

Impact of wood combustion in fireplaces on indoor air quality

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In the last few decades, there has been a growing interest from international scientific community, policy makers, and environmental governances on indoor air quality (IAQ), particularly about the impact of the biomass burning in fireplaces. Especially in colder periods, this heating method is still widely used, and it is an important source air pollutant, both in outdoor and indoor environments [1]. Information is still very scarce about this subject, and since people spend 90 % of their time indoors [2], it makes sense to analyse what would be the impact of the air pollutants. There have been strong evidences that the exposure to emissions from biomass burning can lead to a wide range of health problems. Currently, 4.3 million people die annually from exposure to indoor air quality pollutants, most from stroke (34%), ischaemic heart disease (26%), pneumonia (12%) and lung cancer (6%) [3].

The purpose of this study is to assess the degradation of indoor air quality and the individuals' exposure to particulate matter (PM), namely ultrafine particles (UFP), PM10 and PM2.5, along with other parameters, such as black carbon (BC), carbon dioxide (CO₂) and carbon monoxide (CO). Levels of PM2.5 and PM10 were assessed also through filter sampling.

A series of experiments was performed to characterise the emissions from the combustion of four types of biofuel (*Eucalyptus globulus*, *Quercus ilex*, *Quercus suber* and *briquettes*) in a living room of a house, in a closed fireplace. The ignition phase was done with newspaper and pine cones, according to EPA's recommendations [4].

After analysis of the collected data, we can conclude that the particles are mostly

concentrated in the fine fraction and the highest PM concentrations were recorded for *Quercus suber*. For black carbon and carbon monoxide, the results were consistent with the PM, revealing higher values for *Quercus suber*. For carbon dioxide, *Quercus suber* and *Quercus ilex* also stand out, with values exceeding the legal limit imposed by Ordinance 353-A/2013.

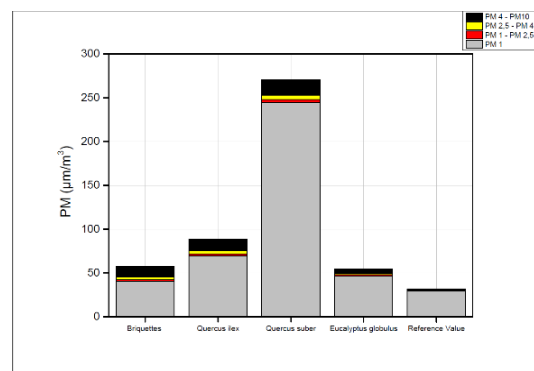


Figure 1 – PM concentrations

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This work reflects only the authors' view:

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