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Bioconversion of Cassava Starch to L-Lactic Acid and Bacteriocin by a Homolactic Bacterial Strain

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Both L-lactic acid and bacteriocins are currently crucial metabolites produced by microbial fermentation using glucose as a sole carbon source. In this study, the production of these metabolites was carried out using cassava starch, a cheap raw material, instead of glucose. A strain of starch-utilizing and homofermentative bacterium was found to produce the similar yield of L-lactic acid to the reference strain *Lactococcus lactis* IO-1, a homolactic fermenting and non-starch-utilizing strain. The starch-utilizing strain could not produce bacteriocins. To enhance its lactic acid production from cassava starch, the strain was exposed to both Ultraviolet (UV) light and N-Methyl-N′-Nitro-N-Nitrosoguanidine (MNNG) for three rounds. Mutants were selected to compare their lactic acid production as well as bacteriocin production capabilities. A double UV treatment mutant, A_5UVU_{25}, could produce L-lactic acid as its original strain, and also produce bacteriocin, a protein compound, having the molecular weight of 12 kDa. The bacteriocin showed its antimicrobial activity, especially against *Bacillus stearothermophilus* TISTR 329, *Listeria monocytogenes* DMS 1327, and *Micrococcus luteus* TISTR 884. The protein was stable to lysozyme and heat at 80°C for 15 min but it was sensitive to protease, protinase K, and heat at 100°C for 30 min. The homolactic bacterial strain, A_5UVU_{25}, would be a potential strain for both L-lactic acid and bacteriocin production from cassava starch.