

**INTERNALISATION OF *pgfp Escherichia coli* INTO *Centella asiatica* DURING
GROWING PERIOD USING HYDROPONIC SYSTEM**



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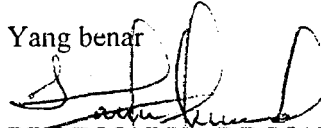
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Sekian, untuk tindakan pihak tuan selanjutnya.

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ABSTRACTS

Most of the recent years, an increase in human foodborne illness has been associated with high consumption of fresh produce. It has been reported that 17 foodborne outbreaks were linked to contamination of lettuce and other salad vegetables, and about 50% of these outbreaks were attributed to contamination with *Escherichia coli* 0157:H7. None of the chemical or physical treatments currently use as a disinfectant can be relied on to eliminate all types of human pathogens. Studies have been shown that *E.coli* 0157:H7 can survive on lettuce leaf surfaces for extended periods when mature plants were exposed to contaminated water. Other human pathogens like *Listeria monocytogenes* and *Salmonella* were also found to be internalised into inner tissue of lettuce plants when these pathogens were introduced at high cell densities (10^7 – 10^9 cfu/ml). Though recent studies have examined the application of several human pathogens on mature lettuce, little is known about the attachment of these pathogens to different types of growing plants. Devising successful intervention steps to reduce population of human pathogens on and in vegetables eaten raw, it is necessary to understand and characterise the nature of bacterial internalisation and attachment to the plants. As a result, the potential of *Esc.coli* to become internalised into germinating and hydroponically grown *centella asiatica* has been studied. With inoculated germinating *centella asiatica* with 10^3 cfu/ml and 10^7 cfu/ml separately with *Esc. coli* bioluminescence tag could be recovered from external and internal sites of root, stems and leave *centella asiatica* in 4 days of inoculation. When *Esc.coli* bioluminescence was introduced with different cell density, 10^3 cfu/ml and 10^7 cfu/ml into nutrient solution of hydroponically cultivated *centella asiatica*, it has been observed that internalisation of pathogen has relied on cell number of population. Internalisation into the leave part was only can be detected at day 28 (1.30 ± 0.02) until day 42 (1.60 ± 0.09) post inoculation and was undetected thereafter when it 10^3 cfu/ml been introduced. Whereas in 10^7 cfu/ml, the internalisation of pathogen into the leave part was detected at day 14 (1.97 ± 0.10) and extended until day 63 (0.90 ± 0.08) of cultivation period and disappeared thereafter. As in the nutrient solution, inoculated pathogens declined significantly ($P<0.01$) during the initial inoculation period and were

undetected thereafter. The current study suggested that the pathogens was able to internalise into germinating *centella asiatica* until to the leave part, however the internalisation of pathogen are dependent on the cell densities present.

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