

## ABSTRACT

Arbuscular mycorrhiza (AM) fungi plays an important role in the process of crop production, due its symbiosis with host plants which can improve crop productivity. However, so far in Indonesia, only few studies on AM fungi genetics have been performed and almost no molecular information exists on AM fungi genetic diversity within the rhizosphere of plants with considerable economic value, such as tea. Therefore, the extensive molecular analysis of AM fungi tea rhizosphere will become a benchmark for further studies on the symbiotic relationships of AM fungi and plants. Soil sample collected from tea plan rhizosphere was sieved and AM spores were isolated and identified based on morphological and molecular approach. We could identify four spores up to species level by molecular technique: *Acaulospora mellea*, *Acaulospora spinosa*, *Glomus clarum*, and *Scutellospora cerradensis*. Total 11 DNA sequences were successfully obtained from AM fungal spores and were phylogenetically analyzed with other 22 sequences from NCBI data. The phylogram obtained from the analysis grouped the 11 sequences in to three clades. Using morphological and molecular grouping, the clades were grouped into five groups. All of clades in the phylogram were consistent with morphological identification; *Acaulospora* sp. A, *Acaulospora* sp. B, *Glomus* sp. A, *Glomus* sp. B, and *Scutellospora* sp. A. In this study, 80% of AM spore were successfully sterilized using filter-paper sandwich methods and two species of AM fungi could be germinated on *Arabidopsis thaliana* root organ culture: *Glomus clarum* were germinate after 7 days of incubation and *Scutellospora cerradensis* were germinate after three days of incubation. However, both of AM spores could not infect *Arabidopsis thaliana* root, the germination tube development were stop after germination.

**Keywords:** Arbuscular mycorrhiza, tea rhizosphere, *in vitro* culture, single spore sequencing, SSU rDNA, molecular identification.

## ABSTRAK

Jamur mikoriza arbuskula (JMA) memiliki peranan penting dalam proses produksi tanaman pangan. Hubungan simbiosis mutualisme antara JMA dengan tanaman inangnya dapat meningkatkan produktivitas tanaman dengan cara meningkatkan: kemampuan penyerapan fosfat ( $\text{PO}_4^{3-}$ ), ketahanan tanaman terhadap pathogen, serta toleransi tanaman terhadap berbagai cekaman lingkungan. Namun demikian, sejauh ini hanya sedikit penelitian yang dilakukan terkait genetika JMA di Indonesia dan hampir tidak tersedia informasi mengenai keragaman genetik JMA yang terdapat di rhizosfer tanaman dengan nilai ekonomi cukup tinggi, seperti tanaman Teh. Pada penelitian ini, isolasi spora JMA dari rhizosfer tanaman teh dilakukan dengan metode *wet sieving*. Spora yang telah berhasil diisolasi kemudian diidentifikasi berdasarkan karakter morfologi spora serta mengg teknik molekuler. Empat jenis spora berhasil diidentifikasi hingga tingkat spesies menggunakan teknik molekuler, yaitu: *Acaulospora mellea*, *Acaulospora spinosa*, *Glomus clarum*, and *Scutellospora cerradensis*. Total 11 sekuen small subunit (SSU) rDNA berhasil didapatkan dari spora JMA. Sekuen tersebut kemudian digunakan untuk menyusun pohon filogenetik, beserta 22 sekuen referensi yang didapat dari NCBI. Filogram yang didapatkan dari analisis *Neighbour Joining* dapat mengelompokkan 11 sekuen JMA kedalam tiga klade, dan dengan kombinasi pengelompokan berdasarkan karakter morfologi dan data molekuler, klade tersebut di kelompokkan lagi kedalam lima grup. Seluruh klade di dalam filogram konsisten dengan identifikasi morfologi: *Acaulospora* sp. A, *Acaulospora* sp. B, *Glomus* sp. A, *Glomus* sp. B, and *Scutellospora* sp. A. 80% spora JMA berhasil di sterilisasi menggunakan metode “*filter-paper sandwich*” dan dua spesies JMA dapat di germinasikan di kultur akar *Arabidopsis thaliana*: *Glomus clarum* mengalami germinasi setelah inkubasi selama tujuh hari, sementara *Scutellospora cerradensis* mengalami germinasi setelah tiga hari inkubasi.

**Keywords:** Jamur Mikoriza Arbuskula, rhizosfer teh, kultur *in vitro*, sekuensing spora mikoriza, SSU rDNA.