Review of the thesis of Aida Meiramova titled by

Effect of residential solid waste burning on ambient air quality

in Central and Eastern Europe

In his work, the candidate identified specific and universal tracers of household waste burning in a study related to Hungary and Romania. Using this, she determined the proportion of waste burning's contribution to the PM10 aerosol concentration. Based on this, she estimated the amount of illegally burned waste.

This doctoral work is an excellent one regarding its concept, execution, and interpretation. It is based mostly on laboratory experiments and application the result in identifying different components in the aerosol particles derived from household waste burning.

The dissertation has been carefully written with excellent English style.

The length of the thesis is 92 pages which is between the required minimum and maximum size. The ratio of the main chapters is appropriate: introduction, literature review, objectives 22 pages, experimental part 21 pages, results and discussions 31 pages.

The length of literature summary is approx. twenty pages, giving a good overview of our current knowledge on the subject. The number of cited papers is approximately one hundred ten to one hundred twenty showing a thorough understanding and utilization of the literature.

The Goal of the research are clear and well-defined.

The analytical method used for the research is mass spectrometry after gas chromatography separation, a widely employed routine method suitable to identify several compounds from tracer components of burning.

Ther are some valuable, new results which are clearly presented, supported by illustrative figures.

Results of candidate are well summarized in six thesis points:

In the thesis one: she firstly identified specific tracers for residential waste burning by GC-MS in PM ten particles by laboratory burning of different waste types. It is acceptable as thesis point.

Thesis two: she has found universal tracers for waste burning, in PM samples as the 1,3,5-triphenylbenzene which has the highest concentrations in waste emissions containing larger number of aromatic rings. She has also confirmed that the burning of PET containing wastes, the terphenyls and quaterphenyls are not specific to the type of waste, but their relative mass ratios are. Acceptable as thesis point.

Thesis three, she has determined the relative mass ratio of specific tracers to PM ten in particulate emissions from controlled waste burning, as well as their absolute mass emission factors. Acceptable as thesis point.

Thesis four: she applied the results of previous theses, and she has quantified specific and non-specific tracers in several settlements' sample during the heating season. She gave evidence on the burning of different types of wastes in different towns and villages in HU and RO. Acceptable as thesis point.

Thesis five: by using the absolute emission factors of the specific tracers for residential waste burning and the levoglucosan she has estimated the total mass of residential solid waste that possibly burned in household stoves. Acceptable as thesis point.

Thesis six is a complex one, with several novelties:

a) She has shown that tracers are predominantly partitioned into the aerosol phase.

b) terphenyls, quaterphenyls, and melamine have longer residence times in the atmosphere than pyrolysis products containing at least one double bond.

c) For the first time she has identified a novel compound formed by the photooxidation of the primary burning tracer styrene trimer, which might be considered as an indicator for residential waste burning.

These also acceptable as thesis point.

Minor notes:

- For the sake of comparability, it would have been better to use the same unit of measure on the vertical axis of Figures 1 and 2.
- Tables 3, 4, and 5 should be mentioned in numerical order.
- In the bibliography, different articles should have been separated by either line spacing or indentation.

A question:

Figure 3 shows the amount of waste burned in households. When the values are added together, the total only amounts to 53%. What accounts for the remaining 47%?

In summary,

this doctoral work perfectly meets the standard requirements for PhD theses in terms of its objectives, implementation, and interpretation. Therefore, I recommend it for acceptance and public defence.

Érd, 2024-05-05

László Horváth

DSc