Screening of IM2 Factor in Actinomycetes Isolated from Soils

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Background & Objectives: Streptomycetes produce a vast array of secondary metabolites. ɣ-butyrolactones are one of the well studied of autoregulator substances. They trigger the onset of secondary metabolism in general and that of antibiotic production in particular in Streptomycetes. However there is no report on the screening of autoregulator producing actinomycetes in Iran. In this article we studied distribution of regulation network in actinomycetes isolated from soils and deposited in University of Tehran Microorganisms Collection.

Methods: Twenty five actinomycetes isolates deposited in University of Tehran Microorganisms Collection (UTMC) were cultured and butyrolactone production in their fermentation broth was studied using Streptomyces sp. FRI-5 as test strain. The filtrate cell suspension was mixed with mixture of hydroxyl amine:NaOH and ferric chloride:ethanol and the brown color was determined at 520nm were considered as butyrolactone producing activity. IM2 activity was assayed in liquid culture of Streptomyces sp. FRI-5 by adding crude extracts of butyrolactone producing strains and measuring the production of blue pigment as described by Yanagimoto (1983). Crude extracts of fermentation broth of IM2 producing strains were applied to thin-layer chromatography. The developed bonds were examined using UV light at 390nm. Biological activity of the appropriated bond was confirmed as described above. Also, 16SrRNA sequence was analyzed on the best strain.

Results: All of the 25 isolates studied showed butyrolactone activity. Optimum time and morphology for production of autoinducers was 3-5 days and clump form mycelia, respectively. Between the strains, 43% had IM2- producing activity. Maximum activity was seen in Streptomyces sp. UTMC…. This strain showed 93.871% Similarity to Streptomyces violarus NBRC 13104.

Conclusion: The result of the study, for the first time showed the distribution of butyrolactone activity in soil actinomycetes of Iran. Addition of autoinducer to fermentation broth of actinomycetes can enhanced secondary metabolite production.

Keywords: Streptomycetes; ɣ-butyrolactones; IM2-based; Actinomycetes, Iran