

## Enhancement of secondary metabolites production by introduction of sodium-hydrogen antiporter genes into *Streptomyces lividans*

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### Abstract

A phenomenon of spontaneous pH drop and recovery was observed in the culture of *Streptomyces lividans* before the initiation of secondary metabolites production. *S. lividans* has 7 different sodium-hydrogen antiporter (SHA) genes. SHA is known to transfer  $H^+$  into the medium or into the cytosol. We speculated that the spontaneous pH change would have been caused by the action of SHA although the detailed mechanism was unknown. Each of the SHA genes was cloned and inserted into *S. lividans* TK24 in order to investigate its gene dosage effects on secondary metabolites production. *S. lividans* was cultivated for 2 weeks in a R2YE liquid medium. In most cases, the introduction of a SHA gene increased cell growth rate. It was also observed that the amount of extracellular actinorhodin was remarkably increased when SHA 4 or SHA 7 gene was introduced. Undecylprodigiocin production was greatly increased by the insertion of SHA 1, SHA4, or SHA 7 gene.