

## ABSTRACT

### INVESTIGATION OF CYTOTOXIC AND IN VITRO GENOTOXIC EFFECTS OF PERCHLOROETHYLENE (PERC) BY USING DIFFERENT TEST SYSTEMS

Ümit ÜNSAL

M.Sc. Thesis, Department of Biology

Supervisor: Assos. Prof. Dr. Tülay AŞKIN ÇELİK

2013, 104 sayfa

In this study, the in vitro effects of 3 different concentrations of Perchloroethylene (PERC) 1mM, 3mM and 5mM on human lymphocytes of the individuals who are working in dry cleaning enterprises in Aydın and who are exposed to (PERC) for a long time, are surveyed. In the study, Sister Chromatid Exchange (SCE), chromosomal aberration (CA) and cytokinesis block micronucleus (MN) techniques are used and mitotic index (MI) and proliferation index (PI) are calculated. In addition, whether the pure PERC has cytotoxic effect or not is surveyed via Brine Shrimp (*Artemiasalina*) Lethality Assay.

In the end, it is concluded that the concentration ranges of used PERC (10, 100 and 1000 ppm) do not have a cytotoxic effect on *Artemia salina* larvae. It is detected that in the 3 different concentrations (1mM, 3mM and 5mM) in the SCE, CA and MN assay, there is a reasonable increase resulting from the treatment. In the 3 different concentrations (1mM, 3mM and 5mM) of PERC applied to peripheral blood lymphocytes. In addition it is seen that RI and MI values with an increase resulting from the treatment again, decrease with a statistically significant amount and DNA replication is affected negatively. As a result of these values; it is detected that PERC creates an in vitro genotoxic risk on peripheral blood lymphocytes.

Being exposed to PERC in dry cleaning enterprises for a long time does not cause a reasonable increase in SCE and CA numbers generally according to negative control and this decrease is observed as statistically significant. Yet, it has a significant increase in MN number according to negative control whereas it is not significant according to positive control. Besides, it is calculated that according to negative control; being exposed to PERC for a long time does not cause a statistically significant decline in human peripheral lymphocytes RI and MI and it does not affect DNA replication negatively as much as positive control does. Moreover being exposed to PERC for a long time stimulates micronucleus occurrence in human peripheral lymphocytes and it is found that the rate of cells with micronucleus is higher than the one in the control.

**Key Words:** Human peripheral blood lymphocytes, Sister Chromatid Exchange (SCE), Chromosome Aberration (CA), Micronuclei (MN), Perchloroethylene