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EFFECT OF SALT-STRESS ON THE PRODUCTION OF PIGMENTS BY *Chlorella sorokiniana* UNDER PHOTOHETEROTROPHIC CULTURE

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Introduction. The photosynthetic microalgae have gained more attention for its ability to produce biochemical components of high value as a natural pigments, protein, polyunsaturated fatty acids and polysaccharides (1). Most natural pigments such as carotenoids, anthocyanin and chlorophylls can provide beneficial effects on health; therefore their demand has been increased in recent years. It has been reported that several stress conditions such as nitrogen and phosphorous depravation, high light intensities and salt stress can improve the pigment production of microalgae. The effect of salt stress in biomass and pigments production, specifically carotenoids has been studied in species of *Chlorella zofingiensis* and *Haematococcus pluvialis*, finding an increase in carotenoid yields (2,3).
The aim of this study was to evaluate the effect of salt concentration in growth and pigment production by *Chlorella sorokiniana* under photoheterotrophic culture.

Methodology. The fresh water microalga *Chlorella sorokiniana* was used**.** The effect of salt concentrations (1, 2 and 3% NaCl w/v, experiments without NaCl were considered as controls) was evaluated. Cultivation was carried out in Erlenmeyer flask containing 150 mL of medium under photoheterotrophic conditions using glucose (2 g L^{-1}) as a carbon source and white light as energy source (12 h light/dark cycles, 100 µmol photons m^{-2} s^{-1}) during 240 h at 30 °C and 145 rpm. The cell concentration was evaluated gravimetrically and reported as dry weight. Pigments were extracted using dimethylsulphoxide (DMSO) and the OD was measured at 649, 665 and 480 nm to calculate pigment content (5).

Results. The microalga *Chlorella sorokiniana* was able to grow in all the NaCl concentrations tested. Similar yields for biomass production are presented in treatments using 1 and 2% of NaCl as compared to the medium without NaCl. Conversely, a high concentration of NaCl a significant decrease in biomass production was observed (Figure 1). In reference to pigment production, similar values of chlorophyll content were observed in stressed cultures in comparison with control (0% NaCl). Meanwhile carotenoid content was higher (22.7%) in cells stressed with 2% of NaCl respect to control. The increase in carotenoids content at high NaCl levels is due by biological activities in the cell in response at oxidative injures, acting these as antioxidant compounds with the ability to prevent accumulation of free radicals and reactive oxygen species (5). In cultures with 2 and 3% of NaCl carotenoid/chlorophyll ratio (0.28 and 0.27 respectively) was higher in comparison with control (0.21).

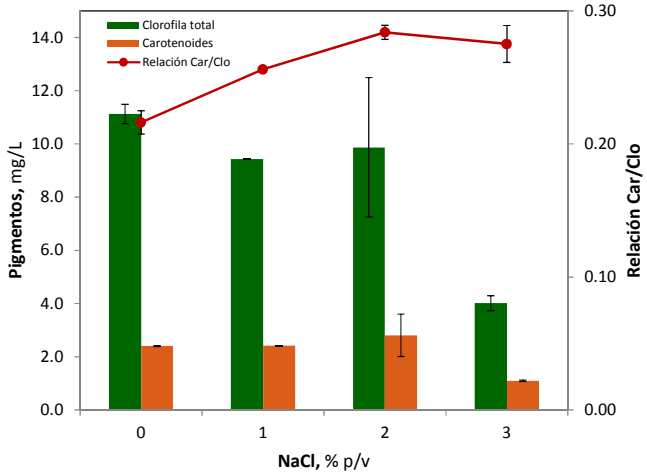

Fig. 1. Effect of NaCl concentrations on pigments content and growth at final time of culture (240 h).

Conclusions. Under salt stress conditions (NaCl) carotenoid biosynthesis was increased in *Chlorella sorokiniana*, indicating that the salt may have a potential commercial and industrial importance in obtaining high yields of commercial valuable pigments.

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