Sitwat Aman et al., J Bioremediat Biodegrad 2017, 8:5(Suppl)
DOI: 10.4172/2155-6199-C1-008

Influence of temperature on lipid production and stress responses in yellow in dark mutants of *Chlamydomonas reinhardtii*

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Lack of control at high temperatures is one of the major environmental factors that has significant effects on the growth and lipid production of microalgae. Therefore, it is important to evaluate the effects of temperature on the growth and physiology of microalgae. We attempted to enhance the growth and total lipid production of three yellow in dark mutants of green microalgae *Chlamydomonas reinhardtii* under high temperature stress in view of their possible utilization as novel raw materials for biodiesel production. In the present study, effects of cultivation temperature (25 and 33 ˚C) on biomass and lipid productivity, carbohydrate, protein, chlorophyll and carotenoids content, detail Fatty Acid Methyl Ester (FAME) signature, and stress biomarkers like reactive oxygen species, anti-oxidant enzymes like catalase, ascorbate peroxidase and lipid peroxidation have been investigated. Results have revealed that all three mutant strains have strong negative correlation between biomass accumulation and lipid content. CC-4033 grew faster at 25˚C but CC-1171 grew faster at 33˚C among the three mutant strains while CC-1173 strain performed equally at both temperature points. The CC-4033 contained the highest lipid content while CC-1173 had lowest lipid content at 33˚C. In all three mutant strains C16:0, C18:1, C18:2, C18:3 were identified as the major FAMEs which are suitable to be used as biodiesel components. Stress biomarkers like reactive oxygen species (ROS), antioxidant enzymes like catalase and ascorbate peroxidase except lipid peroxidation were also low at 33˚C in the three mutant strains. Taken together our evidence supports that temperature which is a critical environmental factor can modulate the amount and composition of fatty acids. The CC-4033 strains should be considered as a potential mutant among all three mutants strains for exploration of new renewable energy.

Biography

Sitwat Aman has worked on microalgae during her Post-doc in China, where she tried to find out the best strains for biodiesel production. Nowadays, she is working as an Assistant Professor.

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