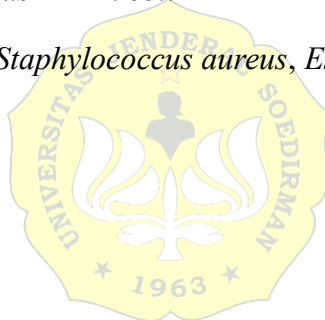


ABSTRAK

Riset nanoteknologi berkembang pesat, terutama nanopartikel seperti seng oksida (ZnO) yang disintesis menggunakan tumbuhan sebagai agen biosintesis. Penelitian ini mengeksplorasi sintesis nanopartikel ZnO menggunakan ekstrak metanol dari daun kamboja putih (*Plumeria alba* L.) dan mengevaluasi aktivitas antibakterinya terhadap bakteri patogen *S. aureus* dan *E. coli*. Proses yang dilakukan antara lain ekstraksi dan fraksinasi daun kamboja putih, sintesis dan karakterisasi nanopartikel ZnO, serta uji aktivitas antibakteri terhadap bakteri *S. aureus* dan *E. coli*. Hasil rendemen ekstrak metanol sebesar 10,13%, fraksi *n*-heksana sebesar 3,60%, fraksi etil asetat sebesar 4,43%, dan fraksi residu sebesar 2,10%. Hasil uji aktivitas antibakteri ekstrak dan fraksi dengan diameter tertinggi dimiliki ekstrak metanol sebesar 9,08 mm untuk bakteri *S. aureus* dan 14,75 mm untuk bakteri *E. coli*. Hasil uji fitokimia ekstrak metanol mengandung senyawa polifenol, flavonoid, alkaloid, saponin, tanin, dan steroid. Hasil sintesis nanopartikel yang memiliki aktivitas optimum dalam menghambat pertumbuhan bakteri yaitu sediaan Np-ZnO 0,15 M *P. alba*. Berdasarkan penelitian, Np-ZnO 0,15 M *P. alba* mampu menghambat pertumbuhan bakteri *S. aureus* dan *E. coli*.

Kata kunci: daun kamboja, *Staphylococcus aureus*, *Escherichia coli*, nanopartikel, ZnO



ABSTRACT

Nanotechnology research is rapidly advancing, particularly in the area of nanoparticles such as zinc oxide (ZnO) synthesized using plants as biosynthesis agents. This study explores the synthesis of ZnO nanoparticles using methanol extract from frangipani leaves (*Plumeria alba* L.) and evaluates their antibacterial activity against the pathogenic bacteria *S. aureus* and *E. coli*. The processes involved include extraction and fractionation of frangipani leaves, synthesis and characterization of ZnO nanoparticles, and antibacterial activity testing against *S. aureus* and *E. coli*. The yield of the methanol extract was 10,13%, the n-hexane fraction was 3,60%, the ethyl acetate fraction was 4,43%, and the residue fraction was 2,10%. The antibacterial activity test results showed that the highest inhibition diameter for the methanol extract was 9,08 mm against *S. aureus* and 14,75 mm against *E. coli*. Phytochemical analysis of the methanol extract revealed the presence of phenolic compounds, flavonoids, saponins, tannins, and steroids. The synthesized nanoparticles exhibited optimum antibacterial activity with the Np-ZnO 0,15 M from *P. alba* being most effective in inhibiting bacterial growth. Based on the study, Np-ZnO 0.15 M from *P. alba* is capable of inhibiting the growth of both *S. aureus* and *E. coli*.

Key words: frangipani leaves, *Staphylococcus aureus*, *Escherichia coli*, nanoparticle, ZnO

