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Transformation of phytoplankton; advantage of single cellular plant research

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Objectives

We have tried to make transformation of *Phaeodactylum tricornutum* through microparticle bombardment and successfully obtained transgenic diatom by antibiotic cell culture system.

Materials and Methods

1. Material

Algae Diatom *Phaeodactylum tricornutum*.

2. Methods

Microparticle bombardment was carried with pPha-T1 vector incorporated STP1 or EGFP gene in *Phaeodactylum tricornutum*. Liquid culture was maintained in f/2 media containing zeocin.

Results and Discussion

To confirm the putative transgenic plant, PCR analysis and GUS analysis were established. Each shoots of putative transgenic orchid presents intense blue staining in each tissue sections and whole shoot of putative transformants also showed GUS activity. PCR was carried out on genomic DNA of putative transformants using gene specific primer and putative transgenic plants gave the expected PCR product. Diatom was responsible to 75% of O₂ and CO₂ concentration in earth and commonly used to feeds in mariculture of fishery. Diatom *Phaeodactylum tricornutum* was well known species in their biological and physiological process than any other species. In recently, the knowledge about them is raising to issue, because of their usefulness on each industry. But their molecular biological approach is still being on infant states. This problem is due to difficult transformation method, the absence of gene information, the diversity of phytoplankton, and so on. We are going to try and error in transformation of *Phaeodactylum tricornutum*. This study about unicellular eukaryotic phytoplankton has many impacts about plant research, so-called study that related or about evolution of chloroplast. We introduced enhanced green fluorescent protein (EGFP) and sugar transporter1 (STP1) of *Arabidopsis thaliana* incorporated pPha-T1 vector in Diatom. Plasmid pPha-T1 vector had promoter and terminator of fucoxanthin-chlorophyll a/c binding protein (FcpA) and promoter-terminator expression cassette for homologous recombination in *Phaeodactylum tricornutum*. As transformation method, biolistic particle bombardment system was used. We evaluated this study will be a good system for unicellular application of plant and chloroplast with evolutionary relationship.

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