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EFFECTS ON THE RESPIRATORY TRACT OF INDOOR AND OUTDOOR AEROSOL

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In this study, the aerosol size distribution between 0.1-10 μm has been measured with an optical spectrometer (PCASP-X) in two indoor and in two outdoor locations in Northwestern Spain: i) the gymnasium of the University of León (Castro et al., 2015), ii) the living room of a rural house during biomass burning in an open fireplace, and an urban area of León iii) in the transition of summer-autumn, and iv) during a vigorous forest fire, 50 km from León city, under an intense thermal inversion. The evolution of the aerosol size distributions and their characteristic parameters were analyzed. In addition, the study of the influence of this particulate matter in the respiratory health was carried out by means of the calculation of the inhalable, thoracic, tracheobronchial and respiratory fractions following the standard UNE 77213. Considering the number of particles of each size, their aerodynamic diameters and their estimated density, the percentages corresponding to the different mass fractions of aerosols deposited in the human respiratory tract were thus calculated for healthy adults and high-risk groups (children, elderly or infirm people). Since all four studied situations showed different size distributions, the particulate matter deposited on different parts of the respiratory tract has also been different, with diverse consequences on human health.

Castro et al. (2015). Indoor aerosol size distributions in a gymnasium. Sci. of the Total Env. 524-525, 178-186.