SUMMARY AND CONCLUSION

This study aimed to investigate the prime mechanisms of induced resistance in french bean and soybean plants against three pathogenic fungi, namely *Fusarium solani* f.sp. *phaseoli, Fusarium solani* f.sp. *glycine* and *Colletotricum lindemothianum*. This later fungal pathogen was chosen for a comparative purpose, as it represents a non related genus of the main fungal pathogens used in this study.

It includes the following:

1. Optomization of the growth of the fungal tested on three different media at two different incubation temperature i.e. 20 and 30 °C.
2. Germination of the plant seeds and growth of the whole growing plants under the laboratory conditions.
3. Induced resistance was performed in different susceptible cultivars of both of the two tested plants. For french bean plants, the hypocotyls of all of the tested cultivars were subjected to inoculation with each of the desired pathogen, separately, using the droplet technique at concentration of 1×10^6 spore ml^{-1} at 20 °C.

   Based on their susceptibility, cvs. Nebraska and Bronco were selected for further detailed study.

   For soybean plants, similar trends were applied, the cultivars, Crowford and Giza 22 were selected but they were inoculated at 30 °C. It should be noted that all the cultivars tested in this

study were studied for the first time except only cv. Crowford which was extensively studied by other researchers but from different perspectives.

4. The normal resistance against the selected fungal pathogen i.e. *F. solani* f.sp. *phaseoli* was performed in both of the whole growing plants and the intact hypocotyls of the selected cultivars of french bean and soybean at room temperature and at 20 and 30 °C respectively. Moreover, but with only french bean plants, the excised pods as another organ was used for a comparative study.
    - Among the tested cultivars of french bean and soybean plants, tested cvs. Nebraska and Crowford were moderately resistant and moderately susceptible to Fusarium infection, respectively, whereas the other tested cultivars were susceptible.
    - Furthermore, the efficacy of the induced resistance was tested using four different incubation temperatures (20, 25, 30 and 35 °C), in combination, with the use of the non pathogenic Fusarium, isolated from potatoes, served as an inducer or elicitor for four hours and then, subsequently, the challenged hypocotyls were inoculated with the pathogenic isolate of *F. solani* f.sp. *phaseoli* in all the pathosystems tested in this study.
    - Evaluation of disease symptoms development and those of the induced resistance was assessed at the time point of 0 up to 48 h after inoculation with the non pathogenic isolate of *F. solani*. This was based on morphological,

histological and histochemical approaches using the light microscopy.

- The light microscopic observations revealed cellular features characterized both the compatible and the induced resistant interaction systems tested in this study.
- The study of ability of tested fungi for infection of tested cultivars, demonstrated that the original and reisolated isolates behaved similar.

5. Phytoalexin production, namely phaseollin extracted from healthy and french bean/ *F. solani* f.sp. *phaseoli* induced combination and glyceollin extracted from healthy and soybean / *F. solani* f.sp. *phaseoli* induced combination was measured at 24 h after inoculation of french bean at 20 °C and soybean at 30 °C. The results demonstrated that the studied induced cultivars characterized with increasing in phytolexin production, indicating that the role of the non pathogen (i.e. Fusarium potato isolate) in induction of resistance through activation of phytoalexins production.
6. Total soluble proteins (i.e. PR proteins) analysis was performed for the studied induced cultivars using SDS-PAGE analysis. Unique protein bands for the induced cultivars were demonstrated. Furthermore, these bands were of diverside nature.
    - The total proteins of the original isolates of the fungal pathogens studied were conducted using also the SDS-PAGE analysis and comparative study was performed for the isolated ones. Difference in the protein profiles

among those original versus to the reisolated ones, was demonstrated.

7. Peroxidase isozymes analysis using SDS-PAGE analysis was performed for all the studied systems. The results indicate that the non pathogen is possible has a role individually or in combination with the pathogen in inducing the production of peroxidase isozymes which are different from those produced in the compatible system. This later conclusion indicates that a diverse defense responses are operated via the activation and the induction of peroxidase responses of diverse nature.
8. RAPD fingerprinting profiles were characterized the induced resistant cultivars of the plants studied. Specificity for the cultivars of each plant tested was clear, indicating that unique bands characterized each cultivar can be utilized as a molecular markers for further understanding of the operator genes or the effect or genes involved in the defense responses associated with the resistance induced in these cultivars.