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Detection and Identification of Salmonella spp. in Surface Water by Molecular Technology in Taiwan

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Salmonella spp. is classified to gram-negative bacterium and is one of the most important causal agents of waterborne diseases. The genus of *Salmonella* comprises more than 2,500 serotypes and its taxonomy is also very complicated. In tradition, the detection of *Salmonella* in environmental water samples by routines culture methods using selective media and characterization of suspicious colonies based on biochemical tests and serological assay are generally time and labor consuming. To overcome this disadvantage, it is desirable to use effective method which provides a higher discrimination and more rapid identification about *Salmonella* in environmental water. The aim of this study is to investigate the occurrence of *Salmonella* using novel procedures of detection method and to identify the serovars of *Salmonella* isolates from 157 surface water samples in Taiwan. The procedures include membrane filtration, non-selective pre-enrichment, selective enrichment of *Salmonella,* and then isolation of *Salmonella* strains by selective culture plates. The selective enrichment and culture plates were both detected by PCR. Finally, we used biochemical tests and serological assay to confirm the serovars of *Salmonella* and also used Pulsed-field gel electrophoresis (PFGE) to identify their sarovar catagories by the genetic pattern. In this study, 44 water samples (28%) were indentified as *Salmonella*. The 44 positive water samples by culture method were further identified as S. Agona(1/44), S. Albany (10/44), S. Bareilly (13/44),S. Choleraesuis (2/44),S. Derby (4/44),S. Isangi (3/44),S.Kedougou(3/44),S. Mbandaka(1/44),S.Newport (3/44), S. Oranienburg(1/44), S. Potsdam (1/44),S. Typhimurium (1/44), and$S$. Weltevreden(1/44) by PFGE. The presence of *Salmonella* in surface water indicates the possibility of waterborne transmission in drinking watershed if water is not adequately treated. Therefore, the authorities need to have operating systems that currently provide adequate source protection and maintaining the system to prevent disease.

Keywords: *Salmonella* spp.; biochemical tests; Serological assay; PCR; PFGE