

## STRAIN IMPROVEMENT BY MUTAGENESIS FOR ENHANCING CITRIC ACID PRODUCTION OF *YARROWIA LIPOLYTICA*

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Citric acid has many applications in food, chemical and pharmaceutical industries. It is extensively used in the food industry as an acidulant, flavor enhancer, preservative, chelator, emulsifier, stabilizer, and antioxidant. Its production is one of the largest biotechnological industries and improvement of the microbial producer strain offers the greatest opportunity for cost reduction. In this study, mutagenesis was used in order to enhance citric acid production by *Yarrowia lipolytica* 57. Mutation and selection treatments were performed by using UV-irradiation and/or ethyl methane sulphonate (EMS) as a chemical mutagen. Selection of mutants was performed by examining their acetate usage. In the UV-treatments, four different UV lamps were used and UV light was exposed at different distances and exposure times. Sixteen strains were selected as UV-mutants after screening 829 colonies. By using EMS at different concentrations, only one strain was selected as mutant after testing of 291 colonies. When combined action of UV and EMS was used, 117 colonies were tested and one more strain was selected as potential mutant. Totally 18 mutant strains were demonstrated by testing of 1234 colonies. Citric acid productions of the mutant strains were screened in a fermentation medium containing glucose. Chemical mutagenesis was found as more effective in enhancing citric acid production than UV-induced mutagenesis. Maximum citric acid concentration (50.1 g/L) and citric acid yield obtained by the chemical mutant *Y. lipolytica* K-168 exceeded that of the parental strain by 57%. The novel mutant *Y. lipolytica* K-168 was demonstrated as a potential hyper-producing strain.

Keywords: Citric acid, *Yarrowia lipolytica*, strain improvement, mutagenesis

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