

PEMANFAATAN ENZIM KERATINASE DARI *Bacillus cereus* TD5B, *Bacillus cereus* LS2B, DAN *Pseudomonas* sp. PK4 DALAM MENGHIDROLISIS SUBSTRAT BULU KALKUN

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INTISARI

Bulu kalkun merupakan limbah dari industri unggas yang mana jika tidak diolah dengan baik akan menyebabkan pencemaran lingkungan dan gangguan kesehatan. Kandungan pada bulu kalkun didominasi dengan protein sehingga limbah bulu dapat dimanfaatkan sebagai pupuk asam amino dan bahan pakan sumber protein. Protein pada bulu yang paling banyak ditemukan yaitu protein keratin yang memiliki sifat sukar terdegradasi sehingga diperlukan metode khusus seperti pemanfaatan enzim keratinase yang dihasilkan oleh bakteri dalam menghidrolisis bulu. Produksi enzim keratinase dapat dihasilkan melalui metabolisme bakteri seperti *Bacillus* sp. dan *Pseudomonas* sp.. Penelitian ini bertujuan untuk (1) mengetahui pertumbuhan *Bacillus cereus* TD5B, *Bacillus cereus* LS2B, dan *Pseudomonas* sp. PK4 dengan penambahan substrat bulu kalkun serta (2) mengetahui kemampuan *Bacillus cereus* TD5B, *Bacillus cereus* LS2B, dan *Pseudomonas* sp. PK4 dalam mendegradasi bulu kalkun. Penelitian ini dilakukan dengan cara pembuatan hidrolisat bulu kalkun menggunakan NaOH 1M dan pengembangbiakan kultur starter. Ketiga bakteri kemudian diuji pertumbuhannya pada medium agar menggunakan metode viabilitas sel bakteri dan pada medium cair menggunakan metode spektrofotometri. Keratinase yang dihasilkan oleh masing-masing bakteri diuji dengan penambahan hidrolisat bulu kalkun pada medium agar menggunakan metode zona bening dan pada medium cair menggunakan metode spektrofotometri. Tingkat degradasi bulu kalkun diuji dengan penambahan masing-masing bakteri pada uji degradasi bulu kalkun selama 21 hari. Data yang diperoleh dari penelitian ini yaitu meliputi persentase hidrolisat bulu kalkun yang dihasilkan menggunakan NaOH 1M sebesar 88,66%. Ketiga strain dapat tumbuh pada medium dengan penambahan substrat bulu kalkun dan mampu memanfaatkan substrat sebagai nutriennya. Ketiga bakteri mampu menghasilkan keratinase pada medium dengan penambahan hidrolisat bulu kalkun dengan produksi tertinggi pada fase log. Kemampuan degradasi bulu kalkun terbesar yaitu oleh *Bacillus cereus* TD5B yaitu 9%, *Bacillus cereus* LS2B yaitu 7%, dan *Pseudomonas* sp. PK4 yaitu 3%.

(Kata kunci : degradasi bulu, aktivitas enzim, protease)

UTILIZATION OF KERATINASE ENZYME FROM *Bacillus cereus* TD5B, *Bacillus cereus* LS2B, AND *Pseudomonas* sp. PK4 IN HYDROLYZING TURKEY FEATHER SUBSTRATE

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ABSTRACT

Turkey feathers, a byproduct from the poultry industry sector, have the potential to become environment pollution and disease. The content of turkey feathers is dominated by protein so that the feathers can be used as a fertilizer of nitrogen source and protein source feed. The majority of these protein are keratin, is difficult to be degraded, so that an effective method is needed such as the use of the keratinase enzyme in the hydrolysis of feathers. The production of keratinase enzymes can be produced through the metabolism of bacteria such as *Bacillus* sp. and *Pseudomonas* sp.. The purpose of the research was to (1) determine the growth of *Bacillus cereus* TD5B, *Bacillus cereus* LS2B, and *Pseudomonas* sp. PK4 with addition of turkey feathers and (2) determine the degradation of turkey feathers by *Bacillus cereus* TD5B, *Bacillus cereus* LS2B, and *Pseudomonas* sp. PK4. This research was conducted by making hydrolyzate of turkey feathers using 1M NaOH and culturing starter culture. The three bacteria were then tested for growth on agar medium using the bacterial cell viability method and on liquid medium using the spectrophotometric method. Keratinase produced by each bacterium was tested by adding hydrolyzate of turkey feathers on agar medium using the clear zone method and on liquid medium using the spectrophotometric method. The degradation level of turkey feathers was tested by adding each bacterium to the turkey feather degradation test for 21 days. The data obtained from the research were he percentage of turkey feather hydrolyzate produced using 1M NaOH of 88,66%. The three strains were able to grow on the medium with the addition of turkey feather substrate and were able to utilize the substrate as a nutrient. The three bacteria were able to produce keratinase in the medium with the addition of turkey feather hydrolyzate with the highest production in the log phase. The degradation ability of turkey feathers by *Bacillus cereus* TD5B is 9%, *Bacillus cereus* LS2B is 7%, and *Pseudomonas* sp. PK4 by 3%.

(Keywords : feather degradation, enzyme activity, proteases)