

## Biological Effects of Mercury Chloride and Radiation Evaluated by *Tradescantia* Stamen Hair and Micronucleus Assay

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### 1. Introduction

This study deals with the combined effect of radiation with mercuric chloride on *Tradescantia* somatic cell pink mutation. *Tradescantia* BNL 4430 was used as an experimental material. The somatic cell of *Tradescantia* are very sensitive to chemical toxicants or ionizing radiation, and thus can be used as a biological end-point assessing their effect [1-3].

### 2. Methods and Results

One group was irradiated with gamma-ray after mercuric chloride treatment. The other group was irradiated with gamma-ray without pretreatment of mercuric chloride. Pink mutation frequencies were analyzed using pooled data during the peak interval. A parallel series of experiment using four increasing doses of gamma-ray at 0.2, 0.5, 0.8 and 1 Gy was conducted. Pink mutation frequencies showed a good dose-response relationship for radiation. Linear regression analysis of the gamma-ray data pink mutation frequencies yielded a correlation coefficient of 0.97. From the dose-response relationship, it is possible to estimate effects of mercuric chloride equivalent to that of radiation. *Tradescantia* somatic pink mutation frequencies irradiated with gamma-ray after mercuric chloride treatment showed a decrease in a concentration range of 0.01, 0.5, 1, 5  $\mu\text{M}$ . *Tradescantia* somatic cell pink mutation frequencies increase not change in concentration of 10, 20, 30, 40, 50, 60, 70  $\mu\text{M}$ .

The pink mutation frequency for mercuric chloride and radiation group yields  $3.51 \pm 0.49$ ,  $2.88 \pm 0.51$ ,  $4.19 \pm 0.54$  and  $4.11 \pm 0.63$  pink mutation/100 hairs for 0.01, 0.5, 1, 5  $\mu\text{M}$  and  $5.78 \pm 0.50$ ,  $4.80 \pm 0.39$ ,  $5.82 \pm 0.56$ ,  $6.16 \pm 0.38$ ,  $4.71 \pm 0.57$ ,  $5.19 \pm 0.53$  and  $5.01 \pm 0.35$  pink mutation/100 hairs for 10 ~ 70  $\mu\text{M}$ . The micronucleus was scored under a light microscope (400 $\times$ magnification). Three hundreds of tetrads were scored from each of the slides in every the experimental group. The frequencies expressed in terms of MCN / 100 tetrads. Trad-MCN frequencies were  $1.93 \pm 0.29$ , and  $4.13 \pm 0.75$  / 100 tetrads at 10 and 20  $\mu\text{M}$ , respectively

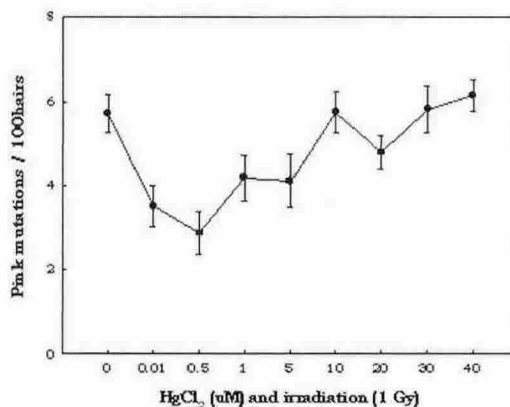


Figure 1. Gamma-irradiation induced pink mutation frequencies in *Tradescantia* (clone 4430) pretreat with mercury chloride.

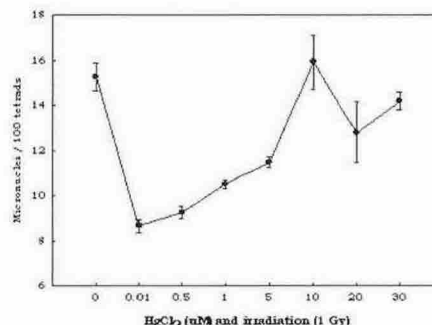


Figure 2. Gamma-irradiation induced micronuclei frequencies in *Tradescantia* (clone 4430) pretreat with mercury chloride.

### 3. Conclusion

Mercuric chloride was treated in the concentration that did not affect the flower bud development. Through this result, it is suggested that mercuric chloride at the low concentrations decreases somatic cell pink mutation induced by gamma-ray. The Trad-MCN assay is sensitive, reproducible, easy to perform, well standardized, inexpensive and undemanding in equipments [5, 6].

## REFERENCES

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