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Design and Optimization of operating parameters of LED Bioreactor for Nutraceutical production from Microalgae

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ABSTRACT Food supplements have been a part of the human diet for a very long time. Recent advances in nutraceutical research coupled with changing dietary habits of an increasing population have necessitated increased nutraceutical production. One common source of nutraceuticals is microalgae. Microalgae *Spirulina* is a prokaryotic cyanobacterium, a rich source of nutrients such as B vitamins, phycocyanin, chlorophyll, vitamin E, omega 6 fatty acids and numerous minerals. Conventional production of nutraceuticals from microalgae include open ponds and photobioreactors. Photobioreactors use ordinary fluorescent light for culturing of microalgae. Fluorescent light contains a wide range of absorption bands or comprises a combination of efficient and inefficient absorption light wavelength spectra for chlorophyll pigments and for production of secondary metabolites. Moreover, LEDs, due to their narrow band wavelength, are now commonly used for secondary metabolite production in microalgae. Limited to no information is reported on the effects of varying light intensity, wavelength and time of exposure to LEDs on production of secondary metabolites from microalgae. Therefore, varying the LED Bioreactor operating parameters such as light intensity, wavelength and time of exposure to the LEDs might significantly help to obtain an increased yield of specific phytochemical from *Spirulina*. Anticipated results include an increased nutraceutical yield in *Spirulina* upon varying operating parameters of the LED reactor.