MONITORING HEAVY METALS IN WATER, SUSPENDED PARTICULATES, SEDIMENT AND CLAM FLESH AT CLAM FARMS IN COASTAL AREA OF HO CHI MINH CITY, VIETNAM

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Introduction

High rate of urbanization and industrialization of provincial cities and Ho Chi Minh City (HCMC), of which current population is more than 10 million, resulted in serious water issues of Saigon-Dongnai River SGDN River. Heavy metal contamination from urban areas and industrial zones were found in water and sediment in Saigon River (Anh et al., 2003; Trang, 2006). Clam is one of predominant commercial aqua-products exploited in Can Gio District, the coastal zone of HCMC, that belongs to Saigon river estuary area. In aquatic organisms such as mollusks, metal content in the tissue can be highly dependent on environmental conditions such as water, sediment, suspended particulate and on the physiological status of individuals (Wright et.al, 1985). Indeed, heavy metals could be absorbed to particulate matter and accumulated in bottom sediments (Kennish, 2001; Pan & Wang, 2012) and bivalves (Dan et al., 2014; Lias, T, & Nor Aliaa, 2013). Thus, this study aimed to monitor some selected trace metals (Cu, Zn, Pb, Cr and Cd) in clam *Meretrix Lyrata*, suspended particulate matter (SPM), water and sediment at clam farms at Can Gio coastal area in HCMC, Vietnam.

Methods

Sediment, SPM, water and clam samples were collected in in both rainy and dry seasons (March, April, May, June, July and September 2015) at clam farms at Can Gio District. Water, sediment, suspended particulate samples and clams were sampled at clam farms in Tan Thanh beach, nearby Cua Tieu estuary, Tien River mouth which belongs to Mekong river Delta, as a comparative site. The sampling was performed at low tide when the sand beach exposed to the air. About 150 mL water samples were filtered on-site using 0.45 µm Whatman® cellulose acetate filter to separate dissolved phase and SPM. About 200 gram of sediment, water, SPM and clam samples were stored in icebox during the transport from the sampling site to laboratory. Clams of 3-12 months age were directly collected at the beach by hand picking. White hard clams (*Meretrix lyrata*) were selected to study. The sediment, SPM and clam samples were dried at 60°C in oven about 5 to 6 hours and powdered until digestion procedure. In the laboratory, the clam tissues were cleansed to remove mud and debris and subsequently washed with double distilled water. Trace metals of filtered water, treated clam fleshes and sediment samples were analyzed according to EPA method 200.7 by using ICP-OES (with level of detection of ± 1- 5 µg/l) at the laboratory of HCMUT. Replicate analyses was conducted on 10% of the samples to evaluate precision of the analytical techniques.

Results

Trace metals in SPM and clam flesh at the clam farms in Can Gio beach were higher than those in Tan Thanh beach (Figure 1). Zn and Cd contents in the clams were higher than those of Median International Standards (MIS). Cu contents in clam fleshes at Can Gio were little bit over than that of the limits of USFW, whereas mean Pb contents of all samples were less. Cu and Pb concentrations increased for clams with

higher age. In comparison to aqua-food quality regulation of some countries, some clam samples at Can Thanh beach did not met the limit values in terms of Zn and Cd, whereas trace metals of all clam samples in Tan Thanh beach, near Tien River, did met.

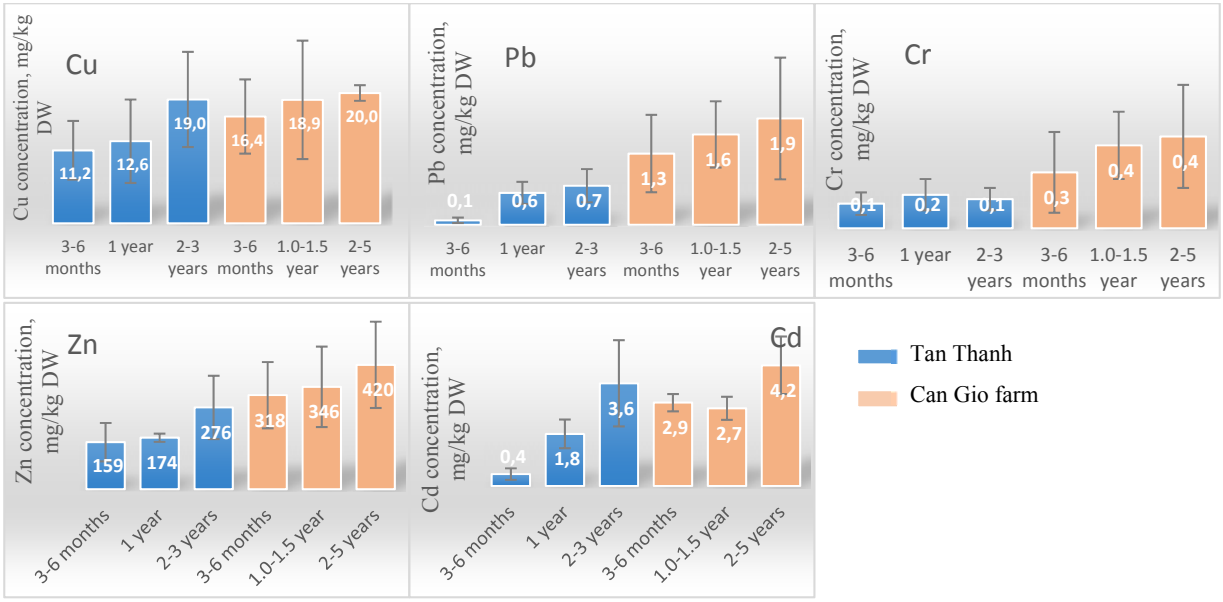

Figure 1. Concentration of trace metals in clam fleshes

Conclusion

This study results showed that heavy metals (Zn, Cu, Pb, Cd and Cr) with the high concentration in water, sediment, particulate and clams in the coastal area in HCMC. These concentrations were higher than that in Tien River belonging to Mekong River.

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