

Recombinant DNA Technique for *Spirulina platensis*

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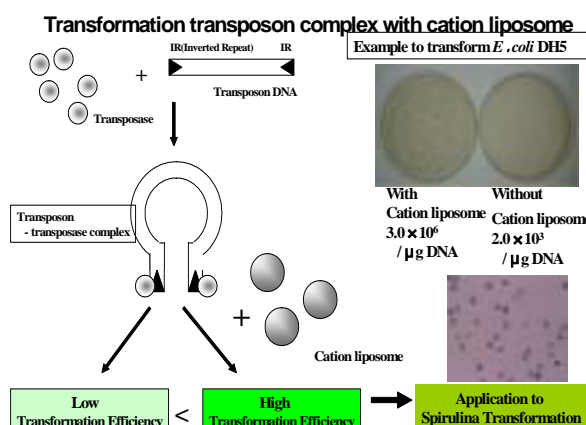
The industrial use of microalgae is important for environmental protection, as it has the potential to assist in the reduction of CO₂ emissions, which are now a serious global problem. This should be coupled to wastewater treatments, and be based on mass cultivation and extraction of useful substances from the microalgae. Genetic engineering will be a key to developing appropriate technology; however it has not yet reached the stage of practical application. We have been engaged in the development of host-vector systems for microalgae.

Spirulina platensis is one of the most commercially important species of microalgae. Thus, it is attractive to develop its genetic engineering for practical use, as its stable gene transfer system has not yet been established, due to a lack of suitable vectors and transformation methods. Recently, artificial transposon systems have been extensively developed by extracting essential elements from natural transposons, recently mutated transposase and transposon complex system improved the transformation efficiency by electroporation.

We applied another strategy using a natural Tn5 transposon, transposase and cation liposome complex by electroporation to improve transformation efficiency for *Spirulina platensis* strain C1 (*Arthrospira* sp. PCC9438).

Aggregation of cells became visible after 3 weeks under chloramphenicol selection in 2.0 µg/ml and grew more than 12 months.

The transfected chloramphenicol acetyl-transferase (CAT) genes are detected in a genomic DNA area by southern hybridization. Transformed cells showed a CAT activity, but non-transformed cells did not.



We are now engaging to couple wastewater treatment and production of chemical materials by using this genetic modified *Spirulina*.

REFERENCE

“Transformation of *Spirulina platensis* strain C1 (*Arthrospira* sp. PCC9438) with Tn5 transposase-transposon DNA-cation liposome complex.” Y. Kawata, S. Yano, H. Kojima and T. Masaaki. *Marine Biotechnology*, **6**, 355-363, 2004