

# **BIODEGRADASI KERATIN DARI BULU UNGGAS MENGGUNAKAN ENZIM KERATINASE HASIL DARI ISOLAT *Pseudomonas* sp. PK4**

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## **INTISARI**

Keratin merupakan salah satu protein yang menyusun sebagian besar protein pada bulu unggas. Pemanfaatan protein keratin pada limbah bulu unggas masih jarang dilakukan karena proses degradasi yang sulit dilakukan. Isolat *Pseudomonas* sp. PK4 yang telah diisolasi dari Rumah Potong Hewan Giwangan mampu menghasilkan enzim keratinase. Penelitian ini bertujuan (1) mengetahui pertumbuhan dan kemampuan isolat *Pseudomonas* sp. PK4 dalam menghasilkan enzim keratinase, (2) mengetahui kemampuan isolat *Pseudomonas* sp. PK4 dalam mendegradasi bulu unggas, (3) mengetahui profil asam amino yang terhidrolisis bakteri *Pseudomonas* sp. PK4 pada masing-masing bulu unggas. Data yang diperoleh dari penelitian ini adalah hidrolisat bulu unggas, kultur mikrobial, viabilitas bakteri, uji keratinolitik metode zona bening, profil pertumbuhan bakteri, aktivitas enzim, degradasi bulu unggas oleh bakteri *Pseudomonas* sp. PK4, berat molekul enzim keratinase dan profil asam amino hasil degradasi dianalisis secara deskriptif. Hasil yang diperoleh menunjukkan bahwa isolat *Pseudomonas* sp. PK4 memiliki enzim keratinase yang dibuktikan dengan adanya zona bening dan memiliki berat molekul >50 kDa. Aktivitas enzim tertinggi sebesar 0,2005 U/ml pada substrat keratin dan 0,3809 U/ml pada substrat kasein. Tingkat degradasi substrat bulu ayam kampung sebesar 38,9%, bulu angsa sebesar 11% dan bulu ayam *layer* sebesar 9%. Profil asam amino dari ketiga sampel hampir sama namun pada hidrolisat bulu angsa dan ayam *layer* mengandung asam amino alanin sedangkan pada hidrolisat bulu ayam kampung mengandung asam amino threonin. Kesimpulan dari penelitian ini adalah isolat *Pseudomonas* sp. PK4 dapat menghasilkan enzim keratinase yang mampu mendegradasi substrat bulu unggas.

(Kata kunci : *Pseudomonas* sp., biodegradasi, keratinase, bulu unggas, asam amino)

# **BIODEGRADATION OF POULTRY FEATHERS WASTE BY KERATINASE ENZYME PRODUCED FROM *Pseudomonas* sp. PK4**

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## **ABSTRACT**

Keratin forms a major component of poultry feathers. The utilization of keratin in poultry feather waste is still rarely done because of the difficult degradation process. *Pseudomonas* sp. PK4 has been isolated from Giwangan Slaughterhouse is able to produce keratinase enzyme. This study was aimed to (1) determine the growth and ability of *Pseudomonas* sp. PK4 in producing keratinase enzyme, (2) determine the ability of *Pseudomonas* sp. PK4 in degrading poultry feathers, (3) determine the profile of amino acids hydrolyzed by *Pseudomonas* sp. PK4 on each feather. The result obtained from this study were the hydrolyzate of poultry feathers, microbial culture, bacterial viability, keratinolytic test with clear zone method, bacterial growth profile, enzyme activity, degradation of poultry feathers by *Pseudomonas* sp. PK4, the molecular weight of the keratinase enzyme and the amino acid profile of the degradation products were analyzed descriptively. The results obtained showed that *Pseudomonas* sp. PK4 has a keratinase enzyme which is evidenced by the presence of a clear zone and has a molecular weight of > 50 kDa. The highest enzyme activity was 0,2005 U/ml using keratin substrate and 0,3809 U/ml using casein substrate. The level of substrate degradation of native chicken feathers was 38.9%, goose feathers were 11% and layer chicken feathers were 9%. The amino acid profile of the three samples is almost the same, but the hydrolyzate of goose and *layer* chicken contains amino acid alanine, while the hydrolyzate of native chicken feathers contains the amino acid threonine. The conclusion of this study is *Pseudomonas* sp. PK4 can produce keratinase enzyme which can degrade the substrate of poultry feathers.

(Keywords : *Pseudomonas* sp., biodegradation, keratinase, poultry feathers, amino acid)