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Influence of Temperature on Mutagenicity in Plants Exposed to Surface Disinfected Drinking Water

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ABSTRACT

Disinfection of surface drinking water, particularly water chlorination, produces by-products with potential genotoxic and/or carcinogenic activity. A study carried out at a pilot plant for drinking water disinfection of lake water revealed mutagenic activity of three different disinfectants (sodium hypochlorite, chlorine dioxide and peracetic acid) in different seasons using *in situ* mutagenicity assays, both in animal (micronucleus test) and in plant organisms (anaphase chromosomal aberration and micronucleus tests). The effects of the disinfectants appeared to be modulated by the season of exposure. In this study, we tried to understand if (and to what extent) the temperature parameter could actually play an independent role in the registered seasonal variation of mutagenic effects, neglecting the variation of other parameters, e.g. physical conditions and chemical composition of the lake water. Therefore plants (*Allium cepa* for chromosomal aberration test and *Vicia faba* for micronucleus test) were exposed to the same disinfected lake-water samples at different temperatures (10°C, 20°C and 30°C), according the ones registered during the *in situ* experiment. Long-term exposure at the temperatures of 20°C (both *Vicia faba* and *Allium cepa*) and 30°C (*Vicia faba* only) to disinfected waters induced clear mutagenic effects. These results show that temperature is an important variable which should be taken into account when *in situ* exposure of plants is planned for mutagenicity testing. Also, different plant systems clearly show specific temperature ranges suitable for their growth, thereby indicating the need for an accurate selection of the test organism for a specific experimental plan.

KEYWORDS

 Clastogenicity/Aneugenicity; *Allium cepa* Aberration Test; *Vicia faba* Micronucleus Test; Temperature Exposure; Water Disinfection

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