

ABSTRACT

Acacia crassicaarpa is a promising species for the wood processing industry, with productivity reaching 110.2 m³/ha at four years of age. However, seedling production in nurseries often faces disease problems, particularly infections by *Fusarium* sp., which can lead to significant economic losses. Biological control using antagonistic microbes, such as *Bacillus* spp., offers an effective and environmentally friendly alternative. This study aimed to explore the potential of *Bacillus* spp. isolated from the rhizosphere of *A. crassicaarpa* as a biocontrol agent against *Fusarium* sp. and as a plant growth promoter. A total of 32 *Bacillus* spp. isolates were obtained, with 21 isolates exhibiting antagonistic activity against *Fusarium* sp. in vitro. The BAM-18 isolate showed the highest inhibition rate at 43.00%. Several isolates, including BAM-18 and BAM-21, also demonstrated chitinolytic activity, nitrogen fixation, phosphate solubilization, and potassium solubilization, indicating their potential to support plant growth.

Keywords : *Acacia crassicaarpa*, *Bacillus* spp., *Rhizosphere*, *Biological control*.

ABSTRAK

Acacia cracicarpa merupakan tanaman potensial untuk industri pengolahan kayu, dengan produktivitas mencapai 110,2 m³/ha pada umur empat tahun. Namun, pengadaan bibit melalui persemaian kerap menghadapi masalah penyakit, khususnya infeksi *Fusarium* sp. yang menyebabkan kerugian ekonomi. Pengendalian hayati menggunakan mikroba antagonis, seperti *Bacillus* spp., menjadi alternatif yang efektif dan ramah lingkungan. Penelitian ini bertujuan mengeksplorasi potensi *Bacillus* spp. dari rizosfer akasia sebagai agens hayati *Fusarium* sp. dan pemacu pertumbuhan tanaman. Sebanyak 32 isolat *Bacillus* spp. berhasil diisolasi, dengan 21 isolat menunjukkan aktivitas antagonis secara in vitro. Isolat BAM-18 menunjukkan daya hambat tertinggi sebesar 43,00%. Beberapa isolat, seperti BAM-18 dan BAM-21, juga memiliki kemampuan kitinolitik, fiksasi nitrogen, pelarutan fosfat, dan pelarutan kalium, yang berpotensi mendukung pertumbuhan tanaman.

Kata Kunci : *Acacia crassicaarpa*, *Bacillus* spp., *Rizosfer*, *Pengendalian hayati*.