Experiment on Induction Recovery Potentiality of Different Plant-Source Anesthetic Agents in Shrimp (*Metapenaeus dobsoni*)

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Session: 2022-2023

A thesis submitted in the partial fulfillment of the requirements for the degree of Master of Science in Fish Biology and Biotechnology

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June, 2024

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The Author

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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

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ACKNOWLEDGEMENTS

All the praises and thanks to Allah, the Almighty, most gracious, most merciful, most benign who has enabled him to pursue the study in fisheries science successfully as well as to submit the thesis for the degree of Master of Science (MS) in Fish Biology and Biotechnology and also pay gratitude to the Almighty for enabling and giving strengths to complete research work as well as thesis within due course of time.

The author would like to take this opportunity to express his sincere gratitude and debt of gratitude to the Director Institute of Coastal Biodiversity, Marine Fisheries and Wildlife Research Center **Professor Dr. Mohammed Nurul Absar Khan**, for his invaluable administrative support in helping him complete his research.

The author expresses his sincere gratitude and appreciation to **Dr. Md. Mahiuddin Zahangir**, Associate Professor and Head, Department of Fish Biology and Biotechnology, Chattogram Veterinary and Animal Sciences University, for his unwavering support, authoritative guidance, constructive criticism, advice, and continuing motivation.

The author also thanks **Dr. Helena Khatoon**, Associate Professor, Department of Aquaculture, Faculty of Fisheries at Chattogram Veterinary and Animal Sciences University, for her support that helped him become a more self-assured individual.

It is his good fortune to warmly recognize the assistance of his fellow members Joya Chakraborty, Md. Nayeem Hossain, Tarisha Maknoon, Md. Jobran Mia, Haphsa Khanom, Md. Shamim Rahman for their assistance and kind consideration during the research period. He also thanks all the teachers, employees and students. Last but not least, I want to emphasize how grateful I am to my parents and friends for their support, blessings, and sacrifice.

The Author

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Abstract

Anesthesia is the state in which an external agent depresses the nervous system thereby rendering a lack of sensation which is very important for routine aquaculture operations. Therefore, this study aims to analyze the induction and recovery potentials of three plant-source anesthetics called eugenol, dygenol, and clove oil in *Metapenaeus dobsoni*, a commercially important marine shrimp species from the Bay of Bengal. In this study, four induction stages (FLE- First loss of equilibrium, CLE-complete loss of equilibrium, LM-loss of movement, LSLM- Loss of swimming leg movement) and two recovery stages (FR-First response and CR- Complete recovery) were taken into consideration under three different doses (250ppm, 350ppm, and 450ppm). Results revealed that all three anesthetics successfully anesthetized the *M. dobsoni* in a dose-dependent manner and all shrimps recovered successfully with no mortality. Based on the findings, the best suitable anesthetics were determined as eugenol and dygenol, at a dose of 250 and 350 ppm for *M. dobsoni* in which induction and recovery occur within the recommended time (induction within 3 min and recovered within 5 min respectively). Comparatively, clove oil took higher recovery time than the other anesthesia agents. The present research will help hatchery operators, shrimp farmers and others in the aquaculture industry to find the appropriate dosage of anesthesia to improve spawning, induced breeding, hormone injection, transportation, and to reduce overall mortality in *M. dobsoni*.

Keywords-: Anesthesia, Induction, Recovery, *Metapenaeus dobsoni*, Eugenol, Dygenol, Clove Oil.