Effect of Salicylic Acid priming on expression of Susceptible genes in *Zingiber-Pythium* interaction

Sinoy Johnson[1*], Sayuj Koyyappurath[1]

*sinoyjohnson@cusat.ac.in
[1]Department of Biotechnology, Cochin University of Science and Technology, Cochin - 682 022.

Keywords: Ginger; *Pythium*; Salicylic Acid; Susceptibility genes; Gene expression

Ginger soft rot, caused by the soilborne oomycete pathogen *Pythium myriotylum*, is a devastating disease that poses a major threat to commercial ginger production in India. The *Pythium* infects all parts of the ginger including the roots, rhizomes, pseudostems and sprouts, leading to huge economic loss. Previous research works have identified several candidate genes in host plants that are differentially expressed during such pathogen attack, which eventually exacerbate disease severity. At present, the management of such diseases caused by phytopathogens in commercial crops mainly relies on the use of chemical agents. These offer several drawbacks, including the hazardous nature of chemical agents, resulting in detrimental effects on nature and human health. These limitations shed light on evaluating prospects for novel eco-friendly approaches in combating this pathogen. However, to address these concerns, it is necessary to identify the exact molecular mechanisms that drive host plants prone to *Pythium* ingression and subsequent infection. In this study, one-month-old healthy ginger plants were primed by foliar application of Salicylic Acid (SA) at optimized concentrations. The Disease Severity Index was calculated to examine the impact of pathogen inoculation. Biochemical investigations evaluated carotenoid, lignin and total phenolics content in plants, which plays a pivotal role in pathogen resistance. In further, the temporal gene expression analysis was carried out to assess the effect of SA on susceptibility genes. Results revealed that the SA-primed plants were more susceptible to infection upon pathogen inoculation. This was accompanied by altered levels of carotenoids, total phenolics and lignin contents in treated plants. Moreover, real time analysis of the susceptibility genes depicted enhanced expression levels in treated plants compared to control plants. This study will help to identify the expression of susceptibility genes during *Pythium* attack, which can be silenced using gene silencing methods in future to induce resistance in cultivable ginger.