Induced systemic resistance by *Trichoderma harzianum* against cucumber root rot which caused by *Pythium aphanidermatum* was investigated using a split-root technique. Eight-day-old cucumber was incited by spore suspension of *T. harzianum* at concentration $10^8$ spores/ml in one half side of root whereas another half side of root of the same plant in split-root system was treated with sterile water in order to determine activities of ascorbate peroxidase (APX) and polyphenol oxidase (PPO) enzymes. Result indicated the changes of enzyme activities of APX and PPO in one half side of root inoculated with *T. harzianum* strain T-50 for 2 and 4 days, respectively. Activities of both enzymes in another half side of root changed in 8 and 6 days after *Trichoderma* inoculation, respectively. When *T. harzianum* strain T-35-C04 was used for root inoculation, the result indicated that the changing periods of enzyme activities after inoculation were different from the use of *T. harzianum* strain T-50.

When one half side of cucumber root was incited by *T. harzianum* strain T-50 for 7 days before another half side of root of the same plant was challenged with *P. aphanidermatum (+P/+T)*, induction of resistance in cucumber plant against root rot disease was observed. Disease incidence was reduced by 37.5% while less amount of roots colonized by *P. aphanidermatum* were detected at 10 days after pathogen’s inoculation. Moreover, the fresh weights of root and leaf, length of root and stem were significantly increased at 4 days after *Pythium* inoculation. Activities of two oxidative enzymes, APX and PPO in roots were reduced at 4 and 7 days after inoculation of *P. aphanidermatum* as compared to the root which was inoculated with *P. aphanidermatum* but did not incited by *T. harzianum* strain T-50 (+P/-T). This indicates the ability of *P. aphanidermatum* to promote activities of oxidative enzymes in root during disease development. Inoculation of *T. harzianum* for 11 days on one half side of cucumber root could promote plant growth by increasing weight of cucumber leaf by 33.75% when compared to non-treated plant (-P/-T). *T. harzianum* strain T-50 effectively colonized upper part better than the lower end part of root. Induction of PR-protein (β-1, 3 glucanase) was detected in a half side of root which was inoculated with *T. harzianum* strain T-50 in the treatments +P/+T and -P/+T when compared to *Trichoderma* non-treated plant (-P/-T).