In-Vitro Production of Indole Acetic Acid and Nitrogen Fixation by free-Living Rhizobacteria of Shallot in Sulawesi Island

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PGPR (plant growth-promoting rhizobacteria) are root-colonizing bacteria that benefit plants by increasing plant growth and reducing disease. A total of 125 bacterial isolates with prolific growth were successfully isolated from shallot rhizosphere in Sulawesi and were screened for indole acetic acid activity and nitrogen fixation. The Indole acetic acid activity was induced by the presence L-Tryptophan, a physiological precursor of auxins. The result revealed that only 51 isolates were able to produce IAA in range of 0.76 to 2.33 ppm on culture filtrates and among of them, 5 isolates (MG9, LB3, MK 6-1-1, MK11, and GR 25) produced higher amount of IAA in range of 2.05, 2.14, 2.20, 2.33, and 2.33 ppm, respectively. Kjeldahl method were used to test the isolate as Nitrogen-fixing bacteria. Among tested bacteria, only 48 isolates were able to fixate nitrogen. Five isolat (MK8, MK12-2, MG14, LB5-2-2, GR11 and GR25) fixed Nitrogen between 2656.01 ppm to 2935.59 ppm). Further research is needed in order to select bacterial isolates based on its ability to produce other hormones i.e: gibrellin and cytokinin, as well as the production of siderophores. Their role as phosphate solubilizer and as biological control agent of plant pathogens will be also important to investigate before it applied on shallot plants.

Key words: Shallot, rhizobacteria, indole acetic acid, N-fixing