Study of Cytotoxic and Genotoxic Effects of Seven Water Sources in Sri Lanka

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Water sources used for drinking and irrigation are complex mixtures containing numerous inorganic as well as organic compounds when polluted. Higher plants have been proposed as test organisms for the detection of genotoxic substances in the environment since the target is DNA which is common to all organisms. *Allium ascalonicum* assay is an *in vivo* system that can be used effectively to assess the genotoxic and cytotoxic effects of substances present in soil or water. The objective of this study was to assess the cytotoxic and genotoxic effects of several water sources that are used for human consumption and irrigation, using *Allium ascalonicum* assay.

The water samples used were from a stream at University of Peradeniya [US], tap water from Meewathura purification centre [PT], bottled drinking water [BW], Kandy lake water [KL], Mahaweli river water [M], Anuradhapura tank water [AP]. De-ionized water [DW] was used as a negative control.

Onion root tips of 3-5 cm in length were harvested and stained with 2% acetic orcein and 3 slides were prepared from each sample according to Feugen squash technique. Random observation fields with well spread cell arrangement from each slide were scored for mitotic index using an Olympus microscope at [X 100 (oil emersion) or X 40] X10 magnification. Mitotic Index was calculated as dividing cells out of total cells counted. Chromosomal aberrations too were observed in the same fields

Significantly low mean mitotic index was observed in AP sample ($p=0.036$) and significantly high mitotic index was observed in samples US ($p=0.0488$) and PT ($p=0.0114$). Chromosomal aberrations such as microneuclei, chromosome bridging, lagging, nondysjunction and binucleate cells were observed. Binucleated cells were exclusively seen in AP sample. Following repeat assay in the same water source if similar results were observed, analysis of water samples may give an insight to causative substances.