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Insilico analysis and antibacterial studies of methanolic extract of Allium sativum bulb coated with Titanium dioxide (TiO2) nanoparticles against Pseudomonas syringae, pathovar of Pea plant.

Background: The pathovars of Pseudomonas syringae translocate and interfere pathogen defensing cellular functions of the plant host Pea through the activity of effector protein like Hypersensitivity outer protein (Hop), involving type III secretion system pathway (TTSS) leading for bacterial disease progression.
Allium sativum (Garlic) methanolic extract contains an array of phytochemicals having antibacterial activities and thus helps in combating the action of bacterial phytopathogens on plant hosts infection.
Aim and Objective: Insilico analysis of selected phytocompounds against targeted proteins and Antibacterial activities of methanolic extract of Allium sativum bulb coated with Titanium dioxide (TiO2).
Methods: In this study, amino acid derivatives, alkaloid, thiophene and phthalates constituents from Garlic were docked against target Hop protein of Pseudomonas syringae using insilico analysis. Ampicillin was used as control.
Molecular docking analysis using Pyrx was carried out in order to find the inhibition properties of the Garlic followed by antibacterial assays. The antibacterial action effects like the disruption of the cell membrane and DNA damage of phytopathogen P.syringae using methanolic garlic extract doped with TiO2nanoparticles were successfully achieved through trypan blue and CellToxTM green uptake assays.
Results and discussions: The docking studies revealed that all the chosen Garlic constituents showed good binding energy values in comparison with Ampicillin followed by positive results in antibacterial assays conducted.
Conclusion: The selected Garlic constituents (ligands) proved effective in inhibiting the target protein (receptor) which enables in discovering novel antibacterial compounds against Pseudomonas syringae phytopathogen.
Key words: Pseudomonas syringae, Allium sativum, Garlic, Docking, Antibacterial assays.

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