OMICS Group Conferences
Accelerating Scientific Discovery

World Congress on
Biotechnology

BIOTECHNOLOGY-2011
doi:10.4172/jpb.1000240

An efficient method of soil DNA isolation for construction of metagenomic libraries

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The soil ecosystem is dynamic and composed of biotic and abiotic components. Soil represents a diverse group of microorganism, which has frequently been used to isolate and explore and exploit microbes for industrial, environmental and agriculture applications. Soil metagenomics, which comprises isolation of soil DNA and the production and screening of clone libraries, can provide a cultivation independent assessment of the largely untapped genetic reservoir of soil microbial communities. An efficient method has been developed for the isolation of heterologous DNA from environmental soils. This approach consists of the direct extraction of large fragmented nucleic acids from soil followed by purification. Cell lysis is a critical step in soil metagenomic DNA extraction. Extraction procedure was optimized with series of steps, which involved gentle mechanical lysis and number of freeze-thawing cycles in liquid Nitrogen and the incubation period and temperature can be varied. A comparison of the optimized protocol with other existing protocols and with commercially available kit suggested that protocol described in this report would be more efficient, high quality and high yield DNA obtained from different environmental samples. In this approach DNA is directly isolated from environmental soil samples and cloned into suitable vectors to construct complex genomic libraries for screening of novel proteins and drugs that are being produced in surrogate hosts. The approach of directly cloning environmental DNA greatly enhances the opportunities to take full advantage of the enormous naturally occurring microbial resources.