Artificial sweeteners as anthropogenic molecular markers

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Background

Discorery and assessement of new molecular markers are important mission of organic geochemists. We examined artificial sweeteners as indicators of human activities, more speficially sewage pollugion, in surface water and groundwater. We surveyed Vietnam, Thailand, Philippines, Indonesia, Japan, Mozambique, South Africa, Kenya, and Ghana by visiting 358 locations in 2010 – 2014. The water samples including sewage, urban and rural river water, and groundwater were analyzed for artificial sweeteners (Acesulfame : ACE; sucralose : SUC; saccharin : SAC; cyclamate: CYC). were also measured. In addition, conventional markers, i.e., linear alkylbenzenes (LABs) and coprostanols, and emerging markers, i.e., antibiotics, were determined.

Results and Discussions

ACE was ubiqutously detected in surface waters in Asian and African countries. Concentrations of artificial sweeteners showed good correlations with those of conventional and emerging markers (Fig.1). These demonstrated the utility of the artificial sweeteners as indicators of sewage inputs.

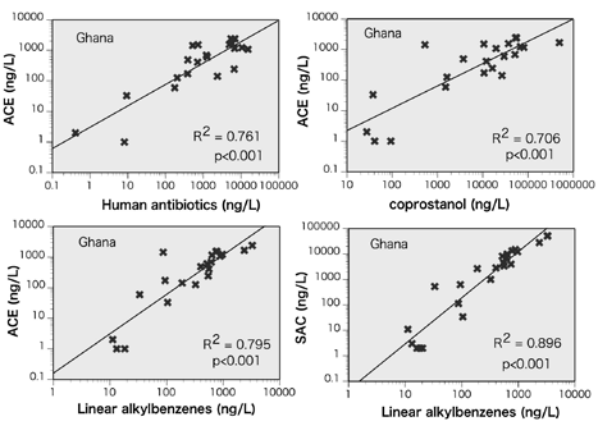

Figure 1. Correlation of artificial sweeteners with those of conventional markers.