Abstract

Non ribosomal peptides (NRP) are produced in bacterias and some higher organisms such as insects. They have many different therapeutic, agricultural, industrial and manufacturing applications such as; siderophore, pigment, toxin, antibiotic, anti tumor, immunosuppressor, cell differentiation, vitamin and some other. These peptides are produced by non ribosomal peptide synthetases (NRPS), which are huge enzymes and composed of protein complexes with several subunits. One or several genes in clusters encode the NRPS enzyme. These enzymes act as template and synthesizer for non ribosomal peptides. We know that NRPSs have several modules and each one is composed of several domains that do its enzymatic activities. The module activates an amino acid and inset in non ribosomal peptide chain. Researches on NRPS genes of actinomycetes in University of Tehran microorganism collection have shown that some of these bacterias isolated from soils of Iran have new and important non ribosomal peptide synthetase genes. Also researches have shown that these genes are potent for production of new important medications. With respect to applications and importance of these NRPs, in this research new nucleotide sequences were identified to receive new non ribosomal peptides; with identification of partial sequences of NRPS gene clusters of some non ribosomal peptides, in actinomycetes.

In this research, at first chosen bacteria that according to previous researchers have NRPS genes, were cultured and their DNA isolated after receiving to appropriate conditions. In next step, degenerated primers were designed according to obtained information about conserved regions in NRPS genes. We used these primers to identify 2 Kb sequence by polymerase chain reaction. Therefore, they were sequenced and analyzed after gel purification of PCR products. Analyses have shown these sequences belong to NRPS gene clusters and encode PCP as well as important part of A domains. Also A domain substrate was recognized with identification of active sites. Finally we cloned some isolated genes and showed some evidence about the production of NRP in industrial scale and modification them by module engineering to have some new NRPs.

Key words: Non ribosomal peptide, Non ribosomal peptide synthetase, Module, Domain, degenerated primers, PCR.

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Title:

Screening and partial isolation of non-ribosomal peptide synthetase genes in Actinomycetes isolated from soils of Iran

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