

Assessing the cyto-genotoxic effects of 2,4,6-Tribromophenol and its musty-smelling derivative 2,4,6-Tribromoanisole

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INTRODUCTION

2,4,6-Tribromophenol (TBP) is a widely used flame retardant and biocide [1]. Studies have detected TBP in a variety of human samples, such as blood and urine, and linked it to thyroid dysfunction, carcinogenicity and reproductive toxicity. Additionally, TBP is a precursor of 2,4,6-Tribromoanisole (TBA), a characteristic musty/corky-smelling compound [2]. Compounds belonging to the Taste and Odor category have attracted substantial interest from the scientific community and considering that water is vital for life, the possible adverse effects of those compounds towards humans are of great concern.

METHOD

Cytokinesis-Block Micronucleus (CBMN) assay was utilized in order to evaluate the possible cyto-genotoxic effects of TBP, TBA, as well as their mixtures (0.125–1 mg L⁻¹).

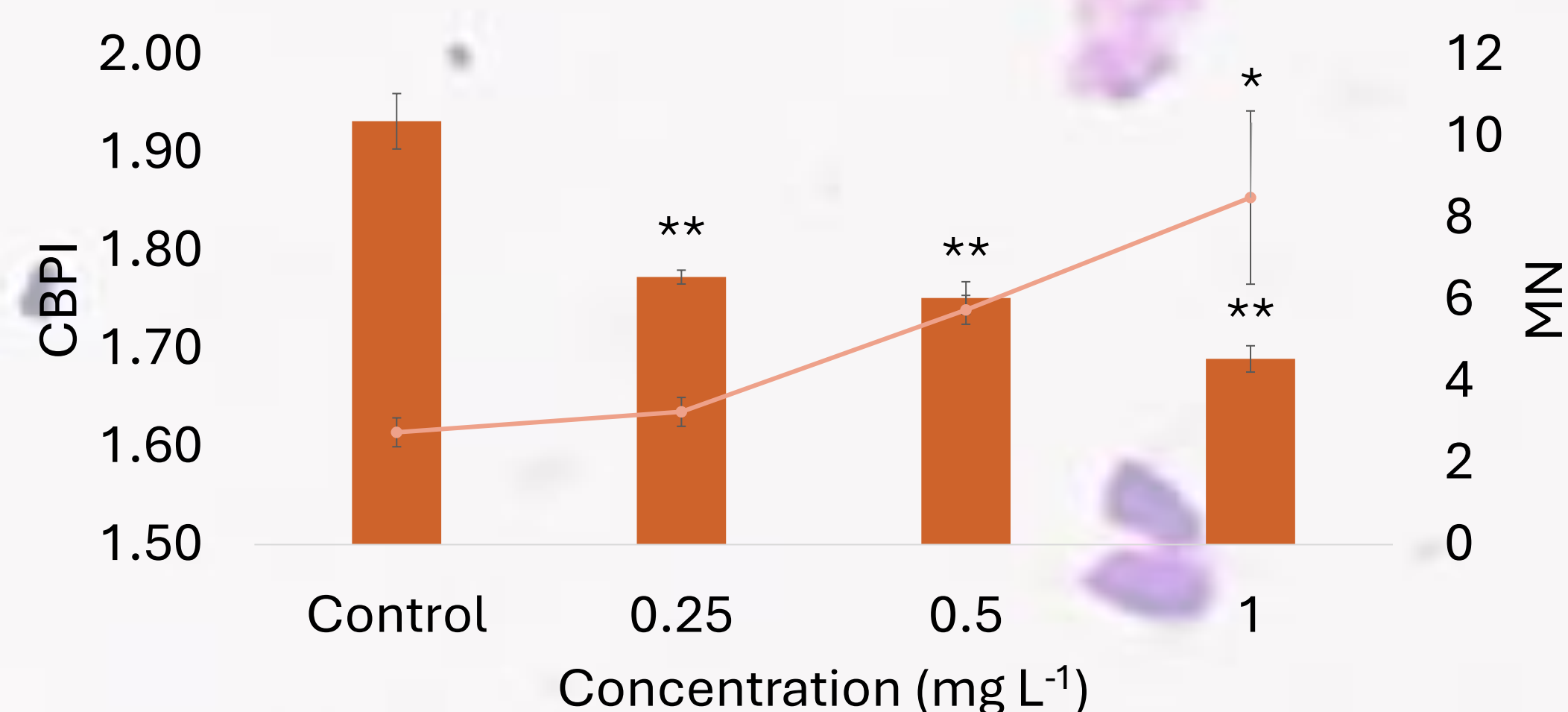


Figure 1: Mean values of CBPI and MN in human lymphocytes after exposure to different concentrations (0.25, 0.5, 1.0 mg L⁻¹) TBP.

*, ** Significant difference compared to control at $p < 0.05$ and $p < 0.001$, respectively.

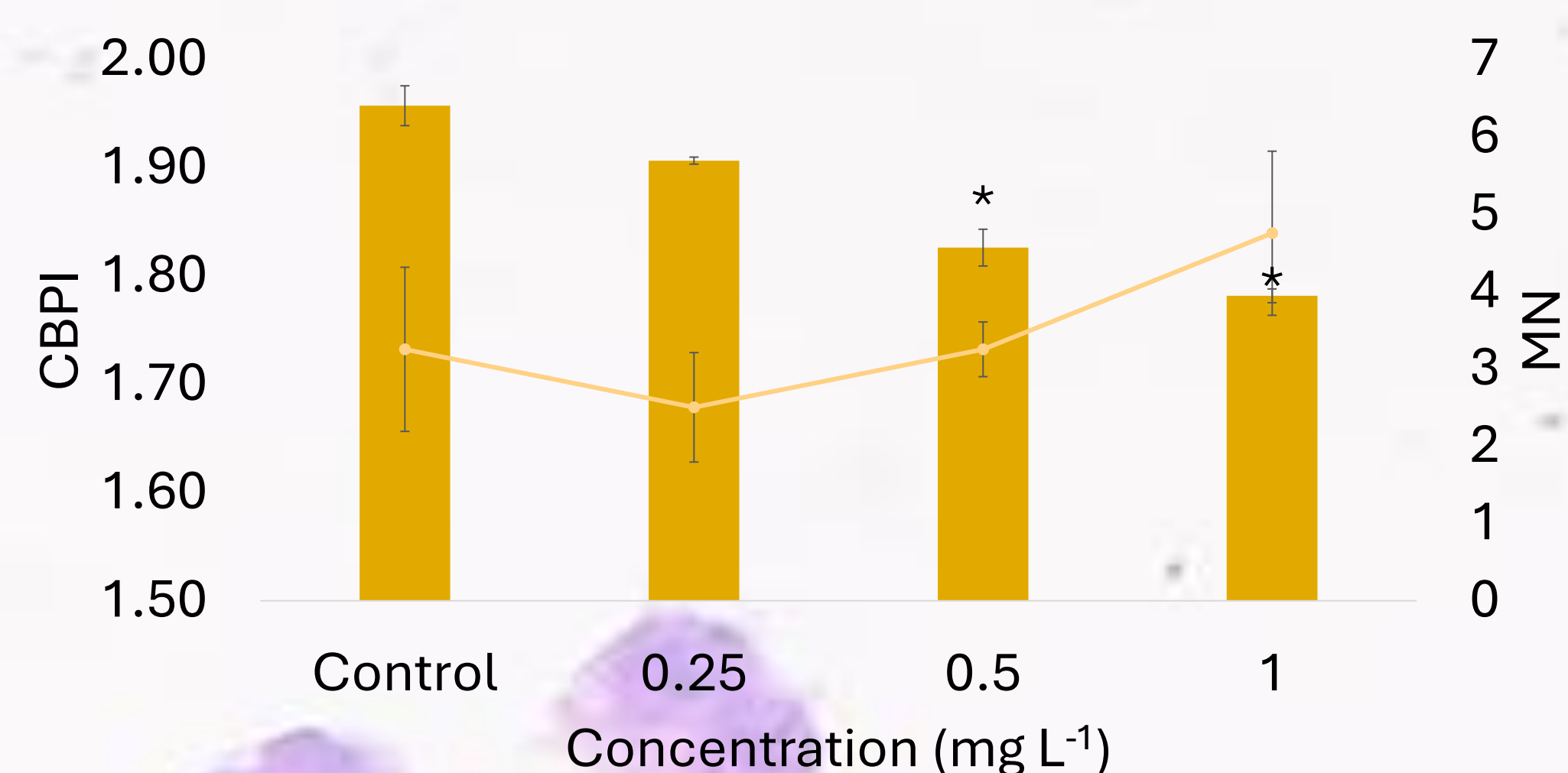


Figure 2: Mean values of CBPI and MN in human lymphocytes after exposure to different concentrations (0.25, 0.5, 1.0 mg L⁻¹) TBA.

* Significant difference compared to control $p < 0.001$.

RESULTS

- All TBP tested concentrations resulted in significant decrease of the CBPI values.
- Only the highest tested concentration of TBP resulted in significant increase in the MN frequency.
- Lymphocytes exposed to 0.5 and 1 mg L⁻¹ of TBA exhibit significant decrease of the CBPI values, but no genotoxic effects were observed.
- After exposing the lymphocytes in the mixture of the tested compounds, all the studied concentrations significantly decreased the CBPI index in comparison to the control, but only the highest tested concentrations presented significant difference in the MN frequency.

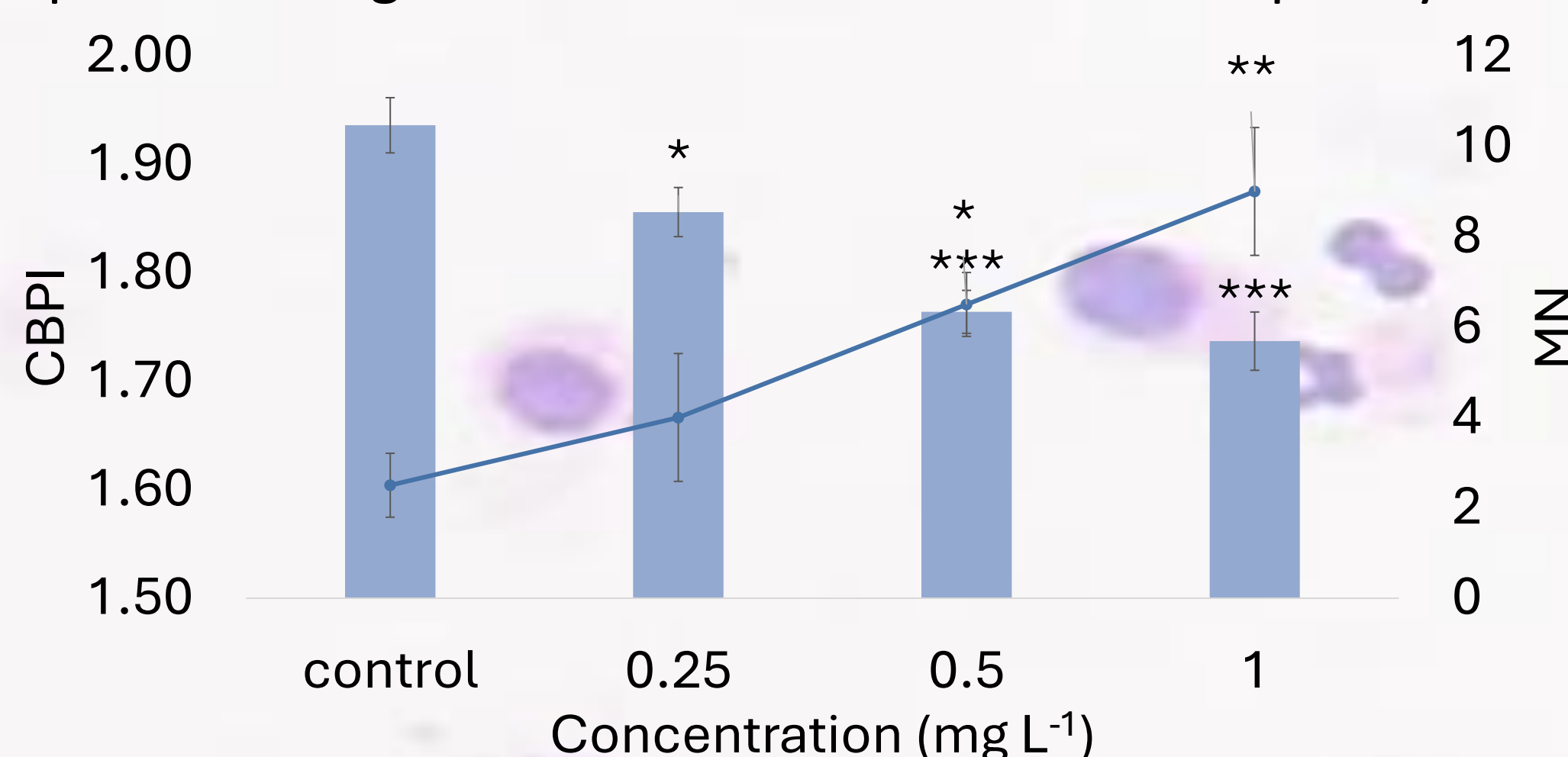


Figure 3: Mean values of CBPI and MN in human lymphocytes after exposure to different concentrations (0.25, 0.5, 1.0 mg L⁻¹) TBP and TBA mixture.

*, **, *** Significant difference compared to control at $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively.

CONCLUSIONS

- TBP presents higher cytotoxic/genotoxic potential in comparison to TBA.
- The studied mixture presented both cytotoxic and genotoxic effects, highlighting the importance of the simultaneous evaluation of the potential adverse effects of commonly co-existing compounds.

REFERENCES

- [1] Koch, C., Sures, B., 2018. Environmental concentrations and toxicology of 2,4,6-tribromophenol (TBP). *Environmental Pollution* 233, 706–713.
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