J Biotechnol Biomater 2014, 3:5
http://dx.doi.org/10.4172/2155-952X.S1.029

OMICS Group Conferences
Accelerating Scientific Discovery

5th World Congress on
Biotechnology
June 25-27, 2014 Valencia Conference Centre, Valencia, Spain

Whole cell bacterial biosensor for environmental monitoring and pollutants detection

Saurabh Gupta
International Centre for Genetic Engineering and Biotechnology, India

Whole-cell microbial sensors have become one of the latest approaches of molecular tools in environmental monitoring. A whole-cell bacterial biosensor capable of detecting a wide range of pollutants (eg- aromatic hydrocarbons) can be created by placing a reporter gene under the control of an inducible promoter. Expression of the reporter gene provides a measurable response when the appropriate transcription activator protein interacts with a pollutant molecule to signal a particular environmental condition. Luciferase is the most sensitive and preferred reporter gene in the application of environmental monitoring, which signals in the form of luminescence. The luminescence is produced by genetically engineered bacteria as a response to the analyte concentration. Linearity range of the curve is determined by exposing the whole cell biosensor to different concentration of analyte and measuring the output luminescence. In summary, this abstract is intended to develop improved bacterial whole-cell sensing systems for detection of water pollutants and environmentally relevant analyte like hydrocarbons, which is typically sensitive, specific and selective, rapid, easy to use, low-cost, and amenable to multiplexing, high-throughput, and miniaturization.

Biography

Saurabh Gupta has completed his PhD from IGIB (Institute of Genomics and Integrative Biology, New Delhi) and pursuing postdoctoral studies from ICGEB, New Delhi.

sg.biotech@gmail.com

Shoot tip regeneration and optimization of *Agrobacterium tumefaciens*-mediated transformation of broccoli (*Brassica oleracea* var. *italica*) cv. Green Marvel

Seyed Ali Ravanfar, Maheran Abdul Aziz, Halimi Mohd Saud and **Jana Ong Abdullah**
Universiti Putra Malaysia, Malaysia

An efficient protocol of plant regeneration from shoot tips and optimization of *Agrobacterium tumefaciens*-mediated transformation of broccoli (*Brassica oleracea* var. *italica*) cv. Green Marvel have been developed. Shoot tip response was assessed on Murashige and Skoog (MS) medium supplemented with different concentrations of zeatin. The highest regeneration with a maximum of 13 shoots per explant was attained on MS medium containing high concentrations of zeatin. Shoot tip explants were co-cultivated with Agrobacterium tumefaciens strain LBA 4404, containing a binary vector pGreen 0049 with the AtHSP101 cDNA gene cloned at the Multiple Cloning Site (MCS) and a luciferase gene, each under the control of a separate CaMV35S promoter. The effects of pre-culture, acetosyringone and growth of bacterial culture were studied. Explants precultured on callus induction medium prior to inoculation with A. tumefaciensfor 30 min with acetosyringone resulted in improved transformation frequency. The result also indicated that ampicillin alone was adequate to eradicate the Agrobacterium growth in SRM incorporated with the respective minimum inhibitory concentration of kanamycin for shoot tip explants. The polymerase chain reaction (PCR) assay and southern blot were confirmed the transgenity of broccoli cv. Green Marvel. In this study, 5% transformation efficiencies were achieved through positive PCR for shoot tip explants using the optimized procedure. The expression of luciferase gene in the transformed cells as a reporter gene and the transcription of AtHSP101 using RT-PCR were also determined. The transgenic broccoli lines harboring the HSP101 gene survived at high temperature of up to 34°C in the transgenic greenhouse.

maheran@upm.edu.m; seyed.ali@upm.edu.my