

ABSTRACT

Application of traditional herbal in medical field increased as the conventional medicine is not optimum in treating diseases. Being one of the most commonly consumed dietary condiments, ginger (*Zingiber officinale*) are proven to have antimicrobial, antibacterial, antioxidant, anti-inflammatory, anti-cancer, anti-diabetes and also analgesic activities. Variety of bioactive components that present in ginger extract may cause a decrease in growth and motility of bacteria. Bacterial swarming motility is one of the primary virulence factors that allows bacteria to move on semi-solid surface, creating biofilm. The aim of this study was to determine the effect of ginger extract towards swarming motility of bacteria *Pseudomonas aeruginosa* ATCC 27853.

Swarming motility test of bacteria *P. aeruginosa* ATCC 27853 was studied with different ginger extract concentration treatment and dimethyl-sulphoxide for negative control group. 100 μ L ginger extract at concentration 2.5%, 5.0% and 10.0% (MIC), as well as 100 μ L diluted dimethyl-sulphoxide (negative control) were mixed together with 200 μ L *P. aeruginosa* bacterial suspension and cultured on the semi-solid media which consists of 0.5% bacto agar, 8g nutrient broth and 5g glucose. The culture was incubated at 37°C for 24 hours. The radiant of bacterial swarming motility was measured from the center of inoculation at 4 sides and the average were calculated. Data collected were analyzed using one-way ANOVA and Tukey HSD Post Hoc test ($p < 0.05$).

Results from the study illustrated a decrease in the radiant of bacterial swarming motility when the ginger concentration increased. The results of one-way ANOVA analysis showed significant differences between study groups. Based on the results from Post Hoc test, significant differences were found among the group comparison. This research concluded that ginger extract has the ability to inhibit the swarming motility of bacteria *P. aeruginosa* ATCC 27853 and concentration of 10% caused highest inhibitory effect, followed by 5% and 2.5%. However, the optimal concentration was yet to get.

Keywords: Ginger extract, Swarming motility, *Pseudomonas aeruginosa*

INTISARI

Penggunaan bahan herbal di bidang medis meningkat karena obat yang digunakan belum maksimal untuk pengobatan beberapa penyakit. Jahe (*Zingiber officinale*) merupakan salah satu bumbu makanan yang paling umum dikonsumsi di dunia dan terbukti memiliki aktivitas antimikroba, antibakteri, antioksidan, anti-inflamasi, anti-kanker, anti-diabetes dan analgesik. Berbagai komponen bioaktif dalam ekstrak jahe dapat menyebabkan penurunan pertumbuhan dan motilitas bakteri. *Swarming* motilitas bakteri adalah salah satu faktor virulensi yang memungkinkan bakteri bergerak di permukaan semi padat antara lain pada pembentukan biofilm. Tujuan dari penelitian ini adalah untuk mengetahui pengaruh ekstrak jahe terhadap *swarming* motility bakteri *Pseudomonas aeruginosa* ATCC 27853.

Uji *swarming* motilitas bakteri *P. aeruginosa* ATCC 27853 dilakukan pada kelompok perlakuan menggunakan konsentrasi ekstrak jahe yang berbeda dan dimethyl-sulphoxide untuk kelompok kontrol negatif. Seratus μL ekstrak jahe konsentrasi 2,5%, 5,0% dan 10,0% (MIC), serta 100 μL dimetil sulfoksida yang telah diencerkan (kontrol negatif) dicampur bersama dengan 200 μL suspensi bakteri *P. aeruginosa* dan ditanam pada media semi padat yang terdiri dari 0,5% bakto agar, 8g kaldu nutrisi dan 5g glukosa. Biakan bakteri diinkubasi pada 37 ° C selama 24 jam. Koloni bakteri yang tumbuh diukur dari titik tengah inokulasi pada 4 sisi yang berbeda dan rata-ratanya dihitung. Data yang terkumpul dianalisis dengan menggunakan uji *one-way ANOVA* dan uji *Tukey HSD Post Hoc* ($p < 0.05$).

Hasil penelitian menunjukkan terdapat pengurangan *swarming* motilitas bakteri seiring peningkatan konsentrasi jahe. Hasil analisis *one-way ANOVA* menunjukkan perbedaan yang signifikan antara kelompok studi. Berdasarkan hasil dari uji *Post Hoc*, perbedaan signifikan ditemukan di antara kelompok perbandingan. Penelitian ini menyimpulkan bahwa ekstrak jahe memiliki kemampuan untuk menghambat *swarming* motilitas bakteri *P. aeruginosa* dan konsentrasi 10% lebih baik daripada konsentrasi 5% maupun 2.5%.

Kata Kunci: Ekstrak jahe, *Swarming* motilitas, *Pseudomonas aeruginosa*