TITLE: INVESTIGATION OF THE ACTIVITY OF SEAWEED EXTRACTS ON THE PROLIFERATION AND ULTRASTRUCTURE OF THE PROTOZOAN *TRYPANOSOMA CRUZI.*

AUTHORS: LUANA PORTELLA TAVARES SANTIAGO[1], ALINE ARAÚJO ZUMA[2], DANIELA BUENO SUDATTI[1,3], DANIELLE PEREIRA CAVALCANTI[4].

INSTITUTIONS:
[1] INSTITUTO DE ESTUDOS DO MAR ALMIRANTE PAULO MOREIRA, [2] LABORATÓRIO DE ULTRAESTRUTURA CELULAR HERTHA MEYER, INSTITUTO DE BIOFÍSICA CARLOS CHAGAS FILHO- UFRJ, [3] INSTITUTO DE PESQUISA JARDIM BOTÂNICO DO RIO DE JANEIRO, LABORATÓRIO DE BIOQUIMICA, [4] LABORATÓRIO DE MICROBIOLOGIA, DIRETORIA DE METROLOGIA APLICADA ÀS CIÊNCIAS DA VIDA, INSTITUTO NACIONAL DE METROLOGIA, QUALIDADE E TECNOLOGIA- INMETRO, RIO DE JANEIRO, BRASIL.

ABSTRACT

Trypanosoma cruzi is the etiological agent of Chagas disease, a neglected tropical disease with a significant impact on public health. This protozoan presents peculiar structures, like the kinetoplast, a specialized region of the mitochondrion that accumulates the mitochondrial DNA; the reservosomes that are part of the endocytic pathway of the parasite; the acidocalcisomes, which are involved in the Ca^{2+} homeostasis and osmoregulation, among others. In endemic areas, the most common mechanism for *T. cruzi* infection is through the bite of triatomine insects. However, Chagas disease can also be transmitted through organ transplants, blood transfusions, contaminated food and from mother to child. The drugs used to treat this illness present serious side effects and low efficacy, leading to the search for new compounds that are more effective and safer for treatment. Although seaweeds have been recognized as the source of several biologically active compounds, few studies have focused on their activity against parasitic protozoa. In the present study, 48 seaweed extracts collected from “Região dos Lagos” (Rio de Janeiro) were screened in order to evaluate their effect on *T. cruzi* proliferation and ultrastructure. The extracts were prepared with a dichloromethane: methanol (2: 1) mixture. For initial screening, the viability of treated parasites was evaluated by the MTT assay. Then, the IC_{50} of selected extracts was determined by flow cytometry. The CC_{50} of extracts in the $LLCMK_2$ cells was evaluated by the MTT assay. Five species of seaweed exhibited an unprecedented effect against *T. cruzi*: *Acanthophora spicifera*, *Codium intertextum*, *Codium taylori*, *Dasya ocellata* and *Plocamium brasiliense*. Moreover, *Plocamium brasiliense* was more promising because it presented a high inhibitory effect against protozoan and low cytotoxicity on $LLCMK_2$ cells. Thus, the effect of the extract of *Plocamium brasiliense* in *T. cruzi* ultrastructure was analyzed by transmission electron microscopy. Ultrathin sections of treated protozoa demonstrated fragmentation of the nucleolus, unpacking of heterochromatin and alterations in the reservosomes. Taken together, ours results highlight the importance of study marine macroalgae as source of bioactive compounds with potential anti-protozoal activity.

Keywords: *Plocamium brasiliense*, marine algae, macroalgae, trypanosomatid, electron microscopy.

Development Agencies: CAPES and CNPq.