Response to Dr. Tamás Pálmai's review

I would like to thank the Reviewer for taking the time to review my thesis entitled: "Phytotoxicity of atmospheric particulate matter" and for the useful comments and suggestions. I deeply apologize for the typing and editing mistakes mentioned in the Review. In my response I am addressing explicit remarks and questions.

Remarks

Based on an ANOVA test, you can not make a statement 'Statistically significant decreases in chlorophyll b…', because ANOVA reveals only if there is a significant difference, but never the direction (increase or decrease).

Questions:

1. Why are oxidative stress–related enzymes and photosynthetic pigment parameters considered effective indicators of air pollution–induced phytotoxicity?

Potentially toxic compounds such as heavy metals and PAHs, which are analysed in our studies, can exert direct phytotoxic effects mostly via the formation of reactive oxygen species (ROS) which is in turn indicated by antioxydant enzymes (e.g. Oguntimehin and Sakugawa 2008).

Oguntimehin, I. and Sakugawa, H. (2008). Fluoranthene fumigation and exogenous scavenging of reactive oxygen intermediates (ROI) in evergreen Japanese red pine seedlings (*Pinus densiflora* Sieb. et. Zucc.). Chemosphere 72(5): 747–754.

2. What environmental and human health implications arise from the accumulation of PAHs in edible plant parts, particularly in areas affected by traffic emissions and illegal waste burning?

Diet is supposed to be the major source of human exposure to PAHs (Phillips, 1999). Tesi et al. (2021) for example reported that vegetables cultivated in some parts of Nigeria could be unsuitable for consumption based on their PAH, especially benzo[a]pyrene content. These vegetables are generally consumed in large quantities during the whole year in Nigeria.

In Hungary, however, vegetables analysed in our studies are consumed seasonally and in lower quantities, most possibly reducing human health hazard.

Phillips, D. H. (1999). Polycyclic aromatic hydrocarbons in the diet. Mutation Research/Genetic Toxicology and Environmental Mutagenesis, 443(1-2), 139-147.

Tesi, G. O. et al. (2021). Polycyclic aromatic hydrocarbons (PAHs) in leafy vegetables consumed in southern Nigeria: concentration, risk assessment and source apportionment. Environmental Monitoring and Assessment, 193(7), 443.

3. Why were the filters only stirred several times during the 24h extracting period, instead of continuous stirring (Chapter 3.1.1)?

Intermittent stirring during the 24-h extraction period was applied to ensure sufficient mass transfer while minimizing filter degradation, analyte loss, and contamination. Given the long extraction time, diffusion-controlled desorption was sufficient, and periodic agitation was adequate to homogenize the extract without compromising analytical accuracy.

4. Why were the plants cultivated in a wide range of temperatures (22±10°C)?

This temperature regime has been used as a reference, based on the conditions required by the OECD 227 Guideline (OECD 2006). However, our measurements indicated a narrower regime, 15-25 °C.

OECD (2006), *Test No. 227: Terrestrial Plant Test: Vegetative Vigour Test*, OECD Guidelines for the Testing of Chemicals, Section 2, OECD Publishing, Paris

5. How can foliar and root uptake pathways be (quantitatively) compared when exposure concentrations are expressed in different units (μg kg^{-1} vs μg L^{-1})?

Foliar and root uptake pathways can be quantitatively compared by converting exposure concentrations to a common internal dose metric (e.g., μg g^{-1} dry tissue or uptake flux per unit biomass or surface area) using plant-specific uptake rates, partition coefficients, and exposure duration to normalize differences between mass-based (μg kg^{-1}) and solution-based (μg L^{-1}) units.

Sincerely yours,

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Veszprém, 2025.01.07