

**A Comparative Study on the Prevalence of Antibiotic Residue in Export Grade and Local Grade Shrimp (*Penaeus monodon)* of Chattogram, Bangladesh.**

**Sharjil Mahmood**

**Roll No: 0117/01**

**Registration No: 404**

 **Session: 2017-2018 (January-June)**

**A thesis submitted in the partial fulfillment of the requirements for the degree of Master of Science in Food Chemistry and Quality Assurance**

**Department of Applied Chemistry and Chemical Technology**

**Faculty of Food Science and Technology**

**Chattogram Veterinary and Animal Sciences University**

**Khulshi, Chattogram-4225, Bangladesh.**

**June 2019**

**Authorization**

I hereby declare that I am the sole author of the thesis. I also authorize the Chattogram Veterinary and Animal Sciences University (CVASU) to lend this thesis to other institutions or individuals for scholarly research. I further authorize the CVASU to reproduce the thesis by photocopying or by other means, in total or part, at the request of other institutions or individuals for scholarly research.

I, the undersigned, and author of this work, declare that the **electronic copy** of this thesis provided to the CVASU Library is an accurate copy of the print thesis submitted, within the limits of the technology available.

**Sharjil Mahmood**

The Author

June 2019

**A Comparative Study on the Prevalence of Antibiotic Residue in Export Grade and Local Grade Shrimp (*Penaeus monodon)* of Chattogram Bangladesh**

**Sharjil Mahmood**

**Roll No: 0117/01**

**Registration No: 404**

 **Session: 2017-2018 (January-June)**

**This is to certify that we have examined the above master’s thesis and**

**have found that is complete and satisfactory in all respects, and that all**

**revisions required by the thesis examination committee have been made.**

****

**-----------------------------------------**

**(Mr. Suvanker Saha)**

**Supervisor**

**------------------------------------------------------**

**(Mr. Md. Fahad Bin Quader)**

**Chairman of the Examination Committee**

**Department of Applied Chemistry and Chemical Technology**

**Faculty of Food Science and Technology**

**Chattogram Veterinary and Animal Sciences University**

**Khulshi, Chattogram-4225, Bangladesh.**

**June 2019**

***DEDICATED TO MY RESPECTEDANDBELOVEDPARENTS, TEACHERS,AND BROTHERS***

**Acknowledgments**

The author remembers the Almighty “**ALLAH**”, the omnipotent, omnipresent, and omniscient who empowers the author to complete the work of this dimension and the manuscript successfully*.*

From the core of my heart, I would like to express the first and foremost heartiest appreciation, deepest sense of gratitude, and indebtedness to my respectable and honorable research supervisor **Mr. Suvanker Saha** (Assistant Professor, Department of Applied Chemistry and Chemical Technology, Faculty of food science & Technology, CVASU). Without his guidance, it would not be possible for me to complete the research and then write up the dissertation successfully.

I also gratefully acknowledge the support, cooperation, and encouragement received during my MS program from all technical and non-technical staff of the **Department of Applied Chemistry and Chemical Technology,** CVASU. I am also grateful to **Professor Dr. Jannatara Khatun**, Dean, Faculty of Food Science and Technology, and **Md. Fahad Bin Quader** (Assistant Professor and Dept. Head, Department of Applied Chemistry and Chemical Technology, Faculty of Food Science& Technology, CVASU) for their valuable suggestions and cooperation during the thesis writing.

I am also grateful for the assistance from the laboratory for their cooperation and friendly help during the thesis period.

I am thankful to and fortunate enough to get constant encouragement, support, and guidance from all the members of my team which helped us in completing our report work. Also, I would like to extend our sincere esteem to all staff in the laboratory for their timely support.

Lastly, I would like to thank my family members for their endless support.

**The Author**

**June, 2019**

**Abstract**

Incommensurate use of antibiotics in the production of local and export quality shrimps can facilitate the infiltration of antibiotic residues into human bodies when shrimps are consumed. The antibiotic residues are toxic enough to pose a risk and can cause serious health hazards. The present study was investigated by the ELISA technique to determine the antibiotic residues found in both local market and export quality shrimp and shrimp feeds. Local-grade samples and export-grade samples of Black tiger shrimps (*Penaeus monodon*) and feeds from four different companies were taken for the completion of this study. The permissible residual limit for the shrimp samples was 0.3(µg/kg) for Chloramphenicol and 1 (µg/kg) for AHD, AMOZ, SEM, and AOZ. Black tiger shrimp from zone 1 had a high concentration of Chloramphenicol (0.35 µg/kg) and SEM (1.2 µg/kg) antibiotic residue whereas zone 2 showed maximum antibiotic residue in AMOZ (1.2 µg/kg) and SEM (1.1 µg/kg). However, in export-grade shrimp antibiotic residue was found under the maximum residual limit. Also, out of four feeds tested, two of them were found positive and the prevalence was 50%. The level of significance was 0.05 in all three tests. The repercussions can be serious when these antibiotic residues get inside human bodies. So, legal actions should be taken against the farmers and the farms that overuse antibiotics in shrimp. Also, people should be made aware of the harmful effects of antibiotics so that the impact can be minimized.

**Keyword:** Antibiotic Residues, CAP, AOZ, AMOZ SEM.

**Table of Contents**

Authorization ............................................................................................................... II

Acknowledgements ..................................................................................................... V

Abstract .......................................................................................................................VI

Table of Contents .......................................................................................................VII

List of Tables................................................................................................................IX

List of Figures .............................................................................................................. X

Abbreviations ..............................................................................................................XI

**CHAPTER 1 INTRODUCTION ...............................................................................1**

* 1. Aim and objectives of the study ........................................................................... 2

**CHAPTER 2 REVIEW OF LITERATURE ............................................................ 3**

 2.1 Shrimp ...................................................................................................................3

 2.2 Habitats .................................................................................................................3

 2.3 Shrimp and Bangladesh.........................................................................................3

 2.4 Antibiotics .............................................................................................................4

 2.5 Antibiotic Residues ...............................................................................................4

 2.5.1 Chloramphenicol (Cap) ......................................................................................4

 2.5.2 Furazolidone ...................................................................................................... 5

 2.5.3 Furazolidone or 3- Amino- 2 oxazolidinone AOZ ............................................5

 2.5.4 3- amino- 5- morpholinomethyl-2-oxazolidinone .............................................6

 2.5.51-Aminohydantoine ........................................................................................... 6

 2.5.6SEM ................................................................................................................... 6

 2.6 Structural view of nitro furan compounds with derivatives ................................. 7

 2.7 Previous History of Research ............................................................................... 7

**CHAPTER 3: MATERIALS AND METHODOLOGY ....................................... 9**

 3.1 Sample Collection ................................................................................................ 9

 3.2 Sample Transportation ......................................................................................... 9

 3.3 Methods ............................................................................................................... 9

 3.3.1 ELISA kit and other reagents ........................................................................... 9

 3.3.2 Standard Solutions............................................................................................. 9

 3.4 Sample preparation ............................................................................................. 10

 3.5 Procedure of ELISA ......................................................................................... 10

 3.6 Statistical Analysis ............................................................................................. 10

**­­­­­­CHAPTER 4 RESULTS ......................................................................................... 11**

**CHAPTER 5 DISCUSSIONS ................................................................................. 15**

**CHAPTER 6 CONCLUSIONS ............................................................................... 17**

**CHAPTER 7 RECOMMENDATIONS AND FUTURE PERSPECTIVE ......... 18**

**CHAPTER 8 REFERENCES.................................................................................. 19**

**APPENDIX ............................................................................................................... 23**

**BRIEF BIOGRAPHY............................................................................................... 25**

**List of Tables**

|  |  |  |
| --- | --- | --- |
| **Serial No** | **Description of the Table** | **Page No** |
| 01. | Local Grade Shrimp Antibiotic Analysis Result | 11 |
| 02. | Export Grade Shrimp Antibiotic Analysis Result | 12 |
| 03. | Distribution of antibiotics in export-grade shrimp | 13 |
| 04. | Comparison of local grade and export grade shrimp | 13 |
| 05. | Feed analysis result | 14 |
| 06. | Distribution of antibiotics in feed | 14 |

**List of Figures**

|  |  |  |
| --- | --- | --- |
| **Serial No** | **Description of the Figure** | **Page No** |
| 01. | Structure of different nitro furan derivatives | 7 |
| 02. | Distribution of antibiotics in local-grade shrimp | 12 |

**List of Abbreviation**

|  |  |
| --- | --- |
| **Abbreviation** | **Elaboration** |
| AOZ | 3- Amino- 2- oxazolidinone  |
| AMOZ | 3- Amino- 5- morpholinomethyl-2- oxazolidinone  |
| SEM | Semicarbazide |
| AHD | 1-Aminohydantoin |
| CAP | Chloramphenicol |
| FDA | Food and Drug Administration |
| EU | European Union |
| BFFEA | Bangladesh Frozen Food Exporters Association |
| DoF | Department of Fisheries |
| BBS | Bangladesh Bureau of Statistics |
| RPM | Rotation per Minute |
| ng | Nanogram |
| Mt | Metric ton |
| FAO | Food and Agriculture Organization |
| EFSA | European Food Safety Authority |
| RASFF | Rapid Alert System for Food and Feed |