

Extremophilic processes and microbiome: Companion for marching towards net zero

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Abstract: The microbiome is a community of microbes living together in a specific habitat. Microbiome is the all-rounder player in nature that participates in dual functions in natural processes. They are the producers of green-house gases, and consumers too. The bioenergy and environmental processes to produce the fuels, chemicals and materials with net zero emissions are mandatory to achieve the net zero. Through scientific literature survey, it is felt to have specific biocatalysts like enzymes, whole cells, and crude mixtures to make these processes efficient. Multistep conversions also need a complex set of new-generation catalysts. The use of multimember consortia as catalysts for the processes in the holobiome approach offers the potential to provide biological solutions to complex climate issues. The evolving concept of integrated biorefineries, if integrated with microbiome and computational biology, can offer the potential for alternative biological paths to coproduce and cater to the material, fuel and chemical sectors. This may further offer the decarbonization of the industrial as well as transportation sectors, a step to net zero. **Keywords:** Microbiome; Netzero, Climate change

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