

Polycyclic aromatic hydrocarbons (PAHs) in surface water from the coastal area of Bangladesh

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Abstract. Sixteen USEPA priority polycyclic aromatic hydrocarbons (PAHs) in the surface water from the coastal areas of Bangladesh were analyzed by GC-MS/MS. Samples were collected in winter and summer, 2015. The total concentration of PAHs (Σ PAHs) showed a slight variation in the two seasons, which varied from 855.4 to 9653.7 ng/L in winter and 679.4 to 12639.3 ng/L in summer, respectively. The levels of Σ PAHs were comparable to or relatively higher than other coastal areas around the world. The areas with recent urbanization and industrialization (Chittagong, Cox's Bazar and Sundarbans) were more contaminated with PAHs than the unindustrialized area (Meghna Estuary). Generally, 2–3-ring PAHs were the dominant compounds. Molecular ratios suggested that PAHs in the study areas could be originated from both pyrogenic and petrogenic sources. The risk assessment revealed the extremely high ecological risk of PAHs, indicating an intense attention should be paid to PAHs pollution in the coastal areas of Bangladesh.

Keywords: polycyclic aromatic hydrocarbons (PAHs); surface water; risk assessment; coastal area; Bangladesh

1. Introduction

Polycyclic aromatic hydrocarbons (PAHs) are a group of persistent organic pollutants. These compounds are composed of two or more fused aromatic rings of carbon and hydrogen atoms. There are two predominant sources of environmental PAHs such as, petrogenic source comprising of PAHs associated with crude oil spills, and pyrogenic source including PAHs derived from fossil fuel combustion, biomass burning, waste incineration, and asphalt production (Zheng *et al.* 2016).

They are ubiquitous in the environment due to their persistence, long range transport, bioaccumulation and known to be very toxic to the biological systems (Lotufo and Fleeger 1997, Gu *et al.* 2013).

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Table S7 Continued

Season	Site ID	pH	Temperature	Salinity	TSS
			(°C)	(‰)	(mg/L)
Summer	CX1	7.2	24.5	22.5	500
	CX2	6.5	23.3	24.0	350
	CX3	6.8	24.1	12.5	480
	CX4	7.1	23.5	16.5	460
	CT1	6.5	22.3	13.5	350
	CT2	6.2	23.8	15.5	440
	CT3	6.3	23.6	17.0	250
	CT4	6.5	23.5	18.5	290
	ME1	7.5	22	4.5	850
	ME2	6.8	24.3	3.5	630
	ME3	7.3	23.6	7.0	520
	SN1	6.5	23.5	13.5	900
	SN2	6.2	24.4	14.0	750
	SN3	5.5	24.9	16.5	850