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Antimicrobial properties of bacterial cell-free supernatants exhibiting lysozyme activity for potential use in food packaging

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Much attention and interest have recently been directed toward application of natural antimicrobial compounds in foods and food packaging. Lysozyme is one of the most often used naturally occurring food preservatives. Lysozyme catalyzes the breakage of β -1,4-linkages of peptidoglycan in bacterial cell walls, and hence kills bacteria. Although lysozymes are generally produced from most organisms, the source has been commercially limited to egg whites. In this study, we screened 26 bacterial strains for the production of lysozyme, and found 7 strains that possessed extracellular lysozyme activity. The lysozyme activities were 342 U from *Thermomonas koreensis*, 290 U from *Lactobacillus rhamnosus*, 178 U from *Lb. paracasei*, 118 U from *Lb. reuteri*, 90 U from *Bacillus subtilis* and only 2.26 U from *T. hydrothermalis*. The cell-free supernatants from lysozyme producing *T. koreensis* (CFS-Tko), *Lb. paracasei* (CFS-Lpa), *Lb. reuteri* (CFS-Lre) and *Lb. rhamnosus* (CFS-Lrh) showed antibacterial activity against *Micrococcus luteus*, *B. cereus*, *Staphylococcus aureus*, *Streptococcus mutans*, *Listeria monocytogenes*, *Escherichia coli* and *Vibrio parahaemolyticus*. The inhibitory effect of CFS-Tko was stronger than that of egg white lysozyme (HEWL) against *B. cereus*. Moreover, the CFS of lysozyme producing lactobacilli, cultured for 48 h, completely inhibited the growth of the test strains. Our results suggest that newly found CFS can be used to extend shelf-life of food and to enhance food safety in food packaging.

Biography

Misook Kim has completed her PhD from Louisiana State University in USA and Post-doctoral studies from LSU Agricultural Center. She is an Assistant Professor of Dankook University, Republic of Korea. She has professional experience with bacterial fermentation, enzyme utilization, new ingredient development and industrial application in food science areas. She has published more than 50 papers in reputed journals and has served as an Editorial Board Member of *Journal of Medicinal Foods* and *Journal of Preventive Nutrition and Food Science*.

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