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Utilization of mixed microbial culture to mitigate carbon dioxide (CO_2)

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Carbon dioxide is one of the GHG's (Green House Gases) & responsible for Global warming. As of July 2011, CO_2 in the earth's atmosphere is at a concentration of 392 ppm by volume which is 35% higher as compared to the mid-1800s. Carbon dioxide is produced during the respiration in small amount and is also emitted from combustion process, volcanic eruptions, hot springs and freed from carbonate rocks by dissolution. The anthropogenic sources for CO_2 emissions into the atmosphere is from industrial sectors which mainly comprised of industries such as automobiles, petroleum refineries, cement plants, breweries, fertilizer plants, steel plants, etc. The CO_2 concentration in earth atmosphere can be reduced by biological, chemical and technological techniques available through either mitigating or sequestering emissions. CO_2 capture and sequestration (CCS) is a technique to capturing the CO_2 from point source and storing it in such a way that it does not enter into the atmosphere. In the recent years, biological route has been identified as one of the most viable options available for the mitigation of CO_2. The biological process of photosynthesis is utilized to stabilize CO_2 in the atmosphere and thus produce valuable products. The biggest challenge is to develop a closed system to mitigate CO_2 released from industrial effluent using photoautotrophic organisms. The size, light intensity and cost is the main problem of closed system (Photobioreactor). The microbial world is full of surprises and very little attention has been paid on their ability to mitigate CO_2. There are Methanogens microbes from Archaea class are capable of utilizing CO_2 and produce Methane. The ability of different microbes to remove pollutants from air has been already established. This paper deals with capabilities of different microbial culture to mitigate CO_2. The approach is to develop a colony of microbes and fungi to biologically absorb CO_2 and convert them into other useful product like Methane. Mixed culture found to be superior candidate than photoautotrophic organisms for CO_2 mitigation. They show a promising future to develop a low cost, compact size close system for in-situ CO_2 mitigation.

Biography

Suresh Gupta has completed his PhD in the year of 2008 from Birla Institute of Technology and Science, Pilani. Currently he is working as an Assistant Professor in this institute. He has 10 years of Teaching, Research, Consultancy, and administrative experience. He has around 40 research publications to his credit in refereed journals and international conferences. He has also completed two research projects: one industry sponsored and another UGC sponsored. He has guided 6 dissertation students and currently guiding three PhD students. He is a Life Associate member of IIChE and a Fellow member of ICCE.

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