

CAGED AND POND TILAPIA IN PAHANG: ARE THEY SAFE TO EAT?**Cheng LP^{1*}, Mohammad Zainie H², Sharifah Mahani SMA¹**¹Temerloh District Health Office, Jalan Kuantan, 28000 Temerloh, Pahang, Malaysia²Temerloh Health Clinic, Jalan Triang, 28000 Temerloh, Pahang, Malaysia

*Corresponding author: Cheng Lai Ping, Temerloh District Health Office, Jalan Kuantan, 28000 Temerloh, Pahang, Malaysia

Introduction

Cadmium (Cd) contamination in *Oreochromis* spp. (Tilapia) is a global public health concern. In Malaysia, the permissible Cd limit in Tilapia is ≤ 1 mg/kg. High Cd levels may cause DNA damage, toxicity, and carcinogenic effects, with bio-accumulation mainly in the kidney and liver. This study aims to determine the Cadmium content in Tilapia reared in cage and pond systems, both commonly consumed in Pahang. It further seeks to compare differences in Cd levels between the two rearing methods to evaluate the safety of Tilapia for human consumption.

Methods

Tilapia were collected from cage and pond sites in Pahang using a stratified sampling method. Sampling sites were selected along the Pahang River based on potential exposure to Cadmium pollution sources, including mining activities, agricultural runoff, and industrial effluents. Cd levels in Tilapia samples were determined using Graphite Furnace Atomic Absorption Spectrometer (GFAAS). Differences in Cd levels between cage and pond systems were analyzed using the Mann-Whitney test in SPSS Version 28. p-value of <0.05 was considered as statistically significant.

Results

A total of 19 Tilapia samples were collected, comprising 10 from cage systems and 9 from pond systems.

Table 1. Comparing median Cd level between Pond and Caged Tilapia

Variable	n	Cadmium level in mg/kg Median (IQR)		Z statistic	p-value
Tilapia systems				-0.041	0.968
pond	9	0.5037	(0.0086)		
cage	10	0.5035	(0.0085)		

Note: Mann-Whitney test

IQR = Interquartile range

Inspection of histograms revealed that Cd levels were not normally distributed for both groups. Therefore, a Mann-Whitney test was run on the data. The results indicated that Cd level were not significantly different between Pond Tilapia (Median=0.5037, IQR=0.0086) and Cage Tilapia (Median=0.5035, IQR=0.0085), $Z=-0.041$, $p=0.968$. Therefore, there is no significant association between Cd levels and Tilapia groups (Table 1).

Discussion

Cd levels in Tilapia from both cage and pond systems in Pahang were below the permissible limit set by Malaysian regulations. There were also no significant differences between cage and pond Tilapia with Cd level. Thus, both Tilapia from pond and cage are safe for human consumption.

Keywords: Cadmium, tilapia, pond, caged, GFAAS