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Strain improvement of starch-utilizing bacteria by mutagenesis to enhance L-Lactic acid production

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Lactic acid is one of typical organic acids produced by microbial fermentation of glucose. The increase in demand of L-lactic acid as a raw material of a biodegradable polymer is going on. Therefore, investigations aiming to obtain efficient lactate production and high productivity have been being attempted by several investigators. This study aims to obtain potential mutant strains for homolactic production from cassava starch, a cheap and abundant raw material which could be of great benefit to the fermentative production of lactic acid. *Lactococcus lactis* IO-1, a homolactic fermenting and non-starch-utilizing strain, was used as the reference strain for comparing L-lactic acid production capability. Two strains of starch-utilizing and homofermentative bacteria (isolates SUT-1 and SUT-5) isolated from cassava starch waste samples in Nakhon Ratchasima Province, Thailand, were selected for strain improvement using two mutagens: Ultraviolet (UV) light and N-Methyl-N′-Nitro-N-Nitrosoguanidine (MNNG) to enhance their lactic acid production from cassava starch. The selected strains were identified as belonging to different strains of the genus *Lactococcus*, and could produce the maximum amounts of lactic acid of about 10 and 9 g/l respectively in the suitable medium containing 2% cassava starch. While *Lactococcus lactis* IO-1 could produce lactic acid at the concentration of around 11 g/l in the same basal medium containing 2% glucose. The selected bacteria were exposed to either UV light or MNNG for three rounds. Mutants were selected to compare their lactic acid production capabilities. Two mutants produced approximate 10% of lactic acid higher than their original strains were finally selected and maintained for using as the potential strains for the direct production of lactic acid from cassava starch. After subculturing the cultures for sixth times, the mutants could still produce the similar amounts of lactic acid as before the first subculturing.