PENGARUH PERBEDAAN FREKUENSI *Ultrasound Assisted Extraction* (UAE) TERHADAP EFEKTIVITAS EKSTRAK DAUN UNGU (*Graptophyllum pictum (L.) Griff*) DALAM MENGHAMBAT PERTUMBUHAN BAKTERI *Salmonella typhi*

ANNISA FITRIA NUR

ABSTRAK

Salmonella typhi merupakan bakteri penyebab dari demam tifoid yang insidensinya cukup tinggi di dunia. Munculnya *multidrug-resistant S. typhi* (MDRST) menjadi ancaman baru dalam keberhasilan penatalaksanan demam tifoid. Daun ungu (*Graptophyllum pictum (Linn) Griff*) mengandung senyawa bioaktif tanin, flavonoid, alkaloid, dan saponin, yang diketahui memiliki aktivitas antibakteri. Penelitian ini bertujuan untuk mengetahui pengaruh perbedaan frekuensi ultrasonik terhadap efektivitas ekstrak daun ungu sebagai antibakteri terhadap *S. typhi*. Ekstraksi dilakukan menggunakan metode *ultrasound assisted extraction* (UAE) dengan variasi frekuensi 30 kHz, 40 kHz, dan 50 kHz dengan pelarut etanol 70%, suhu 45°C, dan lama ekstraksi 20 menit. Penelitian ini termasuk dalam penelitian *true experimental* dan dilakukan secara *in vitro*. Hasil penelitian menunjukkan bahwa daun ungu yang diekstraksi menggunakan metode ultrasonik pada frekuensi 30 kHz, 40 kHz, dan 50 kHz memiliki kemampuan untuk menghambat pertumbuhan bakteri *S. typhi* dengan rata-rata diameter zona hambat sebesar 3,67 mm; 8,39 mm; dan 5,52 mm. Analisis data menggunakan uji *Kruskal Wallis* menunjukkan setidaknya terdapat satu pasang kelompok yang memiliki perbedaan rata-rata zona hambat secara signifikan ($P<0,05$). Uji *Post-Hoc Mann Whitney* menunjukkan bahwa terdapat perbedaan yang signifikan pada setiap pasang kelompok perlakuan ($P<0,05$). Dapat disimpulkan bahwa perbedaan frekuensi ultrasonik mempengaruhi efektivitas ekstrak daun ungu dalam menghambat pertumbuhan *S. typhi* dan frekuensi yang paling optimal adalah 40 kHz di mana frekuensi tersebut memiliki efek kavitasi terbaik dalam memecah dinding sel daun ungu sehingga dapat diperoleh senyawa target dengan maksimal.

Kata Kunci: Antibakteri, daun ungu, *Salmonella typhi*, *ultrasound assisted extraction*.

THE EFFECT OF DIFFERENT FREQUENCY OF ULTRASOUND ASSISTED EXTRACTION (UAE) ON THE EFFECTIVENESS OF PURPLE LEAF EXTRACT (Graptophyllum pictum (L.) Griff) IN INHIBITING GROWTH OF Salmonella typhi

ANNISA FITRIA NUR

ABSTRACT

Salmonella typhi is the bacteria that causes typhoid fever which has a fairly high incidence in the world. The emergence of multidrug-resistant S. typhi (MDRST) poses a new threat to the successful management of typhoid fever. Purple leaves (Graptophyllum pictum (Linn) Griff) contain the bioactive compounds such as tannin, flavonoids, alkaloids and saponins, which are known to have antibacterial activity. The aim of this research was to determine the effect of different ultrasonic frequencies on the effectiveness of purple leaf extract as an antibacterial against S. typhi. The extraction was carried out using the ultrasound assisted extraction (UAE) method with varying frequencies of 30 kHz, 40 kHz, and 50 kHz with 70% ethanol solvent, temperature 45°C, and extraction time of 20 minutes. This research method is true experimental and was carried out in vitro. The results showed that purple leaves extracted using the ultrasonic method at frequencies of 30 kHz, 40 kHz and 50 kHz had the ability to inhibit the growth of S. typhi bacteria with an average diameter of the inhibition zone of 3.67 mm; 8.39 mm; and 5.52 mm. Data analysis using the Kruskal Wallis test showed that there was at least one pair of groups that had a significant difference in the average zone of inhibition ($P<0.05$). Mann Whitney Post-Hoc test showed that there were significant differences in each pair of treatment groups ($P<0.05$). It can be concluded that different ultrasonic frequencies influence the effectiveness of purple leaf extract in inhibiting the growth of S. typhi and the most optimal frequency is 40 kHz, which has the best cavitation effect in breaking down purple leaves cell walls so that maximum target compounds can be obtained.

Keywords: *Antibacterial, purple leaves, Salmonella typhi, ultrasound assisted extraction.*