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Evaluation of novel thermo tolerant haloalkaliphilic bacterium *Halomonas stevensii* for biomitigation of gaseous phase CO_2: Energy assessment and product evaluation studies

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Present work deals with the bio-mitigation potential of gaseous phase CO_2 by chemolithotrophic bacterium *Halomonas stevensii* isolated from haloalkaliphilic habitat using thiosulfate ion (S_2O32-) as an energy source. *H. stevensii* was tested for various abiotic stress tolerance such as salt [1 - 14% (%w: v)], temperature (35-80oC) and pH (4-12). Batch studies were conducted for 6 days at 15 (±1) % (% v:v) inlet CO_2 concentration to find the CO2 fixing capability of *H. stevensii* under varying concentration of energy substrate i.e. 0, 50 and 100 mm $Na_2S_2O_3$. Approximately 98% CO_2 removal from gaseous phase was achieved at 50 and 100 mm $Na_2S_2O_3$. Biomass productivity was estimated in terms of maximum biomass productivity (P-Max) and specific growth rate (μMax). 6th day sample (biomass and supernatant) obtained from 100 mm $Na_2S_2O_3$ batch study was characterized by FTIR and GC-MS to identify the products formed from CO_2 fixation. The evaluation of CO_2 fixation by *H. stevensii* into primary metabolite was carried out by growing the *H. stevensii* at 5%, 10% and 15 % (% v: v) inlet CO_2 concentration for the duration of 6 days. The obtained leachate was further analyzed by GC for the quantification of fatty alcohols. The utilization of gaseous phase CO_2 by *H. stevensii* is also proven by conducting the approximate materials balance and energy assessment for the present CO_2 fixation process.

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