Outdoor and Indoor Cultivation of *Spirulina platensis* in the Extreme South of Brazil

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Water supplemented with 10% or 20% (v/v) of Zarrouk medium was used to cultivate *Spirulina platensis* in closed and open bioreactors under controlled conditions (30 °C, 32.5 μmol m^{-2} s^{-1}, 12 h light/dark photoperiod) and in a greenhouse (9.4 to 46 °C, up to 2800 μmol m^{-2} s^{-1}, variable day length photoperiod) using different initial biomass concentrations (X_0) in the extreme south of Brazil (32.05° S, 52.11° W). Under controlled conditions the maximum specific growth rate (μ_{max}) was 0.102 d^{-1}, the biomass doubling time (t_d) was 6.8 d, the maximum dry biomass concentration (X_{max}) was 1.94 g L^{-1} and the maximum productivity (P_{max}) was 0.059 g L^{-1} d^{-1}, while the corresponding values in the greenhouse experiments were μ_{max} = 0.322 d^{-1}, t_d = 2.2 d, X_{max} = 1.73 g L^{-1} and P_{max} = 0.112 g L^{-1} d^{-1}. Under controlled conditions the highest values for these parameters occurred when X_0 = 0.15 g L^{-1}, while in the greenhouse X_0 = 0.4 g L^{-1} produced the highest values. These results show that the cultivation of *S. platensis* in greenhouses in the extreme south of Brazil is technically viable and that the *S. platensis* inoculum and the concentration of Zarrouk medium can be combined in such a way as to obtain growth and productivity parameters comparable, or superior, to those occurring in bioreactors under controlled conditions of temperature, illuminance and photoperiod.

Key words: Bioreactor, Southern Brazil, *Spirulina platensis*