

Content of Cadmium and Lead in Some Edible Bivalves Samples from Pakphanang Bay, The South of Thailand

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Abstract: The analysis of cadmium and lead in some edible bivalves samples such as *Polymesoda proxima*, *Tegillarca granosa*, *Crassostrea gigas* and *Meritrix meritrix Linnaeus* were determined by Atomic Absorption Spectrophotometry. Some edible bivalves samples were collected from Pakphanang bay, Nakhon Si Thammarat province in the south of Thailand. The results revealed that cadmium and lead were found in the range of 0.33 ∓ 0.51 - 2.15 ∓ 0.23 and 0.30 ∓ 0.46 - 0.92 ∓ 0.27 ppm respectively, but no contamination by lead was found in *Tegillarca granosa*. The results showed that none of the lead samples exceeded the standard of Ministry of Public Health (No. 98, 1986). However, the cadmium content in *Crassostrea gigas* samples exceeded the standard criteria (FAO/WHO, 1989).

Key words: Cadmium; Lead; Edible Bivalves Samples

Introduction

The principal toxic effect of cadmium is its toxicity to the kidney, although it has also been associated with lung damage (including induction of lung tumors. The most critical effect of low-level lead exposure is on intellectual development in young children and, like mercury, lead crosses the placental barrier and accumulates in the fetus.¹⁻³

Edible bivalves are seafood that has a unique flavor, can be a variety of cooking and is currently popular. Edible bivalves are an aquatic species that risks the accumulation of heavy metals. Because the shell is located at the bottom of the river or sediment in the sea.

Experimental

Thesome edible bivalves samples such as *Polymesoda proxima*, *Tegillarca granosa*, *Crassostrea gigas* and *Meritrix meritrix Linnaeus* were collected between July and November

2016 from Pakphanang bay in Pakphanang district, Nakhon Si Thammarat province, the southern part of Thailand.

The standard procedure described in AOAC (2005) was followed for the preparation of samples for analysis of heavy metals. Cadmium and lead in some edible bivalves samples were determined directly after preparation and used atomic absorption spectrophotometry.

Results and Discussion

Table 1. The content of cadmium and lead in Some edible bivalves samples

samples	Cadmium (ppm)	Lead(ppm)
<i>Polymesoda proxima</i>	1.36 \pm 0.41	0.30 \pm 0.46
<i>Tegillarca granosa</i>	0.42 \pm 0.32	N.D.
<i>Crassostrea gigas</i>	2.15 \pm 0.23	0.92 \pm 0.27
<i>Meritrix meritrix Linnaeus</i>	0.33 \pm 0.51	0.33 \pm 0.51

N.D. = Nondetectable

The results revealed that cadmium and lead were found in the range of 0.33 \pm 0.51 - 2.15 \pm 0.23 and 0.30 \pm 0.46 - 0.92 \pm 0.27 ppm respectively, but no contamination by lead was found in *Tegillarca granosa*. (Table 1) The accumulation of metals in some edible bivalves samples specimens may be related to factors such as the amount of heavy metals in the water source, the discharge into the water source and the food of the some edible bivalves samples.

The results showed that none of the lead samples exceeded the standard of Ministry of Public Health (No. 98, 1986), with a value not exceeding 1 ppm. But the cadmium content in *Crassostrea gigas* samples exceeded the standard criteria (FAO/WHO, 1989), with a value not exceeding 2 ppm.⁴⁻⁵

Table 2. The percentage recovery of cadmium and lead

samples	Cadmium (%)	Lead(%)
<i>Polymesoda proxima</i>	103.70	104.00
<i>Tegillarca granosa</i>	100.88	82.00
<i>Crassostrea gigas</i>	103.54	87.00
<i>Meritrix meritrix Linnaeus</i>	99.00	94.00

The percentage recovery of cadmium and lead were found at 99.00 -103.70 and 82.00 -104.00 % respectively (Table 2). The limit of detection and limit of quantitation were found at 0.001 and 0.010 ppm respectively for Cadmium and lead (Table 3). The percentage recovery, limit of detection and limit of quantitation are acceptable

Table 3. The limit of detection and limit of quantitation for Cadmium and lead

heavy meta	limit of detection, LOD(ppm)	limit of quantitation, LOQ(ppm)
Cadmium	0.001	0.010
Lead	0.001	0.010

Conclusions

The results showed that none of the lead samples exceeded the standard of Ministry of Public Health (No. 98, 1986). But the cadmium content in *Crassostrea gigas* samples exceeded the standard criteria (FAO/WHO, 1989). However, avoid eating foods that are at risk of heavy metal accumulation for your body's safety.

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