

## The genetic diversity of endophytic and phyllosphere bacteria from several Indonesian herbal plants = Keragaman genetik bakteri endofit dan filosfer dari beberapa tanaman obat Indonesia

Yogiara Susan Soka, author

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### Abstrak

#### <b>ABSTRACT</b><br>

Tanaman obat dipercaya oleh masyarakat Indonesia memiliki berbagai khasiat untuk menyembuhkan penyakit. Senyawa aktif yang ada pada tanaman dapat berasal dari metabolit sekunder atau dari bakteri endofit dan filosfer yang hidup berasosiasi dengan tanaman obat. Sebanyak 18 isolat bakteri endofit dan 32 isolat bakteri filosfer telah dimurnikan dari tanaman Citrus sp., Pluchea indica, Curcuma longa, Nothopanax scutellarium, Piper crocatum, dan Andrographis paniculata. Sebanyak 72% isolat bakteri endofit memiliki aktivitas proteolitik dan sebanyak 11% memiliki aktivitas lipolitik. Bakteri filosfer yang memiliki aktivitas proteolitik sebanyak 59% dan sebanyak 19% memiliki aktivitas lipolitik. Analisis keragaman bakteri tersebut dilakukan dengan teknik amplified ribosomal DNA restriction analysis (ARDRA) dan digesti gen penyandi 16S rRNA dengan menggunakan enzim restriksi endonuklease MspI, RsaI, dan Sau961. Keragaman bakteri endofit dan filosfer pada beberapa sampel tanaman obat cukup tinggi. Bakteri yang diisolasi dari tanaman obat yang sama tidak selalu memiliki kekerabatan genetik yang dekat. Sementara itu, bakteri asal tanaman P.indica memiliki kekerabatan yang cukup dekat satu sama lain.

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#### <b>Abstract</b><br>

Herbal plants have been believed by Indonesians to be an alternative medicine to treat illnesses. The bioactive compounds in the plant can be derived from secondary metabolites or from endophytic and phyllosphere bacteria which coexist within medicinal plants. A total of 18 endophytic bacteria and 32 phyllosphere bacteria were isolated from the herbal plants of Citrus sp., Pluchea indica, Curcuma longa, Nothopanax scutellarium, Piper rocatum, and Andrographis paniculata. About 72% of endophytic bacteria isolates have proteolytic activity and about 11% have lipolytic activity. On the other hand, about 59% of phyllosphere bacteria isolates have proteolytic activity and about 19% have lipolytic activity. Phylogenetic diversity analysis was conducted by using the amplified ribosomal DNA restriction analysis (ARDRA) method and the sequence of 16S rDNA was digested with endonuclease restriction enzymes: MspI, RsaI, and Sau961. The diversity of endophytic and phyllosphere bacterium from the

samples of herbal plants was high. Bacteria isolated from the same herbal plant does not always have a close genetic relationship except for the bacteria isolated from the *P. indica* plant which showed a close genetic relationship with each other.