

ABSTRAK

SINTESIS ZnO NANOPARTIKEL MENGGUNAKAN EKSTRAK ETANOL DAUN BINTARO (*Cerbera odollam* G) DAN KOMPOSITNYA SEBAGAI ANTIBAKTERI TERHADAP BAKTERI *Salmonella* *typhimurium*

Salmonella typhi merupakan salah satu patogen dalam permasalahan resistensi antimikroba penyebab utama penyakit salmonellosis. Tanaman bintaro (*Cerbera Odollam* G) diketahui mengandung senyawa metabolit sekunder seperti alkaloid, terpenoid, dan tanin terutama senyawa isolasi dari glikosida jantung seperti *17 α -Deacetyltanghinin*, *Cerleaside A*, *17 α -Cerdollaside* memiliki sifat antimikroba. Serta ZnO senyawa logam oksida yang telah diketahui memiliki kemampuan sebagai antimikroba yang sangat baik tanpa toksisitas. Penelitian ini bertujuan untuk mengidentifikasi senyawa metabolit sekunder yang terkandung pada ekstrak etanol daun bintaro (*Cerbera odollam* G), serta melakukan sintesis ZnO nanopartikel beserta kompositnya untuk menganalisis aktivitas antibakterinya terhadap *Salmonella typhimurium*. Pembentukan ZnO nanopartikel dan komposit dilakukan dengan metode *green chemistry* dan sonikasi. Hasil dari uji fitokimia menunjukkan ekstrak etanol daun bintaro positif mengandung alkaloid, flavonoid, tanin, steroid, dan saponin. Hasil karakterisasi XRD menunjukkan pola difraksi yang sesuai dengan *database* ZnO no 01-075-0576, dengan ukuran partikel 38,00 nm dan persen kristalinitasnya 76,25%. Hasil dari karakterisasi SEM menunjukkan ZnO sintesis mempunyai morfologi heksagonal dengan ukuran partikel $40,589 \pm 3,20787$ nm. Hasil pengujian aktivitas antibakteri terhadap *Salmonella typhi* menunjukkan ekstrak etanol daun bintaro sebesar 8,57 mm, ZnO sintesis sebesar 8,57 mm, dan komposit ZnO-ekstrak yang tertinggi yaitu 8,70 mm, ini menunjukkan adanya aktivitas antibakteri.

Kata-kata kunci: Antibakteri; biosintesis; daun bintaro; komposit; *Salmonella typhimurium*; ZnO nanopartikel

ABSTRACT

SYNTHESIS of ZnO NANOPARTICLES USING ETHANOL EXTRACT OF BINTARO LEAVES (Cerbera odollam G) and its composite as an antibacterial against Salmonella typhimurium bacteria

Salmonella typhi is one of the pathogens in the problem of antimicrobial resistance, the main cause of salmonellosis. Bintaro plant (*Cerbera Odollam G*) is known to contain secondary metabolite compounds such as alkaloids, terpenoids, and tannins, especially isolation compounds from cardiac glycosides such as 17 α -Deacetyltanghinin, Cerleaside A, 17 α -Cerdollaside has antimicrobial properties. As well as ZnO, a metal oxide compound that has been known to have the ability to be an excellent antimicrobial without toxicity. This study aims to identify secondary metabolite compounds contained in ethanol extract of bintaro leaves (*Cerbera odollam G*), as well as synthesize ZnO nanoparticles and their composites to analyze their antibacterial activity against *Salmonella typhimurium*. The formation of ZnO nanoparticles and composites was carried out by green chemistry and sonication methods. The results of phytochemical tests showed that bintaro leaf ethanol extract positively contained alkaloids, flavonoids, tannins, steroids, and saponins. The results of XRD characterization showed a diffraction pattern that corresponded to the ZnO database no 01-075-0576, with a particle size of 38.00 nm and a percentage of crystallinity of 76.25%. The results of SEM characterization showed that the synthetic ZnO had a hexagonal morphology with a particle size of 40.589 ± 3.20787 nm. The results of the antibacterial activity test against *Salmonella typhi* showed that the ethanol extract of bintaro leaves was 8.57 mm, the synthetic ZnO was 8.57 mm, and the highest ZnO-extract composite was 8.70 mm, which showed the presence of antibacterial activity.

Keywords: *Antibacterial; biosynthesis; bintaro leaf; composite; Salmonella typhimurium; ZnO nanoparticles.*