Monitoring waterborne pathogenic protozoa in Conceição Lagoon, Florianópolis-SC, Brazil: Implications for recreational water quality and public health

MARINA ARAÚJO DA SILVA[1], PABLO RICARDO MARZZANI[1], CAMILE CEREZOLLI[1], GABRIELI EDUARDA ISRAEL[1], DAYARA CORRÊA MATIOLA[1], GABRIELLA ROSA MONTE MACHADO[1], MATEUS ROCHA RIBAS[1], JAQUELINE GERMANO DE OLIVEIRA[2], JULIANE ARAÚJO GREINERT GOULART[1], DIEGO AVERALDO GUIGUET LEAL[3], KARIN SILVA CAUMO[1 2]

[1] UNIVERSIDADE FEDERAL DE SANTA CATARINA, SANTA CATARINA, BRAZIL, [2] INSTITUTO RENÉ RACHOU (FIOCRUZ MINAS), MINAS GERAIS, BRAZIL, [3]UNIVERSIDADE FEDERAL DO PARANÁ, PARANÁ, BRAZIL

Conceição Lagoon in Florianópolis, SC, has suffered environmental degradation due to unplanned urban growth, intense tourism, wastewater discharge, and accidents, compromising marine life as well as food and water security. Pathogenic protozoa such as *Giardia duodenalis*, *Cryptosporidium* spp., *Toxoplasma gondii*, and *Blastocystis* sp. exhibit high environmental resistance and a strong potential for transmission in recreational waters. Additionally, pathogenic free-living amoebae (FLA), including *Acanthamoeba* and *Naegleria*, pose further public health risks as agents of severe diseases and carriers/reservoirs of pathogenic microorganisms. This study assessed the lagoon's recreational suitability and environmental quality through comprehensive pathogen monitoring. Bimonthly surface water samples were collected from February 2023 to February 2024 at eight georeferenced sites and analyzed for physicochemical parameters. FLA were isolated by culture, followed by morphological and genetic characterization. *Giardia*, *Cryptosporidium*, and *T. gondii* were detected by immunofluorescence and *nested*-PCR, while *Blastocystis* was identified by *nested*-PCR. Of the 56 samples, all tested positive for at least one pathogen, with prevalence rates of *Blastocystis* (85.4%), *Giardia* (55.4%), *T. gondii* (23.2%), and *Cryptosporidium* (12.5%). Among the amoebae, 25 isolates were obtained: 52% were *Acanthamoeba*, and one isolate exhibited exflagellation, suggesting *Naegleria*. Areas with higher urbanization showed elevated contamination, highlighting the impact of human activities on pathogen spread. These findings emphasize the need for environmental surveillance and targeted interventions to improve recreational water quality and reduce the risk of diarrheal outbreaks and severe infections. In conclusion, integrated monitoring is vital for situational diagnosis and effective public health management, guiding mitigation and conservation policies for sustainable resource use.

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Key words Conceição Lagoon, Pathogenic protozoa, Free-living amoebae (FLA).