

**AKTIVITAS DAYA HAMBAT ISOLAT *Actinomycetes* DENGAN LAMA  
FERMENTASI BERBEDA TERHADAP PERTUMBUHAN *Klebsiella  
pneumoniae***

**ANNISA NUR INSANI**

**Abstrak**

*Actinomycetes* merupakan bakteri Gram positif berbentuk filamen yang tersebar luas di tanah dan mampu menghasilkan metabolit sekunder yang berguna sebagai antibiotik. Produksi metabolit sekunder *Actinomycetes* dipengaruhi oleh kondisi pertumbuhan setiap isolat, termasuk lama fermentasi. *Klebsiella pneumoniae* merupakan bakteri patogen oportunistis penyebab infeksi saluran pernapasan bawah. Saat ini, *K. pneumoniae* mendapatkan perhatian serius karena terdapat peningkatan pada jumlah infeksi dan temuan kasus resistensi. Penelitian ini bertujuan untuk mengetahui aktivitas daya hambat isolat *Actinomycetes* dengan perbedaan lama fermentasi terhadap pertumbuhan *K. pneumoniae*. Bakteri *Actinomycetes* diisolasi dari tanah di Kebun Raya Bogor dan ditumbuhkan pada media *Starch Casein Agar* (SCA) kemudian difermentasi pada media cair yang terdiri dari manitol 2%, pepton 2%, glukosa 1% dengan waktu inkubasi 6, 7, dan 8 hari. Aktivitas antibakteri terhadap *K. pneumoniae* diamati pada media *Mueller Hinton Agar* (MHA) menggunakan metode difusi sumuran. *Actinomycetes* dengan lama fermentasi 6, 7, dan 8 hari mampu menghambat pertumbuhan *K. pneumoniae* dengan rata-rata zona hambat 4,46 mm; 4,94 mm; dan 5,04 mm secara berurutan. Aktivitas antibakteri *Actinomycetes* dapat terjadi melalui beberapa mekanisme, mulai dari penghambatan sintesis dinding sel hingga sintesis asam nukleat dan protein bakteri. Uji *One Way ANOVA* menunjukkan bahwa terdapat perbedaan bermakna pada zona hambat yang dihasilkan oleh setiap kelompok fermentasi. *Actinomycetes* memiliki aktivitas antibakteri terhadap pertumbuhan *K. pneumoniae* dengan aktivitas tertinggi dicapai oleh isolat *Actinomycetes* dengan lama fermentasi 8 hari.

**Kata kunci:** *Actinomycetes*, antibakteri, fermentasi, *Klebsiella pneumoniae*

**INHIBITION ACTIVITY OF *Actinomycetes* ISOLATE WITH DIFFERENT  
FERMENTATION PERIODS AGAINST THE GROWTH OF *Klebsiella  
pneumoniae***

**ANNISA NUR INSANI**

**Abstract**

*Actinomycetes* are filamentous, Gram positive bacteria widely distributed in soil and are able to produce secondary metabolites useful as antibiotics. The synthesis of secondary metabolites of *Actinomycetes* is influenced by the growth conditions of each isolate, including fermentation period. *Klebsiella pneumoniae* is a bacterial opportunistic pathogen causing lower respiratory tract infection. Currently, *K. pneumoniae* is gaining serious attention due to the increase in infection numbers and increase findings of bacterial resistance. This study aimed to determine the inhibition activity of *Actinomycetes* with different fermentation periods against the growth of *K. pneumoniae*. *Actinomycetes* were isolated from soil in Kebun Raya Bogor and grown on Starch Casein Agar (SCA) medium before being fermented in liquid media consisting of 2% of mannitol, 2% of pepton, and 1% of glucose with incubation time of 6,7, and 8 days. Antibacterial activity test was conducted on Mueller Hinton Agar (MHA) medium using well diffusion method. *Actinomycetes* after 6,7, and 8 days of fermentation were able to inhibit the growth of *K. pneumoniae* with an average inhibition zone of 4,46 mm; 4,94 mm; and 5,04 mm respectively. The antibacterial activity of *Actinomycetes* can occur through various mechanism, ranging from inhibition of cell wall synthesis to nucleic acid and protein synthesis. One Way ANOVA test showed that there were significant differences between the inhibition zone produced by each fermentation group. *Actinomycetes* posses antibacterial activity against the growth of *K. pneumoniae* with the highest activity achieved by *Actinomycetes* with fermentation time of 8 days.

**Keywords:** *Actinomycetes*, antibacteria, fermentation, *Klebsiella pneumoniae*