

# **BIOETHANOL FIREPLACES AND OTHER COMBUSTION SOURCES OF INDOOR AIR POLLUTION: A COMPARATIVE STUDY**

**S. Bertagna<sup>1</sup>, C. Morreale<sup>1</sup>, G. Migliavacca<sup>1</sup>, R. Rota<sup>2</sup>, M. Derudi<sup>2</sup>**

silvia.bertagna@mi.camcom.it

<sup>1</sup> Innovhub - Stazioni sperimentali per l'Industria – Divisione Combustibili, 20097 San Donato Milanese (MI), Italy

<sup>2</sup> Politecnico di Milano, Dip. di Chimica, Materiali e Ingegneria Chimica "G. Natta", 20131 Milano, Italy

Indoor air pollution is produced from domestic sources usually considered as harmless, such as certain elements of construction and furnishing of houses, certain appliances for home heating, cooking food, and from decorative elements such as candles and incenses.

In particular, flueless alcohol-powered fireplaces can represent a source of indoor air pollution in domestic or non-domestic places where they are installed and used, due to the fact that combustion products are entirely released in the ambient air where people live or spend a long time. These fireplaces may have different characteristics in terms of thermal power and constructive features, which may influence the quality and quantity of the emitted pollutants. The features and conditions of the ambient, where the fireplace is used, are equally important in determining the effect on the local air quality, since its dimension and mainly its ventilation conditions determine both the amount of oxygen available for combustion and the dilution and dispersion of the pollutant species.

In this study all the main parameters influencing the indoor air quality have been considered; for this reason, several laboratory experiments in order to determine the emissions into indoor air due to different models of alcohol-powered flueless fireplaces have been performed. Then, the experimental results have been used to reconstruct a typical exposure scenario in which the estimated pollutants concentrations can be compared with the corresponding indoor air quality standards to assess preliminary possible health risks; moreover, a comparative analysis focused on some target pollutants to evaluate the relative contribution of alcohol-fed appliances with respect to other typical domestic sources of pollutants, such as scented candles and incenses, on the indoor air quality has been performed.

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