

ENGLISH SUMMARY

Genus *Pseudomonas* has tremendous importance due to its widespread distribution in soil and its ability to utilize a wide range of organic substances as carbon or nitrogen sources. *Pseudomonas putida* is one of the saprophytic fluorescent *Pseudomonas* spp. which are common in the environment. Some strains belonging to this species improve plant growth and productivity, consequently are useful in agriculture. Also, *Pseudomonas putida* showed significant increases in germination percentage of seeds and phosphorus uptake in some plants. Moreover fluorescent Pseudomonads comprise an important group of bacteria used as biological controlling agents for microfungi and some pathogenic bacteria in plant rhizosphere.

Pseudomonas putida as well as many bacteria were susceptible for both virulent and temperate bacteriophages. The current study was carried out to through light on detection, isolation, purification and characterization of some phages specific for *Pseudomonas putida* as one of the biological agent that destroy and lyse these bacteria.

In this study two viruses (phages) specific for *P. putida* were isolated from soil cultivated with potato, collected from Faculty of Agriculture farm, Ain Shams University, (Shoubra El-Khima, Qalubia Governorate, Egypt). The phages were isolated on the base of the differences between the plaque morphology. The two phages were signed as PP₁ and PP₂. Phage PP₁ forming clear circular plaques with diameter of 2 mm and phage PP₂ formed circular plaques, with central clear area, surrounded by halo with 7 mm in diameter. The isolated phages were propagated by the liquid enrichment method which gave a high titer phage suspension of 10¹²

pfu/ml. Phages were purified and concentrated by the two phase polyethylene, 6000 and sodium dextran sulfate, 500 liquid system followed by differential low and high speed centrifugation.

Electron microscopy examination for the uranyl acetate (4%) negatively stained preparations revealed that, particles of phage PP₁ are tadpole shaped with isometric head and long non-contractile tail type, whereas the particles of phage PP₂ are tadpole shaped with isometric head and long contractile tail having sheath. UV-light absorption properties of both viruses showed that phage PP₁ contains more protein content than PP₂ phage, while PP₂ phage particles contain more nucleic acid content than PP₁ phage do.

Pseudomonas putida phages PP₁ and PP₂ infected few strains belong to genus *Pseudomonas*, which means that they have a narrow or limited host range. Protein analysis of both phages by 12% SDS-polyacrylamide gel electrophoresis revealed that phage PP₁ had 16 structural polypeptides, whereas phage PP₂ had 13 structural polypeptides. On the other hand, protein content of phage PP₁ was 0.0803 mg/ml and it was 0.077 mg/ml for PP₂.

Both PP₁ and PP₂ phages have one molecule of double stranded DNA with size of about 2223 pb and 2559 bp for PP₁ phage, and PP₂ phage, respectively. Specific antiserum of each phage was produced in rabbits injected with the purified particles. Immunodiffusion test revealed that, phages are serologically related to each other.

In conclusion, two phages specific for *Pseudomonas putida*, named PP₁ and PP₂ were isolated from loam clay soil cultivated with potato. They have different morphotypes by which PP₁ belonging to *Siphoviridae* family and PP₂ belonging to *Styloviridae*. Also, Phages differed in their UV-light absorption properties, host

range or lytic pattern, chemical composition and serological properties.