



## Multi-step approach for comparing the local air pollution contributions of conventional and innovative MSW thermo-chemical treatments

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### HIGHLIGHTS

- New comparison method on the contribution of MSW thermal options to local air quality pollution.
- Thermal processes comparison: original results.
- Heavy metals impact not negligible.

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### ABSTRACT

In the sector of municipal solid waste management the debate on the performances of conventional and novel thermo-chemical technologies is still relevant. When a plant must be constructed, decision makers often select a technology prior to analyzing the local environmental impact of the available options, as this type of study is generally developed when the design of the plant has been carried out. Additionally, in the literature there is a lack of comparative analyses of the contributions to local air pollution from different technologies. The present study offers a multi-step approach, based on pollutant emission factors and atmospheric dilution coefficients, for a local comparative analysis. With this approach it is possible to check if some assumptions related to the advantages of the novel thermochemical technologies, in terms of local direct impact on air quality, can be applied to municipal solid waste treatment. The selected processes concern combustion, gasification and pyrolysis, alone or in combination. The pollutants considered are both carcinogenic and non-carcinogenic. A case study is presented concerning the location of a plant in an alpine region and its contribution to the local air pollution. Results show that differences among technologies are less than expected. Performances of each technology are discussed in details.

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