

Study of biomarkers and nitro-organic compounds from sugarcane burning in atmospheric samples collected in São Paulo in 2012 and 2013

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São Paulo is a megacity located in South America where main source of aerosols is associate with fossil fuels burning and industrialized emissions. São Paulo state is the major producer of sugarcane in Brazil¹. It contributes to the atmospheric pollution through long-range transport of the particulate matter, influences cloud formation, radiation balance ozone formation and human health.

In the last years, levoglucosan has been used as marker compound for biomass burning in aerosol samples; it is a compound originated from pyrolysis of cellulose. The aim of this study was to correlate sugar cane burning activity in São Paulo State with the increase of biomarkers concentrations in the atmosphere.

High volume sampler was used to collected aerosol samples inside the University of São Paulo, during the winter in 2012 and 2013. Elemental Carbon (EC), Organic Carbon (OC), monosaccharides and nitro-organic compounds were determined in PM₁₀ by thermal-optical analysis, liquid and gas chromatography. Nitro-organic compounds were identified in Brazilian samples for the first time. These compounds presented strong correlation with levoglucosan, indicating that both were originated from the same source.

The concentrations of PM₁₀ was higher in 2013 (93.7 $\mu\text{g m}^{-3}$) than 2012 (40.5 $\mu\text{g m}^{-3}$). Concentration in 2013 exceeded the WHO recommendation (50 $\mu\text{g m}^{-3}$). Also PM₁₀, levoglucosan, galactosan, mannosan and nitro-organic compounds concentrations were higher for the samples collected in 2013 than 2012.

Chemical analysis and air masses trajectories indicated that sugarcane burning in the vicinities of São Paulo city, contributed to air quality.

Biblyograph

¹ Vasconcellos, P.C., Souza, D.Z., Ccoyllo, O., Bustillos, J.O., Lee, H., Santos, F.C., Nascimento, K.H., Araújo, M.P., Saarnio, K., Teinila, K., Hillamo, R. (2010). Determination of anthropogenic and biogenic compounds on atmospheric aerosol collected in urban, biomass burning and Forest areas in São Paulo, Brazil. *Science of Total Environment*. 408, 5836 - 5844.

² Kahnt, A., Behrouzi, S., Vermeylen, R., Shalamzari, M. S., Vercauteren, J., Roekens, E., Claeys, M., Maenhaut, W. (2013). One-year study of nitro-organic compounds and their relation to wood burning in PM₁₀ aerosol from a rural site in Belgium. *Atmospheric Environment*. 81, 561 – 568.