

Marine Environment Is the Source of Food and Potentially Hazardous Organisms for Humans: a Collaborative Risk Assessment Study on a Seafood-borne Bacterial Infection in Southern Thailand

Varaporn Vuddhakul¹, Fumiko Kasuga², and Mitsuaki Nishibuchi^{3*}

¹Faculty of Science, Prince of Songkla University, Thailand, ²National Institute of Health Sciences, and

³Center for Southeast Asian Studies, Kyoto University, Japan

*Tel: +81-75-753-7367, Fax: +81-75-7350, E-mail: nisibuti@cseas.kyoto-u.ac.jp

1. INTRODUCTION

The marine environment is a natural habitat for various organisms. They include the organisms both beneficial and hazardous to humans. Seafood and human-pathogenic bacteria contaminating seafood are good examples. How can humans interact with this double-edged sword? It is important to obtain as much information on these organisms in the marine environment as possible and precisely assess the risk associated with consumption of the food from the marine environment. People can then decide to what extent they take a risk and establish some measures to minimize the risk if they wish to benefit from the marine environment. We will introduce an example of such an effort done collaboratively by Thai and Japanese researchers.

2. PREVALENCE OF INFECTION BY A SEAFOOD-BORNE PATHOGEN: A STUDY IN SOUTHERN THAILAND

Vibrio parahaemolyticus is a very important seafood-borne bacterial pathogen. It is detected in seawater at temperatures above 15C° and is important in tropical, subtropical, and warm zones in the world in this order. Infection by *V. parahaemolyticus* has been limited to sporadic infections due to consumption of local seafood until recently. A new clone of *V. parahaemolyticus* emerged in Asia around 1995 and it has been spreading worldwide. Prevalence of infection by this clone has been confirmed first in Asia and then in various parts of the world including North and South America, Europe, and Africa. An epidemiological study done collaboratively by the researchers of Kyoto University and Prince of Songkla University demonstrated molluscan shellfish accumulating aquatic bacteria by filter-feeding are the source of infection by this clone in southern Thailand.

3. RISK ASSESSMENT OF THE PATHOGEN IN MOLLUSCAN SHELLFISH IN SOUTHERN THAILAND: THE FIRST ATTEMPT OF THIS KIND IN NON-WESTERN COUNTRIES

To help establish the public health measures against molluscan shellfish-borne *V. parahaemolyticus* infection in this area a Thai-Japanese collaborative team carried out a risk assessment study, the first attempt

of this kind in non-Western countries. The Thai team carried out collection of data on concentration of pathogenic *V. parahaemolyticus* in bloody clams (*Anadara granosa*) and green mussels (*Perna viridis*). The quantitative data were collected at the harvest, retail, and cooking stages. The data on time and temperature between the stages were collected. These and other available data allowed the Japanese team to run a Monte Carlo simulation analysis. The result predicted the frequency of infection by pathogenic *V. parahaemolyticus* in shellfish and it is evident from the result that improper cooking is an important risk factor.

4. CONCLUSION AND DISCUSSION

Human-nature interaction is not simple. This study demonstrates an example how we can understand and control the interaction in a local setting. Evidence-based analysis performed collaboratively by local scientists and experts from Japan is very persuasive and the result emphasizes importance of public education on the risk factors. Spreading the knowledge obtained in this study will be beneficial to local people as well as scientific communities.

Quantitative data collection was an essential step in the risk analysis. However, due to technical limitation, the quantitative data collection was labor intensive in this setting. Development of a method for easier data collection suitable for this setting is necessary to bring the risk assessment approach into wide use. Again, integration of the field knowledge and advanced technology by international collaboration would be needed to solve this problem.

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NISHIBUCHI, Mitsuaki

NISHIBUCHI Mitsuaki is Professor of Division of Integrated Area Studies, Center for Southeast Asian Studies, Kyoto University. He received his Ph. D. in Microbiology at Oregon State Univ., USA (1983). He was a postdoctoral research associate in Bacterial Genetics Section, Center for Vaccine Development, Univ. of Maryland School of Medicine, USA (1983-1986), Assistant, Division of Bacteriology and Immunology, Research Institute for Microbial Diseases, Osaka Univ., (1986-1987), Assistant Professor, Department of Microbiology, Faculty of Medicine, Kyoto Univ. (1988), Associate Professor, Department of Microbiology, Faculty of Medicine, Kyoto Univ. (1988-1996), and Professor, Division of Human Environment, Center for Southeast Asian Studies, Kyoto Univ. (1996-to date). His major interest is enteric infections in Asia. His major publications include Nishibuchi, M. 2004. Infection by a new clone of *Vibrio parahaemolyticus*: an infectious disease that emerged in Asia and spread to a world wide pandemic. In H. Furukawa, M. Nishibuchi, Y. Kono, and Y. Kaida (ed), Ecological Destruction, Health, and Development: Advancing Asian Paradigms. Kyoto University Press/Trans Pacific Press, Kyoto, pp. 251-263; Nishibuchi, M., and A. DePaola. 2005. *Vibrio* species. In P. M. Fratamico and A. K. Bhunia (ed), Food-borne Pathogens: Microbiology and Molecular Biology. Horizon Scientific Press, Norfolk, U. K. pp. 251-271. nisibuti@cseas.kyoto-u.ac.jp.