Title:	Electricity-driven bioproduction from CO2 and N2 feedstocks using enriched mixed microbial culture
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Abstract:	Microbial electrosynthesis (MES) is an emerging technology with the potential to reduce carbon emissions by converting CO2 and renewable power into chemicals. Here, MES of acetate using gaseous N2 as a nitrogen source is investigated as an approach to substitute fixed nitrogen (ammonia) in the process. At an applied cathode potential of − 0.995 V vs. SHE, the mixed microbial community with a few known N2 and CO2 fixing microorganisms produced 463.5 ± 14 mg/l acetate using gaseous N2 and CO2 feedstock along with traces of ammonia (0.80 ± 0.06 mg/l) confirming the simultaneous fixation of these gases. Up to 85%, 0.5%, and 4.9% electrons were recovered in acetate, ammonia, and biomass, respectively, with a maximum of 39% energetic efficiency. A preliminary analysis suggested the possibility of bringing down a considerable amount of CO2 from going into the environment both by fixing CO2 into acetate and avoiding the use of fixed ammonia, the production of which is associated with the CO2 emissions. Thus, the demonstrated process circumvents the conventional fixed nitrogen (ammonia) usage in MES while still being able to produce considerable acetate from CO2.
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