

Occurrence of oxygenated and nitrated polycyclic aromatic hydrocarbons in aerosol samples collected in the Amazon region

SOFIA CAUMO¹ (PG), NILMARA DE OLIVEIRA ALVES² (PQ), PAULO ARTAXO³ (PQ), PÉROLA C. VASCONCELLOS^{1*} (PQ)

perola@iq.usp.br

¹Institute of Chemistry, University of São Paulo, São Paulo, Brazil,

²School of Medicine, University of São Paulo, São Paulo, Brazil

³Institute of Physics, University of São Paulo, São Paulo, Brazil

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Abstract

The Brazilian Amazon represents about 40% of the world's remaining tropical rainforest. Human activities have become important drivers of disturbance in that region. In this study we characterize western Amazonia biomass burning emissions through the quantification of oxy-PAH and nitro-PAH. Some of these species present mutagenic and carcinogenic properties.

Introduction

In this study we characterize western Amazonia biomass burning emissions through the determination of oxy and nitro-PAH. The samples were extracted and fractionated. The target compounds were determined by gas-chromatography and mass spectrometry.

Results and Discussion

The results show that PM₁₀, OC and EC concentration were relatively constant throughout the wet season indicating an overall stable balance between aerosol sources and sinks¹.

Four oxy-PAH were determined in this study (Figure 1).

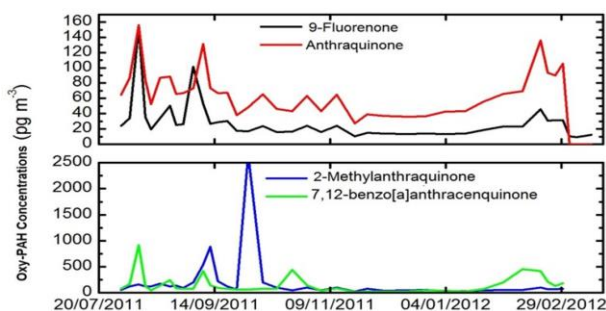


Figure 3: Time series of oxygenated-PAH in the Amazon region.

The species 2-methylanthraquinone and 7,12-benzo[a]anthracenquinone were the most abundant oxy-PAHs, depicting 192.2 pg.m⁻³ and 145.9 pg.m⁻³, respectively.

A total of 11 nitro-PAHs were detected and quantified. Among them, some mutagenic compounds like 2-nitrofluoranthene. It is formed in the atmosphere. The 6-nitrochrysene was the most abundant nitro-PAH (119.0 pg.m⁻³), followed by 9-nitroanthracene (82.5 pg.m⁻³) and 6-nitrobenzo(a)pyrene (73.8 pg.m⁻³) (Figure 2).

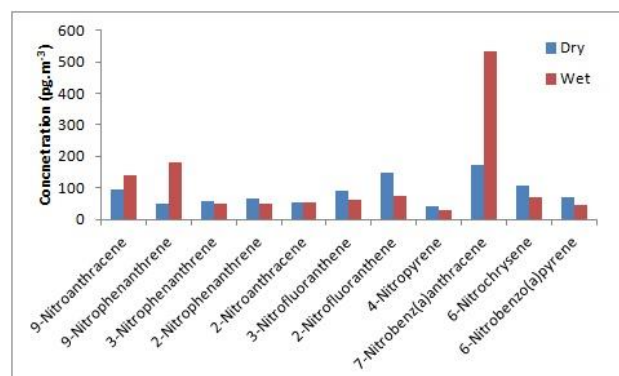


Figure 2: Average concentration of Nitro – PAH in PM collected in Porto Velho.

Conclusions

This study describes quantification of ambient PM₁₀, OC, EC, nitro-PAHs and oxy-PAHs in a region strongly impacted by biomass burning in the Amazon Basin. These species affect the air quality of a representative site of the arc of the deforestation.

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¹ De Oliveira Alves et al., 2015. *Atm. Environ.*, doi: 0.1016 / j.atmosenv.2015.08.059.