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EVALUATION OF THE EFFECT OF A NUTRITIONAL SOLUTION ON THE PHYTOREMEDIATION POTENTIAL OF BLUE DYE BY THE AQUATIC MACROPHYTE *Salvinia Spp*

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Water pollution is one of the largest problems faced by our planet in recent times. Discharging of high-solubility, chemical-stability, toxic organics into effluents is one of the major sources of water contamination (JIN, 2019). Dye compounds have been used for many years in various industrial segments, mainly in the field of textile products. Such substances with considerable coloring capacity are widely employed in the textile, pharmaceutical, food, cosmetics, plastics, photographic and paper industries. Their excessive use has been causing more and more damage to the environment, such as preventing the passage of solar radiation affecting living beings that inhabit aquatic ecosystems (MITTER, 2016). One of the most difficult tasks confronted by the wastewater treatment plants of textile industries is the removal of the color of these compounds, mainly because dyes and pigments are designed to resist biodegradation, such that they remain in the environment for a long period of time (CHEQUER, 2013). An option to reduce the impact of these pollutants is phytoremediation, which consists of a process that uses plants to purify contaminated environments, preventing the pollutant from dispersing further. Some phytoremediation plants are already known, the species *Salvinia Spp* is one of them. In agriculture, it is common to use nutrient solutions to help the environment reproduction. The objective of this study is to prove the effect of a nutrient solution on the phytoremediation potential of the macrophyte Salvinia Spp. For this, a calibration curve of the dye was performed in the Spectra Max M5 equipment, at the wavelength of the blue dye, 570 nm, the calibration curve was made with 6 different concentrations, all in mg/l: 50, 100, 150, 250, 350 and 400. With the absorbance reading at these concentrations, we obtained the equation of the straight line $y = 0.0005x + 0.0031$ with r^2 of 0.998. Experiment treatments were performed with a solution of water and dye at a concentration of 350 mg/l. A nutrient solution adapted from Hoagland-Arnon (HOAGLAND et al., 1950) was prepared for 100 mL, in the composition (weighed on an analytical balance): calcium nitrate (80 $g.L^{-1}$), potassium nitrate (80 $g.L^{-1}$), potassium phosphate (60 $g.L^{-1}$), magnesium sulfate (90 $g.L^{-1}$), sodium chloride (20 $g.L^{-}$

^{1}), boric acid (4 g.L^{-1}), manganese chloride (5 g.L^{-1}), molybdic acid (50 mg.L^{-1}) and Iron EDTA (10 g.L^{-1} g). The experiment was divided into two groups and placed in a transparent plastic container: group A, containing 100 ml of water-dye solution and plant and group B, containing 100 ml of water-dye solution, plant and 1 ml of nutrient solution. Each group was done in quadruplicate. Collections were performed at 0, 2, 4, 8, 16, 24, 48, 72, 96 and 120 hours and the samples were stored in the refrigerator until the absorbance reading was taken. At hour 4, the dye concentration in the solution had dropped to approximately 79% in both groups; from then on, it was noted that the concentration of group B began to decline faster than that of group A, reaching 26% at hour 48, while group A, at this same hour, had a dye concentration rate of 41%. In the last collection of the experiment, group A presented 35% of the initial concentration of dye, while group B, which contained the nutrient solution, presented only 19% of initial concentration. It is therefore concluded that the best remediation strategy for dye is to combine phytoremediation techniques by the macrophyte *Salvinia Spp.* with the use of nutrient solutions, such as Hoagland-Arnon.

Key words: environmental pollution, Hoagland-Arnon, spectrophotometry, phytoremediation, *Salvinia SPP*
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References:
HOAGLAND, Dennis Robert et al. The water-culture method for growing plants without soil. Circular. California agricultural experiment station, v. 347, n. 2nd edit, 1950
MITTER, E. K. Corantes da indústria têxtil: impactos e soluções. Jornal Biosferas. Pós-Graduação em Microbiologia, UNESP, 2016
JIN, Chengchao et al. The role of microstructure in piezocatalytic degradation of organic dye pollutants in wastewater. Nano Energy, v. 59, p. 372-379, 2019.
CHEQUER, FM Drumond et al. Textile dyes: dyeing process and environmental impact. Eco-friendly textile dyeing and finishing, v. 6, n. 6, p. 151-176, 2013.