

ISOLASI DAN KARAKTERISASI BAKTERI UREOLITIK DARI USUS LARVA *BLACK SOLDIER FLY* (*Hermetia illucens* Linnaeus, 1758) DEKOMPOSER KOTORAN TERNAK

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INTISARI

Gut microbiome pada larva *black soldier fly* (*Hermetia illucens* Linnaeus, 1758) berperan penting dalam kemampuannya mendekomposer kotoran ternak. Salah satu *gut microbiome* tersebut adalah bakteri ureolitik yang memproduksi enzim urease sebagai biokatalisator hidrolisis urea menjadi amonia dan karbon dioksida. Penelitian ini bertujuan untuk mengisolasi, mengarakterisasi, serta mengukur aktivitas urease dari bakteri ureolitik yang diperoleh dari usus larva *H. illucens* menggunakan metode *conductivity assay*. Sebanyak tujuh isolat berhasil terisolasi (U₁-U₇), dengan karakter bentuk koloni *circular-irregular*, elevasi *flat-raised*, margin *entire-lobate*, berwarna cream, serta bersifat Gram positif dengan bentuk sel berupa *bacillus*, *coccus*, dan *streptobacilli*. Hasil uji biokimia menunjukkan semua isolat bersifat positif terhadap fermentasi glukosa dan katalase, namun negatif pada fermentasi laktosa dan pembentukan indol; empat isolat menunjukkan kemampuan hidrolisis pati sedangkan tiga isolat menunjukkan kemampuan reduksi nitrat. Aktivitas urease spesifik ketujuh isolat relatif rendah dibandingkan acuan (1,2–3,9 mM urea terhidrolisis/menit/OD), yaitu berkisar antara 0,0018–0,0035 mM urea terhidrolisis/menit/OD. Hasil ini mengindikasikan potensi enzimatik dari bakteri ureolitik usus larva *H. illucens*, dan pengukuran dengan metode alternatif lainnya disarankan untuk eksplorasi lanjutan.

KATA KUNCI: bakteri, *Hermetia illucens*, urease, ureolitik, usus

ISOLATION AND CHARACTERIZATION OF UREOLYTIC BACTERIA FROM THE GUT OF BLACK SOLDIER FLY LARVAE (*Hermetia illucens* Linnaeus, 1758) AS LIVESTOCK MANURE DECOMPOSERS

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ABSTRACT

The gut microbiome of black soldier fly larvae (*Hermetia illucens* Linnaeus, 1758) larvae plays a key role in their ability to decompose livestock manure. Among these microbial communities are ureolytic bacteria which capable of producing urease, an enzyme that catalyzes the hydrolysis of urea into ammonia and carbon dioxide. This study aimed to isolate, characterize, and evaluate the urease activity of ureolytic bacteria isolated from the gut of *H. illucens* larvae using conductivity assay. Seven isolates (U₁-U₇) were successfully isolated, exhibiting circular-irregular colony morphology, flat-raised elevation, entire-lobate margins, cream colony color, and Gram-positive staining with bacillus, coccus, and streptobacilli cell morphologies. Biochemical tests revealed all isolate had positive results for glucose fermentation and catalase activity, while lactose fermentation and indole production were negative; four isolates exhibited starch hydrolysis capabilities while three isolates exhibited nitrate reduction capabilities. The specific urease activity of all seven isolates was relatively low compared to reported references (1.2–3.9 mM urea hydrolyzed/min/OD), ranging from 0.0018 to 0.0035 mM urea hydrolyzed/min/OD. These results indicate the enzymatic potential of ureolytic bacteria from the gut of *H. illucens*, and further evaluation using alternative assay methods is recommended for future exploration.

KEYWORDS: bacteria, gut, *Hermetia illucens*, urease, ureolytic