Biomass burning in the Amazon Region: Characterization of airborne particle-phase Polycyclic Aromatic Hydrocarbons

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The Brazilian Amazon region has been intensively affected by deforestation and biomass burning, resulting in increased impacts on our climate and environment with adverse effects on health (Alves *et al*, 2011).

Moreover, studies have documented that one of the components that may be responsible for the observed health effects are organic particulate matter, mainly carcinogenic and/or mutagenic compounds such as polycyclic aromatic hydrocarbons (PAHs) (Boneta et al., 2009).

The objective this study was to identify and to quantify the PAHs in the particulate matter smaller than 10µm (PM_{10}) in filter samples collected in Porto Velho, located in the northern state of Rondonia, region of deforestation and human occupation in the Amazon.

The PM_{10} samples were collected during the dry season (July - October/2011) using high-volume sampler (Figure 1). Subsequently, the samples were extracted with dichloromethane and fractionated in different classes of organic compounds. The PAHs were analyzed by gas-chromatography-mass spectrometry.

Figure 1. The PM_{10} samples were collected using high-volume sampler in Porto Velho, Amazon region.

PM_{10} average mass concentration in the samples collected were 27.3 µg/m³ (Figure 2). The majority of the PM_{10} concentrations did not exceed the limit established by the World Health Organization (WHO) (50 µg/m³).

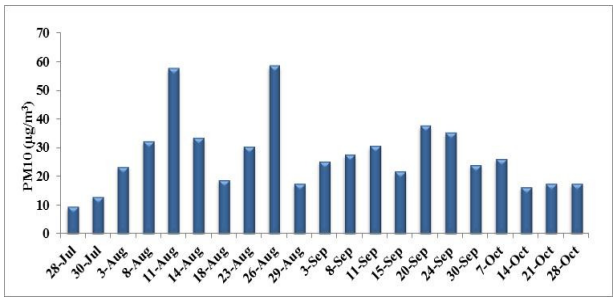

Figure 2. Concentrations of PM_{10} collected in Porto Velho.

The results showed that the anthracene, indene[1,2,3-c,d]pyrene and benzo[g,h,i]perylene were the most abundant compounds among those analyzed. Benzo[a]pyrene, a highly mutagenic and carcinogenic compound, has been identified (Figure 3).

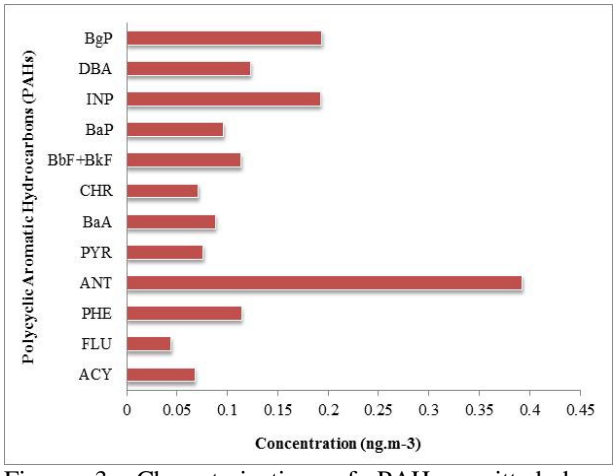

Figure 3. Characterization of PAHs emitted by biomass burning in Porto Velho.

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Alves, NO. et al. (2011) *Ecotoxicology and Environmental Safety*. 74, 1427-1433.

Boneta, S.et al. (2009) *Chemosphere*. 77:1030–4.