

Peer Review

Review of: "Long-Term Environmental and Human Health Impacts of Hazardous Waste Incineration: A Case Study in Catalonia, Spain"

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This is an excellent review of the work carried out by the Laboratory of Toxicology and Environmental Health of the Rovira i Virgili University (Tarragona, Catalonia, Spain), directed by Prof. José L. Domingo, on the health risks posed by one hazardous waste incinerator to the surrounding population. It describes studies on dioxin and metal concentrations in soil, grass, breast milk, adipose tissue, food, vegetation, autopsy tissues, hair, blood plasma, and whole blood performed over 20 years in the area of influence of this incinerator. The review provides baseline data for the assessment of health risks which, in this case, was found not to be significant in terms of direct exposure to the surrounding population.

The work described provides useful guidelines on the methodology for studying the health risks of these facilities. This review deserves to be published because of the results obtained, the procedures described, and the great experience of Prof. Domingo in the field of dioxin studies, in particular those related to the health risks of waste incinerators.

The review also identifies some areas for improvement in future studies, such as monitoring of volatile organic compounds, brominated dioxins, microplastics, and nanoparticles. It also mentions the need for specific analysis of hexavalent chromium in view of the total concentrations of this metal found in some autopsy tissues.

While some of the studies conducted by the Toxicology Laboratory indicate that the environmental levels of dioxins observed between 2013-2016 did not imply additional carcinogenic or non-carcinogenic risks to the local population (Marques et al [12]), the review highlights the need for epidemiological assessment of possible increases in cancer incidence in the area surrounding the incinerator. It also

indicates that, although this facility meets the EU Industrial Emissions Directive Limit of 0.1 ng TEQ/Nm³ for PCDD/F, the safety of this threshold remains unproven. The present case study could provide useful information in this regard.

In relation to this statement, the demarcation of Tarragona is one of the few Catalan and Spanish counties that has a Cancer Incidence Registry. The information generated by this Agency could provide important information in this regard, since it has been collecting information on clinically identified cancers for more than 50 years, including monitoring of the classification of the diagnosed cancers. In the review, perhaps it could be clarified whether this Agency was approached and what results were obtained from the information provided.

There are some small items that the authors could consider for improvement:

- a) It should be clarified whether the PCDD/F data also included the toxicity equivalents of dioxin-like polychlorinated biphenyls.
- b) In many referenced studies, the number of samples analyzed is mentioned, but in others, this information is missing. I suggest that Tables 1 and 2 include this information in the summary of results of each paper.
- c) The paper Ferre-Hughet et al (14) is not included in Table 1.
- d) The review refers to the only hazardous waste incineration existing in Spain. Are there studies on the impact of human and environmental health of hazardous waste incinerators elsewhere? It would be useful to give some hints on those from other countries, if available.
- e) The review could mention whether reports on the control of atmospheric dioxin emissions from the studied installation are available and quote them.
- f) Also, there may be reports or papers on atmospheric dioxin levels in the area surrounding the incinerator. They should be mentioned if available.

Declarations

Potential competing interests: No potential competing interests to declare.