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CHONCHANOK LEELAHAWONG : MOLECULAR CHARACTERIZATION AND
BIOCHEMICAL PROPERTIES OF ROOT NODULE BACTERIA ISOLATED FROM THAI
MEDICINAL PLANTS. THESIS ADVISORS : ASST. PROF. NEELAWAN PONGSILP, Ph.D.,
ACHARA NUNTAGIJ, Ph.D., AND ASSOC. PROF. NEUNG TEAUMROONG, Ph.D. 237 pp.

Fifty-six strains of root-nodule bacteria isolated from Thai medicinal plants (*Pueraria mirifica*, *Derris elliptica* and *Indigofera tinctoria*) were characterized. All isolates utilized D-glucose, D-fructose, D-galactose, D-mannose, L-arabinose, mannitol, proline, DL-alanine, L-alanine, L-ornithine monohydrochloride, L-glutamine and casein as sole carbon sources. They could use DL-lysine, DL-valine, DL-phenyl alanine, ammonium molybdate-4-hydrate and proline as sole nitrogen sources. Most isolates showed resistance to ceftazidime (30 µg) ampicillin (10 µg) and chloramphenicol (30 µg). They grew well at pH 5.0 and 6.5. The optimum temperatures were 20 and 30°C. They were able to grow at 0 and 0.2 M NaCl. The concentration of IAA produced by these isolates ranging from 4.310 ± 0.672 to 34.757 ± 0.178 µg/ml. The 16s rDNA sequence of 28 strains were analyzed. The bacterial strains from root nodules of *Indigofera tinctoria* were similarly related to genera *Pseudoalteromonas*, *Ralstonia-Cupriavidus*, *Rhizobium*, *Sinorhizobium* and *Bradyrhizobium*. The strains from root nodules of *Pueraria mirifica* were related to genera *Rhizobium* and *Bradyrhizobium*, while the strains from *Derris elliptica* were related to members of genera *Rhizobium*, *Sinorhizobium* and *Bradyrhizobium*. Five strains were selected to analyze *nifH* and *nodC* genes. The results indicated that *nifH* gene of symbionts isolated from *Indigofera tinctoria*, *Pueraria mirifica* and *Derris elliptica* correlated with *nifH* of genera *Bradyrhizobium* and *Sinorhizobium*. The *nodC* gene of symbionts isolated from *Indigofera tinctoria* and *Derris elliptica* correlated with *nodC* of genera *Bradyrhizobium* and *Sinorhizobium*. Then, phosphatase activities were studied in all strains. They had extracellular enzyme activity higher than intracellular enzyme activity. The highest level of acid phosphatase activity was generated by the strain DASA 68062. While the highest level of alkaline and neutral phosphatase activities were generated by the strain DASA 68056. Furthermore, factors influencing phosphatase activities were studied in the strains DASA 57020, DASA 68056 and DASA 68066. The result showed that D-fructose increased acid phosphatase, neutral phosphatase and alkaline phosphatase of extracellular enzyme.

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