

## RINGKASAN

Kontaminasi bakteri patogen pada sayuran dapat terjadi selama proses penanaman dan distribusi dari produsen ke konsumen. Sayuran yang ditanam dengan pemupukan organik dapat terkontaminasi oleh bakteri Enterobacteriaceae. Beberapa jenis sayuran dikonsumsi tanpa pengolahan terlebih dahulu, di antaranya adalah sayur selada. Jenis sayuran ini memerlukan proses pencucian yang dapat menurunkan jumlah mikroba atau membunuh mikroba patogen. Pencucian sayur dengan sabun dapat mencegah kontaminasi bakteri patogen. Sabun umumnya mengandung zat kimia sintetik sebagai surfaktan tambahan untuk meningkatkan mutunya. Ekstrak kasar bakteriosin isolat bakteri asam laktat (BAL) LG 90 dan biosurfaktan LG 17 asal sedimen mangrove pantai Logending berpotensi digunakan sebagai alternatif agensia pencuci sayuran karena memiliki aktivitas antibakteri. Keberhasilan pengendalian pertumbuhan bakteri dapat dipengaruhi oleh lamanya paparan bakteri oleh agensia pengendali. Penelitian ini bertujuan untuk mengetahui kemampuan antibakteri ekstrak kasar isolat LG90 dan isolat LG17 serta kombinasinya terhadap bakteri Enterobacteriaceae yang terdapat pada sayur selada dengan waktu rendam yang berbeda.

Penelitian ini dilakukan secara eksperimental dengan Rancangan Acak Lengkap (RAL) pola faktorial. Variabel bebas penelitian ini yaitu ekstrak kasar isolat LG90 dan LG17 yang mengandung bakteriosin dan biosurfaktan. Variabel terikat yang diamati berupa kemampuan antibakteri ekstrak kasar LG90 dan LG17 dengan waktu rendam yang berbeda terhadap bakteri Enterobacteriaceae pada selada. Parameter utama yang diukur yaitu jumlah bakteri pada selada dan parameter pendukung yang diukur yaitu diameter zona hambat dan hasil karakterisasi bakteri.

Hasil penelitian menunjukkan bahwa waktu perendaman berpengaruh tidak nyata terhadap jumlah bakteri selada, sedangkan jenis biosanitizer berpengaruh terhadap jumlah bakteri selada. Masing-masing jenis biosanitizer bersifat berbeda tidak nyata terhadap penurunan jumlah bakteri selada. Jumlah bakteri terendah dihasilkan oleh kontrol positif berupa sabun dengan rata-rata log jumlah bakteri Enterobacteriaceae 8,1246/mL dan jumlah total bakteri 8,1745/mL. Ekstrak kasar LG90 dan LG17 diketahui belum mampu menurunkan jumlah bakteri Enterobacteriaceae yang terdapat pada selada, namun ekstrak kasar LG90 diketahui mampu menurunkan jumlah total bakteri selada. Uji aktivitas antibakteri dengan metode Kirbys Bauer menunjukkan bahwa ekstrak kasar LG90 dan LG17 menghasilkan zona penghambatan sedang

**Kata kunci:** *agensia pencuci sayuran, antibakteri, bakteriosin, biosurfaktan, Enterobacteriaceae, jumlah total bakteri*

## SUMMARY

The contamination of vegetables by pathogenic bacteria can occur during the growing process and subsequent distribution from producers to consumers. Vegetables grown with organic fertilizers can be contaminated by Enterobacteriaceae bacteria. Some vegetables are consumed without prior processing, including lettuce. This type of vegetable requires a washing process that can reduce cells number of microbes or kill pathogenic microbes. Washing vegetables with soap can prevent contamination with pathogenic bacteria. Soap generally contains synthetic chemicals as additional surfactants to improve its quality. The use of bacteriocin and biosurfactant crude extract from lactic acid bacteria (LAB) isolate LG90 and LG17 isolated from mangrove sediment of Logending beach as alternative vegetable washing agents is a promising solution due to their antibacterial properties. The success of controlling bacterial growth can be influenced by the length of exposure to bacteria by the controlling agent. This study aims to determine the antibacterial ability of the crude extract of LG90 and LG17 isolates and their combination against Enterobacteriaceae found in lettuce with varying soaking times.

This research was conducted experimentally with a completely randomized design (CRD) factorial pattern. The independent variables are the crude extracts of LG90 and LG17 isolates containing bacteriocins and biosurfactants. The dependent variable observed was the antibacterial ability of LG90 and LG17 crude extracts with different soaking time against Enterobacteriaceae on lettuce. The main parameter measured was the number of bacteria on the lettuce and the supporting parameters observed were the diameter of the inhibition zone and the type of bacteria.

The results indicated that the soaking time did not have a significant effect on the total number of lettuce bacteria, whereas the type of biosanitizer had an effect on the number of lettuce bacteria. Each type of biosanitizer did not affect significantly in decreasing bacterial cells number of lettuce. The lowest number of bacteria was produced by the positive control, which consisted of comersiil soap. The average log number of Enterobacteriaceae bacteria was 8.1246/mL, while the total number of bacteria was 8.1745/mL. The crude extracts of LG90 and LG17 have been shown to be unable to reduce the number of Enterobacteriaceae bacteria found on lettuce. However, the crude extract of LG90 has been demonstrated to be more capable in reducing the bacterial total number on lettuce. The Kirby-Bauer antibacterial activity test showed that the crude extracts of LG90 and LG17 produced a moderate zone of inhibition.

**Keywords:** *antibacterial, bacteriocin, biosurfactant, Enterobacteriaceae, total bacterial count, vegetable washing agent.*