

Bacterial source tracking and risk assessment in Matang mangrove estuary

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Matang mangrove estuary situated on the west coast of peninsular Malaysia, has the largest tract of reserved mangrove forest in peninsular Malaysia. It serves as an important farming area for various commercial aquaculture stocks, including shellfish, fish and prawn. However, previous research and national reports had found frequent contamination of vibrios in the aquaculture products. Therefore, this study was undertaken to study the ecology of various potential human pathogens, particularly vibrios in Matang estuary. In this study, microbial risk assessment and bacterial source tracking approaches were intergrated not just to understand the distribution and dissemination of pathogen in the estuary but also to evaluate the potential public health risk attributed to seafood consumption. Estuarine water, sediments and copepods were sampled from eight stations located along three main rivers of the estuary: Kuala Sepetang River (1 station), Selinsing River (2 stations) and Sangga Besar River (5 stations). Fishing villages, cockle culture beds and numerous floating fish cages were found along Sangga Besar River, whereas the Selinsing River were farther away from human activity, and

therefore served as control in this study. Various pathogen-like bacteria, including *E. coli*, *Vibrio parahaemolyticus*, *Vibrio cholerae*, *Aeromonas* and *Staphylococcus* were frequently isolated from the estuary during the study. To our surprise, both the sediment and water samples collected downstream to the fish cages yielded the lowest total plate count and bacterial diversity, which was speculated to be due to heavy use of antimicrobial compounds in the fish farming. Genotyping revealed also low genetic diversity among the *E. coli* isolates collected from station E and G (located downstream of the fish cage). In conclusion, human activity has introduced various pathogen-like bacteria into the estuary. Uncontrolled use of the estuary as an aquaculture site will definitely lead to deterioration of water quality and safety of Matang estuary, which in turn pose a high risk of waterborne and foodborne illnesses to the public.