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ANTIFUNGAL PEPTIDES AS NOVEL TOOLS TO ENHANCE RESISTANCE IN COTTON

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Abstract Only

Uzbekistan continues to suffer considerable losses in cotton production due to *Fusarium* and *Verticillium* Wilts in spite of varietal improvements achieved through traditional breeding techniques. New technologies to reduce losses to these diseases are therefore needed. To address this need, we have investigated the use of small molecular weight peptides with fungicidal and antimicrobial properties. We have identified cysteine-rich peptide thionins from cotton seed and from some members of the Malvaceae (i.e., *Hibiscus cannabinus*, *Hibiscus esculentus* and *Malva sylvestris*). Antifungal activities of the thionins were determined with *Verticillium dahliae* and *Fusarium oxysporum* f. sp. *vasinfectum* as the test organisms. The IC50 values for thionins from the seeds of *H. cannabinus*, *H. esculentus* and *M. sylvestris* were estimated to be 6.3, 6.6, 6.8 µg/ml, respectively. We studied the effect of the thionins on membrane binding of Ca2+ in cell cultures. We found the thionins increased the level of Ca2+ membrane binding. We developed a molecular model of the interaction between the conservative terminal of the thionins and phospholipids of cell walls using the molecular modeling software AMBER. Using this model, we observed the formation of lipid–protein complexes between thionins and cell wall phosphatidylethanolamine.