Concentration of heavy metals in water, sediment and some commercial fish species in the coastal area, Bangladesh and health risk assessment

Mohammad Raknuzzaman and Shigeki Masunaga

Introduction: In recent years, the accumulation of heavy metals in aquatic ecosystems has become a great problem throughout the world, especially in developing countries like Bangladesh. In the Bangladesh context, the accumulation of heavy metals in coastal areas have been paid less attention and no complete study have been carried out so far. Besides,unfortunately the concerned authorities, public administration of the government and overall general people have not been awared to this severe lethal health risk problem.Eventually, it will be a severe public health concern in near future.Hence,it is high time to concentrate our views to this problem with integrated approaches.

Objective: To determine the concentrations of certain heavy metals and their spatial and temporal distribution in water, sediment and some commercial fishes emphasizing on public health risk assessment in the coastal area of Bangladesh

Coastal Fishing

Materials and methods

Fig. Map of study area (coastal)

Heavy metals contamination in water, sediment and fish

- Lead = renal failure, liver damage, mental retardation
- Cadmium= kidney injure , poor reproductive capacity, hypertension, tumors , hepatic dysfunction
- Chromium, Zinc, Copper= nephritis, anuria and extensive lesions in kidney

Environmental Challenges for Bangladesh

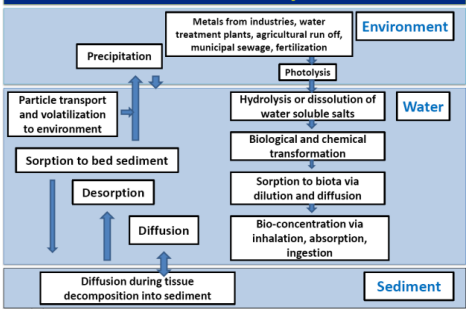
Public Health Risk

Implications for new generation

Coastal Pollution Status(Chittagong Port Area)

Coxs Bazar

Movement of Heavy Metals



Sunderbans

Water sample:
surface water samples--- > 100 ml polyethylene bottles previously washed with dilute nitric acid and deionized water ------> different stretches and acidified with 5% concentrated nitric acid

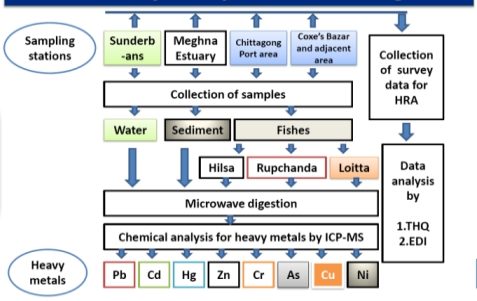
Sediment sample:
Coastal bed sediment (top to 5 cm) by Ekman grab sampler -------> acid-rinsed polypropylene bags ----> oven dried at 105 °C for 24 h -------> an agate mortar and a pestle-----> sieved through a plastic mesh (aperture 63μm) ------> stored in polyethylene bottles until sequential extraction analysis

Fish sample:
Fish samples ------> deionized water to remove surface adherents-----> about 300 g of fish muscle ------> dried under oven at 105 °C for 24 h------> polypropylene bottles or Ziploc bag for chemical analysis

Health risk assessment:
Target Hazard Quotient (THQ)

Chemical analysis:
Inductively Coupled Plasma-Mass Sspectrometry (ICP-MS)

Summary of Experimental Design



Bhola

Outcome: To provide baseline information for public health risk and help the concerned authorities address human health problems attributed to heavy metals toxicity

Data Analysis
1. Heavy metal analysis(water, sediment and fishes)
2. Questionnaire analysis
3. Salinity and SS analysis

Future plan

Sampling difficulties and limitations

1. Remote area with bad communication system
2. Natural calamities (bad weather, rolling)
3. Limited access of transportation
4. Fish storage
5. Limited facilities in laboratory

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mohammad-raknuzzaman-jc@ynu.ac.jp