

Bioprospeksi daun *diospyros discolor* willd. bisbul untuk biosintesis nanopartikel perak = Bioprospection of *diospyros discolor* willd. bisbul leaves for silver nanoparticles biosynthesis

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Abstrak

Diospyros discolor Willd. atau bisbul diketahui mengandung beragam senyawa metabolit sekunder di antaranya fenol dan flavonoid. Senyawa-senyawa tersebut diduga berperan sebagai agen pereduksi dalam biosintesis nanopartikel perak NPP. Adapun karakter NPP seperti ukuran, bentuk, dan kesetabilan NPP dapat dipengaruhi oleh kondisi lingkungan biosintesis misalnya pH. Dalam penelitian ini dilakukan biosintesis menggunakan air rebusan daun *D. discolor* pada pH 4, 6, 7, 9, dan 11 untuk mengetahui pengaruh pH terhadap karakter NPP yang diperoleh. Selain itu, untuk mengetahui peran senyawa fenol dan flavonoid, maka dilakukan pengukuran kadar senyawa tersebut dalam air rebusan daun *D. discolor*. Biosintesis NPP dilakukan dengan mencampurkan air rebusan daun *D. discolor* 2 pH 4, 6, 7, 9, dan 11 dan AgNO_3 1 mM pada perbandingan volume 1:2. Pembentukan NPP diketahui dengan melakukan karakterisasi pada warna larutan hasil biosintesis, karakterisasi menggunakan spektrofotometer UV-Vis, Transmission Electron Microscopy TEM, dan Particle Size Analyzer PSA. Setelah inkubasi 24 jam, hasil biosintesis menunjukkan adanya perubahan warna larutan biosintesis menjadi kuning kecokelatan hingga cokelat gelap. Spektrum absorbansi yang muncul pada panjang gelombang 414-446 nm menunjukkan terbentuknya NPP. Hasil TEM dan PSA menunjukkan NPP berbentuk spherical dan memiliki ukuran berkisar 21-54 nm. Ukuran NPP tersebut cenderung semakin kecil seiring dengan kenaikan nilai pH. Hasil PSA juga menunjukkan bahwa NPP yang dihasilkan cenderung stabil dengan nilai zeta potensial berkisar antara -14 mV hingga -30 mV. Keberhasilan biosintesis NPP menggunakan air rebusan *D. discolor* diduga karena peran senyawa fenol atau flavonoid dalam air rebusan tersebut sebagai agen pereduksi. Adapun kadar fenol dan flavonoid dalam air rebusan *D. discolor* yaitu 823,7 ugGAE/mL dan 157,4 ugRE/mL.

.....*Diospyros discolor* Willd. or Bisbul contains of various secondary metabolites including phenol and flavonoid. These compounds are known to have role as reducing agent in silver nanoparticles SNPs biosynthesis. The SNPs characters such as size, shape, and stability of SNPs can be influenced by environmental conditions of biosynthesis such as pH. In this research, biosynthesis was done using *D. discolor* leaves aqueous extract at pH 4, 6, 7, 9, and 11 to know the effect of pH on characters of SNPs obtained. In addition, to know the role of phenol and flavonoid compounds, the levels of these compounds in *D. discolor* leaves aqueous extract was measured.

Biosynthesis was done by mixing *D. discolor* leaves aqueous extract 2 pH 4, 6, 7, 9, and 11 and AgNO_3 1 mM ratio 1:2 UV-Vis then the solution was incubated 24 hours. The SNPs formed are characterized by spectrophotometer UV Vis, Transmission Electron Microscopy TEM, and Particle Size Analyzer PSA. After 24 hours of incubation, the color of solution was changed from yellow to brown or dark brown. The absorption spectrum shows peak at 414-446 nm, indicate the formation of SNPs. Meanwhile, TEM imaging shows that the shape of SNPs is spherical.

Based on PSA result, size of SNPs are ranging between 21-54 nm. Their size tend to become smaller with the increasing of pH value. The PSA result also shows that SNPs have zeta potential value ranging from 14

mV to 30 mV which indicate that the SNPs are relatively stable to moderately stable. The success of SNPs biosynthesis using *D. discolor* is thought to be due to the role of phenol or flavonoids as reducing agents. The levels of phenol and flavonoids in *D. discolor* leaves aqueous extract is 823.7 ugGAE/mL and 157.4 ugRE/mL.