Review of: "Probabilistic Assessment of the Heavy Metal Pollution in Debrecen's Topsoil"

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Review Comments on **Probabilistic assessment of the heavy metal pollution in Debrecen's topsoil**

The research effort of the authors is commendable. The following comments and suggestions are to improve the quality of the manuscript:

Abstract:

1. The methodology and the instrumentation adopted for the determination of heavy metals in the soil samples should be mentioned in the Abstract.

Introduction:

1. The use of the expression "pollutant substances" amounts to tautology, since pollutants are substances that pollute.

2. Examples of environmental threats from some specific heavy metal pollutants are to be included.

3. The reference "Yang et al, 2019" to be corrected with a capital "Y" in all cases.

Materials and methods

1. Fig. 1 was not available.

2. The map of sampling areas/sites identifying the urban and non-urban areas, as well as clearer details on the sampling procedure, are to be included (Section 2.2).

3. State the mesh size of the sieve used to obtain the fine soil particles. What is the difference between the particle size of fine soil particles obtained by sieving and that obtained after crushing in a mortar? (Section 2.3)

4. Necessary details of the procedure for the XRF analysis, such as sample particle size, sample size, preparation of the sample for introduction into the XRF analyser, etc., should be included in section 2.3.

5. The use of the terms "element pollutants" and "trace elements" in Section 2.3 is not clear.

6. Quality control and quality assurance protocols adopted for the XRF analysis should be included.

7. The abbreviation PGI does not go with Pollution Accumulation Index as quoted. The parameter proposed by Muller

(1969) is Index of geo-accumulation (I-geo). The change from I-geo to PGI should be appropriately referenced.

Results and Discussion

1. Table 1 - there is a need to provide an explanation for the variation in the number of samples indicated for each element in column 2, all of which is less than the 300 soil samples collected for the analysis.

2. Resolution of Fig. 2, Fig. 3, Fig. 4, and Fig. 5 to be improved for clear understanding.

3. In section 3.3, the correlation between As and **Pd** (0.66) to be corrected to As and **Pb**; and As and Zn (**0.45**) to As and Zn (**0.43**).

4. The discussion to include an explanation of the environmental and health implications of levels of Cu, Cd, and Mo which exceeded the permissible levels for Debrecen soil; as well as of the toxicity of the water system attributed to the leaching of Ca^{2+}

5. The numbering "section 3.3" is repeated.