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**Improving C3 plant productivity by using cyanobacterial bicarbonate transporters**

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In order to improve photosynthetic performance of C3 crop plants, inspirations can be drawn from C4 plants as well as lower organisms like algae and cyanobacteria which possess mechanisms to concentrate carbon dioxide around RuBisCO to reduce photo-respiratory losses. One approach involves transfer of bicarbonate transporter proteins from cyanobacteria which are known to enhance CO<sub>2</sub> concentration around RuBisCO thus alleviating its oxygenase activity. Single-subunit bicarbonate transporters such as BicA and SbtA are the most obvious initial *candidates* because of simplified plant transformation requirements. We have designed and synthesized fusion constructs incorporating transit peptides and the above mentioned transporter genes bicA and sbtA from cyanobacteria after an extensive *in silico* analysis of *Arabidopsis thaliana* chloroplast envelope proteins based on the location of their N and C-termini, topology and function. The fused segments were sub-cloned into a modified plant expression vector pRI101-AN containing GUS as a reporter gene. Recombinant pRI (TP+bicA/sbtA+gus) constructs were bombarded on tobacco leaves to study transient expression by fluorometric GUS analysis. The constructs were also transformed into *Agrobacterium tumefaciens* GV3101 which were further used to generate stable transgenic plants via co-culture method in tobacco and floral-dip method in *Arabidopsis*. Successful transformants obtained using co culture method were analyzed by GUS histochemical assay. Transgenic T1 plants were obtained using floral dip method were screened on kanamycin containing media. These plants would be further raised to obtain T2 generation seeds. A successful incorporation of bicarbonate transporter into inner envelope membrane of chloroplast is expected to provide marginal but significant improvement in photosynthetic performance.

**Biography**

Sandhya Mehrotra has completed her PhD in 2003 from National Botanical Research Institute, India and Postdoctoral studies from Nara Institute of Science and Technology, Japan in 2008. She is an Assistant Professor in Biological Sciences at Birla Institute of Technology and Science, a premier educational and engineering organization in India. She has published more than 25 papers in reputed journals and has been serving as an Editorial Board Member of several journals.

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