Analysis Tutorial Prospectus

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1. Title – Evaluation of potential genotoxic effect of untreated textile dye effluent using R statistical software
2. Introduction – Untreated or improperly treated textile dye effluent may contain various hazardous chemicals such as heavy metals, azo dyes and other persistent organic chemicals that pose potential negative consequences on aquatic and terrestrial ecosystem. Assessing its genotoxicity is crucial for evaluating its impact on living organisms. This tutorial will guide using R statistical software to analyze the genotoxicity of untreated textile effluent at different concentrations (0% (control), 25%, 50% and 100%) using mitotic index as the end point
3. Research question – Do untreated textile effluents possess genotoxic effects on living organisms?
4. Objective(s) –

* To introduce the concept of genotoxicity and its assessment using the mitotic index
* To demonstrate data analysis techniques in R for statistical comparison of mitotic index values across different effluent concentrations
* To interpret results and determine the potential genotoxic effects of untreated textile dye effluent

1. Approach – *Allium cepa*( Onion ) root tip cells were exposed to 0%, 25%, 50% and 100% concentrations of untreated textile dye effluents (pink, blue and yellow)

After 48 hours of exposure period, cells were fixed, stained and observed under microscope to determine the mitotic index

Mitotic index = Number of dividing cells \* 100

Number of total cells

Finally, using R descriptive analysis will be done ( mean, standard deviation, boxplots)

and one-way ANOVA test will be used to compare the mitotic index across groups

1. Selected references –

R Core Team. 2024. R: A Language and Environment for Statistical Computing. from <https://www.r-project.org>

Fiskesjö, G., 1985. The Allium test as a standard in environmental monitoring. Hereditas, 102(1), pp.99-112.

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Crawley, M.J., 2014. *Statistics: an introduction using R*. John Wiley & Sons

Leme, D.M. and Marin-Morales, M.A., 2009. Allium cepa test in environmental monitoring: a review on its application. Mutation research/reviews in mutation research, 682(1), pp.71-81.

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