Thesis Title Isolation and Characterization of *Pseudomonas aeruginosa* from Hospitalized Patients and Wastewater of Hospitals and Other Communities

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ABSTRACT

Pseudomonas aeruginosa is the most common nosocomial pathogen and has been recognized as health risks to patients in many hospitals. It predilects for moist inanimate environments and in particular resistants to various antimicrobial chemicals as well as antimicrobial chemotherapeutic agents. Recognition of *P. aeruginosa* as a significant proportion of the heterotrophic population that can develop in hospital wastewater and has been implicated in human health problems emphasizes the need to control bacterial regrowth in the distribution system. In this study, a total of 400 isolates of *P. aeruginosa* was studied, comprising 2 main groups by sources of specimens, i.e., 200 *P. aeruginosa* isolated from clinical specimens of patients attending 8 hospitals and other 200 *P. aeruginosa* which isolated from 320 wastewater samples of these eight hospitals and of eight other communities during 10 weeks of July to September 1993.

High frequencies of isolation of *P. aeruginosa* was found in wastewater samples from both the hospitals and environments, with or without treatment before disposal. It was detected in 215 samples (67.2%), mostly from untreated wastewater, and was not detected in 105 samples (32.8%), mostly from treated watswater. There was a progressive reduction in the *P. aeruginosa* count per milliliter from only 3 in 4 of treated hospital wastewater. Thus only effectiveness of wastewater treatment process could be able to reduce the numbers of *P. aeruginosa*.

When two typing methods, antibiograms and pyocin typing were used in combination to further characterize these isolates. They were helpful to indicate the possibility for the spreading of *P. aeruginosa* from hospitalized patients through the hospital wastewater, since antibiotic susceptibility studies showed some correlation between hospitalized patient isolates and hospital wastewater isolates in the antibiotic resistant rates, the resistance patterns (antibiograms) and the distribution of the resistance determinants. Their resistant rates to all antibiotics tested were not statistically significant different. The most commonly found resistance patterns were similarly detected in isolates from both groups, with no significantly difference in some antibiotic resistance patterns. Numbers of pyocin typable and the three most commonly found pyocin types were also nearly occurred in both hospitalized patient isolates and hospital wastewater isolates.

This study suggested that *P. aeruginosa* might cause further health problem because the majority of these isolates were highly resistant to many antibiotics that may transfer R-factor to other bacteria in natural water and be back to cause infection in hospitalized patients who are prone to infection with severe outcome and in any populations with health risks. Thus this study emphasized the significance of hospital wastewater without effective treatment as a reservoir and a source of distribution of large numbers of *P. aeruginosa* with highly resistant to multiple drugs into a water environment and may further become a serious threat to public health in the future.