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Biomonitoring and physicochemical and microbiological evaluation of the Cantareira System dam in Bragança Paulista-SP

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Abstract

The Jaguari-Jacareí dam is the largest in the Cantareira System, which is the largest water supply system managed by Sabesp. The objectives of this study were to determine the presence of potentially toxic and mutagenic agents and to evaluate the physicochemical and microbiological parameters of the supply dam Jaguari-Jacareí, located in the city of Bragança Paulista-SP, and compare the mutagenesis rate with the post-treatment water of the same city. To determine the rate of mutagenesis it was used Trad-MCN bioassay, which evaluates the integrity of the chromosomes after exposure of the plant Tradescantia pallida purpurea to experimental and control solutions. To determine the physicochemical and microbiological parameters it was used Ecokit II by Alfakit®. The Trad-MCN bioassay identified a micronuclei number compatible with genotoxic activity only in the dam waters ($p<0,05$ on 2 of 3 statistical analysis), and in the dam's water evaluation through Ecokit II were detected nonconformities in the parameters orthophosphate and thermotolerant coliforms in relation to the parameters established in CONAMA 357/2005 Resolution for class 1. Therefore, through the present assessment, it was possible to verify that the treated water of the municipality does not present high levels of mutagenesis, but also revealed a need for more intensive monitoring by the authorities of natural waters for public supply.

Key words:
Mutagenesis, TRAD-Mcn, Environmental Sanitation.

Introduction

The Jaguari-Jacareí dam is the largest in the Cantareira System, which is the largest water supply system managed by Sabesp, responsible for the treatment of water of the entire metropolitan region of São Paulo[1]. Its waters are class 1 according to CONAMA 357/2005 Resolution, which classifies the water bodies and determines the environmental procedures for the framing[2]. The objectives of this study were to determine the presence of potentially toxic and mutagenic agents and to evaluate the physicochemical and microbiological parameters of the supply dam Jaguari-Jacareí, located in the city of Bragança Paulista-SP, and compare the mutagenesis rate with the post-treatment water of the same city.

Image 1. Jaguari-Jacareí dam.

Results and Discussion

To determine the rate of mutagenesis it was used Trad-MCN bioassay, which evaluates the integrity of the chromosomes after exposure of the plant *Tradescantia pallida purpurea* to experimental and control solutions. To determine the physicochemical and microbiological parameters it was used Ecokit II by Alfakit®.

Chart 1. Main results of physicochemical and microbiological evaluation.

Parameters	CONAMA Resolution 357/2005 (Class 2)	Values obtained
Orthophosphate	0,020 mg/L	0,75 mg/L
Thermotolerant coliforms	200 CFU/100ml	1.200 CFU/100ml

The Trad-MCN bioassay identified a micronuclei number compatible with genotoxic activity only in the dam waters ($p<0,05$ on 2 of 3 statistical analysis), and in the dam's water evaluation through Ecokit II were detected nonconformities in the parameters orthophosphate and thermotolerant coliforms in relation to the parameters established in CONAMA 357/2005 Resolution for class 1.

Conclusions

Through the present assessment, it was possible to verify that the treated water of the municipality does not present high levels of mutagenesis, but also revealed a need for more intensive monitoring by the authorities of natural waters for public supply.

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[1] WHATELY, M.; CUNHA, P. C. Um olhar sobre o maior manancial de água da Região Metropolitana de São Paulo: Resultados do Diagnóstico Socioambiental Participativo do Sistema Cantareira. São Paulo: Instituto Socioambiental, **2007**.

[2] BRASIL. Resolução do Conselho Nacional do Meio Ambiente – CONAMA 357. DOU, Brasília, 17 mar. **2005**. Seção 53, p. 58-63.