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Detection of Microbial Degradation of Natural Rubber Latex by Isolated Native Bacteria in Sri Lanka

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Abstract

Rubber waste management plays an important role to deal with high production and consumption of rubber. The main constituents of natural rubber is cis 1,4-polyisoprene. It is relatively resistant to microbial decomposition compared with many other natural polymers. The aim of study was to evaluate the potential effects of the *Bacillus cereus*, *Enterobacter* sp. and Enterobacter ludwigii on natural rubber latex degradation. Aliquots of 100 ml mineral salt medium were prepared and latex was spiked at different concentrations to make final dilutions at 1:10,000, 1:15,000. Each isolates were separately inoculated (3% v/v) to each dilution and incubated at 120 rpm for 12 days. Pour plate method was performed to confirm the resistance of bacteria against to latex. The amount of CO₂ liberation was determined during the cultivation of cells in mineral salt medium and the released CO_2 was trapped by 1M NaOH. Quantification of CO₂ was performed by titrimetric method. The liberation of gradually increased and reached at 8.67, 9.78 and 10.31 CO_2 was ppm for *E.ludwigii*, *B.cereus* and *Enterobacter* sp. respectively. CO_2 liberation was not detected in control. Based on the calculation adapted to the present study, 100% of latex degradation of latex by released CO_2 value should equal to 12.5 ppm. The present study showed that B.cereus, E. ludwigii and Enterobacter sp. have harber gene which can produce enzyme to degrade latex and future studies are needed to elucidate the degradation mechanism.

Keywords: Natural Rubber Latex, E. ludwigii, B. cereus, Enterobacter sp.