (Oct. 28, 2019) Available at: https://abcnews.go.com/US/us-air-quality-declines-years-improvement/story?id=66582569

[5] "State of the Air 2019" American Lung Association Available at: https://www.lung.org/our-initiatives/healthy-air/sota/key-findings/

[6] Air pollution and health World Health Organization Available at: https://www.who.int/airpollution/en/

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blending increased.[7] Additional data from the University of Illinois-Chicago (UIC) show substantial reductions in particulate matter (PM) and benzene with the addition of biofuels.[8] The American Lung Association, Upper Midwest Region found higher volumes of biofuels can reduce ozone-forming pollutants and evaporative emissions.[9] Many of these results have been revalidated as recently as April 2020 with yet another study showing that increased blends of ethanol lead to lower tailpipe emissions, particularly in PM which is a leading cause of respiratory illness.[10]

Such benefits are not unique to ground transportation; research has demonstrated that sustainable aviation fuels (SAF) reduce contrails, particulate number and mass emissions compared to conventional fossil jet, with the potential to improve air quality near airports and reduce the climate impacts of aviation at high altitude.[11] Additionally, technologies such as biological gas fermentation are capable of capturing and converting waste carbon emissions from steel production and other industries into advanced fuels and chemicals. Using fermentation to avoid combustion of these emissions provides immediate air quality and health benefits.

Increasing the use of biofuels is not the only solution that BIO's members can provide to lessen air pollution and thus the severity of COVID-19. The production of petrochemicals, much of which are used in single use plastics are a major contributor to air pollution and climate change. According to the U.S. Energy Information Administration, U.S. chemical production uses 28 percent of the total energy used by all industrial sectors.[12] However, that can be mitigated. Biobased products can provide a solution to the increasing criteria pollution and greenhouse gasses from these facilities.

The U.S. Department of Agriculture (USDA) found that the development of renewable chemicals and biobased products removed 12.7 million metric tonnes (mmt) of CO_2 from the manufacturing sector in 2016 alone in its report, "An Economic Impact Analysis of the U.S. Biobased Products Industry".[13] This is due to the displacement of petroleum and reduction of fossil fuels in the manufacturing and use of biobased products. The report goes on to note:

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[7] Cooper, G. Real-World Ozone and Particulate Data Expose Fallacy of Minnesota Study. Renewable Fuels Association (RFA). (Dec. 18, 2014). Available at: http://www.ethanolrfa.org/2014/12/real-world-ozone-and-particulate-data-expose-fallacy-of-minnesota-study/

[8] Mueller, S. UIC Study PM and Benzene in Splash Blended Fuels with Ethanol. (May 2017). Available at: http://www.erc.uic.edu/assets/pdf/UIC_Cook_County_Slides.pdf

[9] Clean Fuels: E85, American Lung Association, Upper Midwest Region Available at: https://www.cleanairchoice.org/fuels/e85.cfm

[10] Nigel N. Clark, David L. McKain Jr., Tammy Klein & Terence Higgins (2020) Quantification of Gasoline-Ethanol Blend Emissions Effects, Journal of the Air & Waste Management Association, DOI: 10.1080/10962247.2020.1754964

[11] Moore, R.H. et al. "Biofuel blending reduces particle emissions from aircraft engines at cruise conditions. *Nature.* (Mar. 16, 2017). Available at: https://www.nature.com/articles/nature21420

[12] U.S. Energy Information Administration "Use of Energy Explained, Energy Use in Industry" (2018) Available at: https://www.eia.gov/energyexplained/use-of-energy/industry.php

[13] Daystar, J., Handfield, R., Golden, J., McConnell, E., & Morrison, B., "An Economic Impact Analysis of the U.S. Biobased Products Industry" (Jul. 2018). Available at: https://www.biopreferred.gov/BPResources/files/BiobasedProductsEconomicAnalysis2018.pdf

The use of biobased products reduces the consumption of petroleum equivalents by two primary mechanisms. First, chemical feedstocks from biorefineries have replaced a significant portion of the chemical feedstocks that traditionally originate from crude oil refineries. Biorefineries currently produce an estimated 150 million gallons of raw materials per year that are used to manufacture biobased products. Second, biobased materials are increasingly being used as substitutes for petroleum-based materials, which have been used extensively for many years. An example of this petroleum displacement by a biobased material is the use of natural fibers in packing and insulating materials as an alternative to synthetic foams, such as Styrofoam. In this report we updated the oil displacement values from the 2016 report to reflect economic growth. In 2016 the estimated oil displacement is estimated to be as much as 9.4 million barrels of oil equivalents.

In addition to the environmental benefits, USDA found that the value added to the U.S. economy by biobased products was $459 billion in 2016. With employment in the industry increasing from 4.22 million jobs in 2014 to 4.65 million jobs in 2016.

We believe this report just begins to underscore the true value of a resilient bioeconomy, an economy which can systematically reduce emissions and pollution through the entire value chain. This starts with sequestering CO_2 during the growth of feedstocks, cleaner manufacturing using biocatalyst and enzymes, all leading to the creation of a safer, more sustainable product for consumers and industry.

Response to additional SAB Charge Questions

The products manufactured by BIO's member companies only reduce pollution in the air we breathe, but can also allow for a cleaner and safer environment. BIO's member companies are creating products that are specifically designed to attack the biofilm which protects the coronavirus and other more deadly antibiotic-resistant organisms. Other member companies are engaged in the production of enzymes which allow for more sustainable and effective disinfectant products. These new probiotic cleaners are safer to apply and can provide lasting protection, something traditional disinfectants cannot. We believe more widespread adoption of these technologies will lead to a safer and healthier society. To that end BIO applauds EPA for taking the lead in evaluating the efficacy of environmental sanitation products on List N, their duration, and their application protocols for eradicating surface contamination in public places and in the home.

Conclusion

BIO would like to thank the EPA's SAB once again for the opportunity to comment on the COVID-19 research topics. We strongly believe the bioeconomy not only has solutions to solve present challenges brought on by the COVID-19 Pandemic but

will be an integral part in rebuilding a stronger, more resilient economy; a bioeconomy for our future.

Sincerely,

Stephanie Batchelor

Vice President
Industrial and Environmental Section
Biotechnology Innovation Organization (BIO)