



Safe Fish, Safe Families: Strengthening Food Safety in Tuguegarao City's Wet Markets



Food Science & Chemistry

Jinky Marie T. Chua*, Ma. Krischen Z. Austria, Gail Ann P. Pascual, Rosalia B. Cabalza and Jay Andrea Vea D. Israel

College of Allied Health Sciences, Cagayan State University, Andrews Campus, Tuguegarao City, Philippines

Corresponding Author: jchua@csu.edu.ph

Key Findings and Policy Implications

- Common fish species of Tilapia and Hito had the highest freshness and quality based on pH levels and QIM scores.
- Galunggong showed quality deterioration, likely due to poor transport and storage.
- Lead and Cadmium levels were within safe limits, but prolonged exposure may still pose health risks.
- Continuous monitoring of fish quality and contamination is essential to ensure food safety and public health.
- Enforce routine testing of fish to ensure compliance with food safety standards.
- Require proper handling, storage, and sanitation in fish markets to reduce spoilage.
- Educate consumers on selecting fresh, safe fish and understanding health risks.
- Strengthen environmental policies to prevent water pollution and contamination.

Background

Fish is an important component of the Filipino diet since it offers many households a significant source of protein and other necessary nutrients. However, irregular handling, storage, and possible contamination with heavy metals like lead (Pb) and cadmium (Cd) have raised questions about food safety in wet markets.

Research Objectives

The primary objective of this study is to assess the physicochemical properties and heavy metal contamination of fish sold in Tuguegarao City's wet markets to ensure food safety and public health protection. Specifically, the research aims to:

- Evaluate the freshness and quality of commonly sold fish species (Bangus, Galunggong, Tilapia, and Hito) based on physical, sensory, and chemical parameters such as length, weight, pH, and appearance.
- Determine the levels of heavy metals (lead Pb and cadmium Cd) in fish samples and assess whether they comply with permissible safety limits set by food safety authorities.

Methodology

- Fish samples from four commonly sold species (Bangus, Galunggong, Tilapia, and Hito) were randomly collected from different vendors in the Tuguegarao City Fish Depot to ensure variability and representativeness.
- The length, weight, skin appearance, gill color, eye clarity, and odor of the fish were assessed using standard quality indicators and the Quality Index Method (QIM) to determine freshness.
- The pH of fish meat was measured using a digital pH meter to evaluate freshness and potential spoilage.
- Heavy Metal Analysis (Lead and Cadmium Testing)
 - a. Fish samples were digested using nitric and perchloric acid before analysis.
 - b. Flame Atomic Absorption Spectrophotometry (FAAS) was used to determine the concentration of lead (Pb) and cadmium (Cd) in the fish samples.

Key Findings

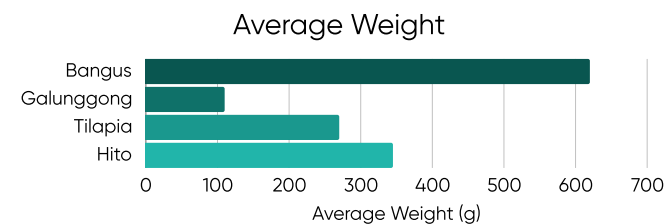


Figure 1. Average Weight of Common Fish in Tuguegarao Wet Markets.

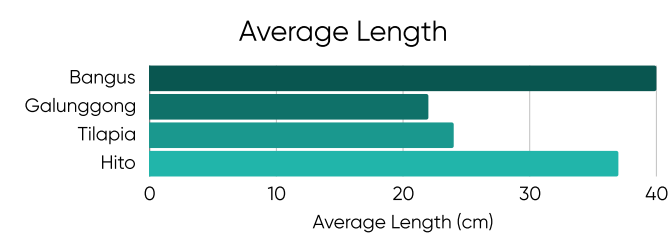


Figure 2. Average Length of Common Fish in Tuguegarao Wet Markets.

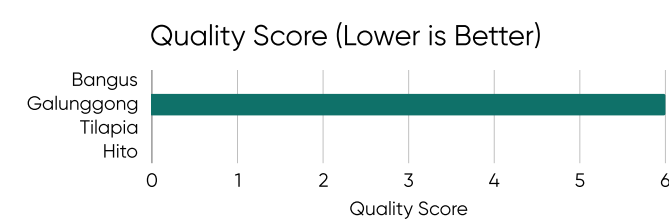


Figure 3. Quality Score Assessment of Common Fish in Tuguegarao Wet Markets.

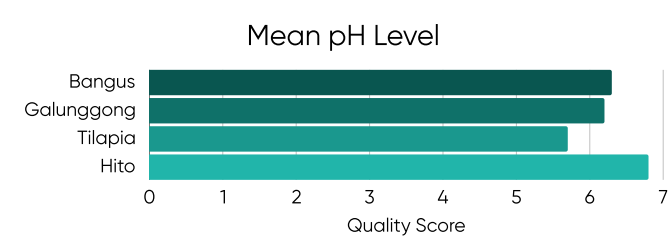


Figure 4. Mean pH Level of Common Fish in Tuguegarao Wet Markets.

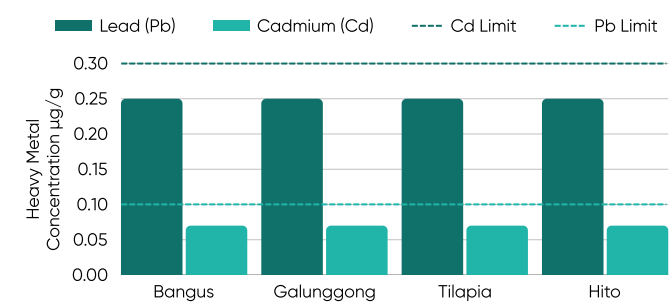


Figure 5. Lead (Pb) and Cadmium (Cd) Levels in Common Fish Samples.

Conclusion

To ensure the safety and quality of fish sold in Tuguegarao City's wet markets, this study highlights the urgent need to improve handling practices, raise consumer awareness, strengthen food safety monitoring, and enforce environmental safeguards. While heavy metal levels in fish were within safe limits, risks persist due to inconsistent storage and limited public knowledge.

Collaboration among stakeholders, market administrators, and government agencies is crucial.

Strengthened regulations, better storage infrastructure, and public education campaigns are essential to protect consumers and promote a safer food system. Preventing environmental contamination is equally vital to secure the long-term integrity of local fish supplies.

Policy Recommendations

Strengthen Food Safety Monitoring and Regulation (DA-BFAR, FDA)

Establish routine heavy metal testing and enforce market compliance through vendor protocols and regular inspections.

Improve Handling and Storage Practices (LGUs, Market Admin, DTI)

Implement vendor training and upgrade market facilities with cold storage and sanitation to maintain fish quality.

Enhance Consumer Awareness and Protection (DOH, DepEd)

Launch campaigns on assessing fish freshness and promote labeling for traceability and safety information.

Enforce Environmental Safeguards (DENR, DA-BFAR)

Tighten pollution controls and adopt sustainable aquaculture standards to reduce contamination in fish.

Checklist for Ensuring Fish Freshness in Wet Markets



Visual Appearance

- Skin is shiny, metallic, and not dull or discolored.
- Scales are intact and firmly attached.
- Belly is firm and not aburst or bloated.

Eyes

- Eyes are clear, shiny, and slightly bulging.
- Avoid fish with sunken or cloudy eyes.

Smell

- Smells fresh and slightly like sea or clean water.
- No sour, musty, or ammonia-like odor.

Gills

- Gills are bright red or pink (not brown or gray).
- No foul or rotting smell from the gills.

Target Policy Actors and Beneficiaries



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Editor's Note

This policy brief is based on results of the CSU-funded project "Physicochemical Analysis of Fishes Sold in Wet Market in Tuguegarao City, Cagayan" This project was implemented by the Cagayan State University - Andrews Campus. The CSU - Andrews Campus project team is composed of Jinky Marie T. Chua, Ma. Krischen Z. Austria, Gail Ann P. Parel, Rosalia B. Cabalza, Jay Andrea Veal D. Israel.



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