

Isolation and Characterization of Actinophages Infecting Streptomyces scabies in Egypt

Authors : D. Zahran, M. AlKhazindar, M. Khalil, E. T. A. Sayed

Abstract : Streptomyces scabies is a pathogenic actinomycete that infects potato crop causing severe production losses. Actinophages affect the composition and diversity of the bacterial population, thereby, can be used as a biological control. Samples of actinomycetes and phages were collected from different cultivated soils including farms of Faculty of Science, Faculty of Agriculture and different locations in Giza, Egypt. Actinomycetes were identified by using biochemical, morphological tests and molecular studies using 16S rRNA sequencing. Two specific phages (E1 and E2) against Streptomyces scabies and other hosts were isolated. Phages were identified using dilution end point (DEP), longevity in vitro (LIV), thermal inactivation point (TIP), host range and electron microscopy. PhageE1 was characterized by 10⁸ (DEP), 180 days (LIV), 95°C (TIP), narrow host range and electron microscopy showed head (59.9 nm) and tail (10.4 nm). On the other hand phageE2 had 10²⁰ (DEP), 180 days (LIV), 90°C (TIP), and the size of head was (67.2 nm) and tail (114 nm). Antiviral activity was also studied using different chemicals (NaCl, KCl, CaCl₂, BaCl₂, CoCl₂, AgNO₃, AlCl₃ and HgCl₂) with different concentrations and different plant extracts with different concentrations (star anise, tea, thyme, peppermint, ginger, cumin, chamomile, turmeric cinnamon, marjoram and black cumin). Both Phage E1 and phage E2 were vulnerable to (cumin, ginger, chamomile, guavas leaves and star anise) but resistant to (Thyme, marjoram, fennelflower seeds, peppermint, and cinnamon).

Keywords : potato scab, actinophages, biological control, electron microscopy, TIP, DEP, LIV, antiviral activity

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