TITLE: EXTRACTION OF PROTEINS WITH ANTIPARASITIC ACTION OF CYANOBACTERIA *Arthrospira platensis*

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ABSTRACT:

The cyanobacterium *Arthrospira platensis* (*A. platensis*), integrated in the Oscillatoriales order, stands out for presenting a biomass rich in nutritional compounds and natural pigments such as carotenoids and phycobiliproteins, which are widely studied due to their antimicrobial properties. In view of this, this research aimed to extract the proteins present in a strain of *A. platensis*, and also test them in vitro against trypomastigote forms of *Trypanosoma cruzi* (*T. cruzi*) (Y strain). The cyanobacteria, obtained from the culture collection, was cultivated in a culture medium with high concentrations of carbonate and bicarbonate salts, at an initial concentration of 50 mg/mL with an illuminance of 72 ± 5 µmol photons $m^{-2}.s^{-1}$ until an exponential growth phase. After this step, the culture was centrifuged at 10000 rpm, 4°C for 10 minutes and the cells concentrated for extract preparation. 400 mg of dry cells were homogenized with 4 mL of 0.2 M Tris-HCl buffer, pH 7.3 for 9 h under magnetic stirring, promoting cell rupture, with subsequent release of proteins from inside the cells, which were centrifuged at 4500 rpm, 4°C for 20 minutes. The virulent strains of *T. cruzi* were obtained from the collection of the Reference Service for Chagas Disease of the IAM/Fiocruz and their trypomastigote forms were incubated in 96-well microplates in the presence of different concentrations of the obtained extract (1000 – 31.25 µg µg/ml) at 37°C and 5% CO2 for 24h. The extract had a protein concentration of 32 mg/mL and at the highest concentration tested, it presented an inhibition percentage of 86%. At 500 µg/mL, the protein mix inhibited trypomastigote viability by 52%. At the lowest concentrations tested, the mix still showed antiparasitic activity, inhibiting an average of 30% of the trypomastigote forms. Finally, *A. platensis* obtained an IC_{50} (concentration capable of inhibiting the parasite viability by 50%) of 455 µg/mL. These findings allow us to infer that the *A. platensis* proteins can be considered promising against *T. cruzi* trypomastigotes, in addition to this, due to their low cytotoxicity to human cells, these biomolecules could become a source of safe drugs for the humans in the fight against Chagas disease. However, processes that guarantee the purity of these proteins must be conducted for further elucidation of their mechanism of action against the parasite.

Keywords: biotechnological processes, Chagas disease, photosynthetic microorganism, proteins

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