

## RINGKASAN

Aplikasi pupuk dan pestisida kimia sintetis pada sistem pertanian konvensional dapat berdampak negatif terhadap kesuburan tanah. Penurunan kesuburan tanah tersebut diduga terjadi karena pupuk dan pestisida kimia sintetis dapat bersifat toksik terhadap mikroba tanah yang berperan dalam proses dekomposisi dan siklus hara. Melalui praktik sistem pertanian organik, daur ulang secara alami oleh mikroba tanah dapat ditingkatkan dengan memaksimalkan input berupa bahan organik. Rizobakteri Pemicu Pertumbuhan Tanaman (RPPT) merupakan kelompok mikroba yang berperan dalam penyediaan hara, memproduksi hormon untuk pertumbuhan tanaman dan memproduksi enzim untuk menghambat penyakit tanaman. Penelitian ini bertujuan untuk mengetahui aktivitas mikroba tanah dan eksplorasi bakteri PGPR pada sistem pertanian organik dan konvensional.

Penelitian dilaksanakan di Laboratorium Mikrobiologi, Pusat Penelitian Biologi LIPI, Bogor pada bulan Juli – Desember 2017. Variabel yang diamati yaitu populasi bakteri, respirasi tanah, enzim urease, enzim PME-ase dan eksplorasi bakteri potensial PGPR serta uji hayati untuk mengetahui pengaruh isolat PGPR terhadap pertumbuhan bibit tanaman padi INPAGO LIPI GO 2 menggunakan 12 isolat potensial dengan tiga kali ulangan.

Hasil penelitian menunjukkan bahwa aktivitas mikroba tanah sistem pertanian padi organik lebih tinggi dengan peningkatan populasi bakteri 12 kali lipat, respirasi tanah 49,42%, aktivitas urease 8,97% dan aktivitas PME-ase 24,26% dibandingkan dengan sistem pertanian padi konvensional. Aplikasi isolat TPK1a, TPO5a.1, TPO5g.1, berpengaruh nyata terhadap panjang akar. Aplikasi isolat TPK3b, TPK5b.2, TPK9b.1, TPK1a, TPK4b, TPK6a, TPO7i, TPO8a.1, TPO9b.1, TPO5a.1, TPO5g.1, TPO6g, berpengaruh nyata terhadap kandungan klorofil daun. Aplikasi isolat TPK9b.1, TPK1a, TPK6a, TPO7i, TPO8a.1, TPO9b.1, TPO5a.1, TPO5g.1, dan TPO6g berpengaruh nyata terhadap bobot segar tanaman.

## SUMMARY

*There has a negative impact on soil fertilitation due to application of synthesics fertilizer and pesticide in conventional agriculture. It causes toxic effect on soil microbe as decomposer and nutrition cyclers. Input organic matter in organic farming system, increases activity of microbes. Plant Growth Promoting Rhizobacteria (PGPR) is benefit bacteria as nutrient supplier, produce hormone to support plant growth and produce enzyme to control disease. Objective of this study to know activity of soil microbes and exploration potential bacteria as PGPR in different farming systems of organic and conventional.*

*This study was carried out at laboratory of Agriculture Microbiology in July-December 2017. Observed variables of microbe activity were population of bacteria, urease activity, PME-ase activity, and PGPR potential, and seedling bioassay test on INPAGO LIPI GO 2 using without isolat and 12 potential isolates with three replicates.*

*The results showed that activity of microbes in organic system of rice was higher i.e. population of bacteria 12 fold, soil respiration 49,42%, urease activity 8,97%, and PME-ase activity 24,26% than conventional system. Application of isolate TPK1a, TPO5a.1, TPO5g.1 were significant effect on root lenght. TPK3b, TPK5b.2, TPK9b.1, TPK1a, TPK4b, TPK6a, TPO7i, TPO8a.1, TPO9b.1, TPO5a.1, TPO5g.1, and TPO6g were significant effect on chlorophyl. TPK9b.1, TPK1a, TPK6a, TPO7i, TPO8a.1, TPO9b.1, TPO5a.1, TPO5g.1, and TPO6g were significant effect on fresh weight of biomass.*