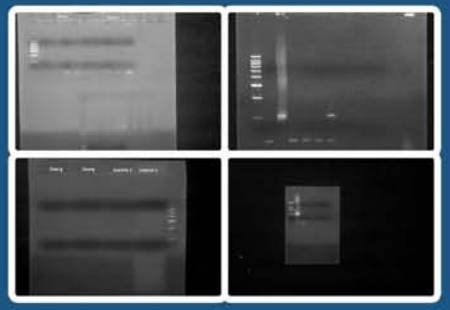
Search for
The Ubiquitous Genetically Engineered Machine

Abstract

The BioBrick has been used as an abstraction or template for creating standardized functional parts. This year's ArtScienceBangalore project proposes alternate re-appropriations of the BioBrick by using existing BioBrick primers as random-PCR primers in investigating soil samples. These random PCR primers provide a succinct signature of the biological diversity present in soil samples. Such investigation of soil leads us to ask questions about citizen's science "performed" by non-institutional actors using accessible tools, and also offers a glimpse into the "post-natural world" where BioBricks may very well end up in our environment as bands in a gel. By imagining a world in which the BioBrick has become the accepted standard for synthetic biology, and where these engineered products are ubiquitous in our lives and environments, the samples we have archived will serve as the baseline from which the subsequent extent of human influence can be measured.Our project is part speculative. Would it be possible to involve a larger community in a Synthetic Biology project? If yes, what questions would we collectively ask and how would we find answers to these questions together? If we could create an open community of citizen scientists by initiating such investigations in an inexpensive manner, could science become a performative celebration of humanity?



DNA Extraction

1. For dissolving the DNA present in the soil, mix the soil sample in Tris Buffer (2 gm soil sample in 2 mL 25mM Tris Buffer) and mix thoroughly.
2. Freeze the eppendorf tubes containing the above mixture in liquid nitrogen, and then boil (at 100°C for 20 mins). This will cause breakdown of the cell, and release the DNA into the mixture.
3. It is then centrifuged at 13.2 krpm for 10 mins at 25°C. This will result in the separation of the DNA from the soil particles.
4. Discard the soil particles, and collect the supernatant.
5. Presence of DNA can be confirmed by electrophoresing on an agarose gel containing ethidium bromide, or another fluorescent dye that reacts with the DNA, and checking under UV light.

Polemerase Chain Reaction

The Plomerase Chain Reactin was conducted by loading the DNA extraction samples into eppendorf tubes, which were then run for 2 hours. This was done at two different temperatrures – 45.1°C and 53.6°C. The

Gel Electrophoresis

Presence of DNA can be confirmed by electrophoresing on an agarose gel containing ethidium bromide, or another fluorescent dye that reacts with the DNA, and checking under UV light

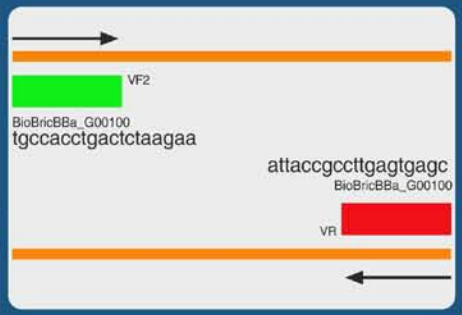
Preparing an agarose gel solution

1. Add the tris buffer to the agarose powder, heat at 50 degrees centigrade till you obtain a clear solution and add Ethidium bromide.
2. Pour into the Gel box, add the comb to form wells, get rid of any air bubbles and let it settle for 30 minutes.
3. Load 3 micro litres of the samples in the wells
4. Begin Gel electrophoresis

Bio Bricks used as Primer

BBa_G00100 (Forward primer for sequencing/amplifying BioBrick parts) is the annealing site for primer VF2. It is used in the construction of BioBrick vectors which include the VF2 primer annealing site.

BBa_G00101(Reverse primer for sequencing/amplifying BioBrick parts (VR)). This reverse primer binds downstream of the standard BBa_MSC on biobrick vectors. Used for general-purpose PCR and sequencing of Biobrick parts.



Result

The ladder used was 6L of 1kb DNA ladder. 1 kb ladder contains 9 bands of double stranded linear DNA fragments ranging from 1 kb to 10 kb with a size increment of 1 kb.

Though the Gel Electrophoresis bands didn't indicate the presence of DNA in either the control sample, or the Coorg soil, the Spectrophotometer (Nanodrop) had different results.

The control sample containing E.coli K12 strand contained 407.6 ng/µL of nucleic acid. And the Coorg samples contained 4.3 ng/µL, and 31.7 ng/µL of