

ABSTRAK

RAHMAN, ANDI ARIEF., 2025. EFEK KOMBINASI EKSTRAK ETANOL DAUN KUMIS KUCING DAN DAUN SIRIH HIJAU TERHADAP BAKTERI *Escherichia coli* DENGAN METODE PITA KERTAS, PROPOSAL, FAKULTAS FARMASI, UNIVERSITAS SETIA BUDI SURAKARTA. Dibimbing oleh Dr. Ana Indrayati, M.Si. dan apt. Ghani Nurfiana., M.Farm.

Prevalensi ISK di Indonesia yang tinggi didominasi bakter *E. coli* dengan persentase 80%. Penggunaan antibiotik yang tinggi menyebabkan resistensi. Penggunaan ekstrak tunggal pada penelitian terdahulu tidak cukup adekuat terhadap bakteri *Escherichia coli*. Daun kumis kucing dengan konsentrasi tunggal pada metode difusi memberikan daya hambat 5 mm, sedangkan daun sirih hijau memiliki aktivitas yang kuat 9,5 mm. Penelitian ini bertujuan menganalisis efek kombinasi ekstrak etanol kedua tanaman ini terhadap *E. coli* penyebab ISK menggunakan metode pita kertas.

Ekstrak etanol daun kumis kucing dan daun sirih hijau diperoleh melalui proses maserasi menggunakan pelarut etanol 96%. Ekstrak yang diperoleh selanjutnya diuji menggunakan metode dilusi bertingkat dengan konsentrasi 100; 50; 25;12,5; 6,25; 3,125; 1562; 0,78%. Uji dilusi untuk mengetahui KHM dan KBM. Nilai optimal dari dilusi kemudian dilanjutkan dengan difusi perbandingan 1:1; 1:2; dan 2:1. Konsentrasi optimal difusi dilanjutkan metode pita kertas untuk mengetahui efek kombinasi kedua ekstrak. Pengukuran daya hambat metode difusi diukur menggunakan SPSS 25.

Hasil penelitian menunjukkan ekstrak DSH memiliki rendemen 23.8% dan DKK 14.4%, dengan kadar air di bawah 10%. Uji dilusi membuktikan ekstrak DSH konsentrasi 6.25% empat kali lebih kuat daripada DKK 25%. Pada uji diameter daya hambat, DSH tunggal menghasilkan 18.75 mm dan DKK tunggal 9.725 mm. Kombinasi 1 DKK:2 DSH menghasilkan daya hambat rata-rata tertinggi sebesar 21,8167 mm. Uji *ANOVA Sig.* 0.000 dan *Tukey* mengonfirmasi bahwa kombinasi ini berbeda dan paling efektif. Kombinasi ekstrak etanol DKK dan DSH pada rasio 1:2 menunjukkan efek sinergis yang maksimal, menjadikannya agen antibakteri alami yang potensial.

Kata kunci : ISK, daun kumis kucing, daun sirih hijau, antibakteri, Pita Kertas, *E.coli*

ABSTRACT

RAHMAN, ANDI ARIEF. 2025. THE EFFECT OF THE ETANOLIC EXTRACT COMBINATION OF *Orthosiphon stamineus* AND *Piper betle* ON *Escherichia coli* BACTERIA USING THE PAPER DISC METHOD.. PROPOSAL, FACULTY OF PHARMACY, SETIA BUDI SURAKARTA UNIVERSITY Supervised by Dr. Ana Indrayati, M.Si. and apt. Ghani Nurfiana, M.Farm

The prevalence of urinary tract infections (UTIs) in Indonesia remains high, with *Escherichia coli* accounting for approximately 80% of cases. The extensive use of antibiotics has contributed to the emergence of resistant bacterial strains. Previous studies utilizing single-plant extracts have demonstrated limited efficacy against *E. coli*. *Orthosiphon stamineus* (cat's whiskers) ethanol extract exhibited a relatively weak antibacterial effect with an inhibition zone of 5 mm, while *Piper betle* (betel leaf) ethanol extract showed moderate activity with an inhibition zone of 9.5 mm. Therefore, this study aims to evaluate the antibacterial activity of a combination of ethanol extracts from *Orthosiphon stamineus* and *Piper betle* leaves against uropathogenic *E. coli* using the paper disc diffusion method to explore a potentially more effective therapeutic approach.

The ethanol extracts were obtained through maceration using 96% ethanol as the solvent. The antibacterial activity of each extract was first evaluated by performing serial dilution tests with concentrations of 100%, 50%, 25%, 12.5%, 6.25%, 3.125%, 1.562%, and 0.78% to determine the Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC). Optimal concentrations identified from the dilution tests were then subjected to comparative diffusion testing at combination ratios of 1:1, 1:2, and 2:1. The most effective concentration derived from the diffusion assay was subsequently assessed using the paper strip method to evaluate the synergistic potential of the extract combination. The dilution tests were analyzed qualitatively, while the diffusion assay results were examined through descriptive quantitative analysis supported by statistical evaluation.

Research results showed that DSH extract had a yield of 23.8% and DKK had 14.4%, with moisture content below 10%. The dilution test proved that DSH extract at a 6.25% concentration was four times stronger than DKK at 25%. In the inhibition zone diameter test, single DSH yielded 18.75 mm and single DKK yielded 9.725 mm. The 1 DKK:2 DSH combination resulted in the highest average inhibition power of 21.8167 mm. The ANOVA test (Sig. 0.000) and Tukey's post-hoc test confirmed that this combination was distinct and most effective. The combination of DKK and DSH ethanol extracts at a 1:2 ratio showed maximum synergistic effect, making it a potential natural antibacterial agent.

Keywords: UTI, *orthosiphon stamineus*, *piper betle*, antibacterium, *Paper Disc*, *E.coli*