

ABSTRAK

Ayunda Puspa Dwi Prihandari, 2026. Penyusunan Monograf Berbasis Riset: Isolasi dan Karakterisasi Bakteri dari Reaktor Biogas *Fixed dome* . Skripsi. Program Studi Pendidikan Biologi, FKIP, Universitas PGRI Madiun. Pembimbing (I) Dr. Pujiati, S.Si., M.Si., (II) Nurul Kusuma Dewi, S.Si., M.Sc.

Penyusunan monograf berbasis riset merupakan salah satu inovasi dalam pengembangan bahan ajar yang mengintegrasikan hasil penelitian ke dalam pembelajaran. Penelitian ini bertujuan menyusun monograf berbasis hasil isolasi dan karakterisasi bakteri dari *slurry* reaktor biogas tipe *fixed dome* serta mendeskripsikan karakteristik morfologi koloni bakteri yang berhasil diisolasi. Penelitian menggunakan metode deskriptif eksploratif dengan pendekatan kualitatif melalui pengamatan karakteristik morfologi makroskopis koloni dan karakteristik mikroskopis bakteri berdasarkan pewarnaan Gram. Sampel *slurry* diambil dari reaktor biogas tipe *fixed dome* di Desa Jabung, Kabupaten Magetan, kemudian diisolasi dan dikarakterisasi di laboratorium. Hasil penelitian menunjukkan diperoleh tujuh isolat bakteri (IS-1 sampai IS-7) dengan karakteristik morfologi koloni yang beragam. Berdasarkan kesesuaian karakteristik morfologi koloni dan sifat Gram dengan literatur acuan, isolat diduga termasuk genus *Proteus* sp. (IS-1 dan IS-4), *Pseudomonas* sp. (IS-2), *Methanobacterium* sp. (IS-3), *Serratia* sp. (IS-5), *Acinetobacter* sp. (IS-6), dan *Enterobacter* sp. (IS-7). Hasil penelitian selanjutnya dikembangkan menjadi monograf berbasis riset yang memperoleh tingkat kelayakan sangat valid berdasarkan penilaian ahli materi sebesar 93,75% dan ahli media sebesar 96,88%, sehingga layak digunakan sebagai bahan ajar pada pembelajaran mikrobiologi dan bioteknologi lingkungan.

Kata kunci: monograf, isolasi bakteri, karakterisasi bakteri, reaktor biogas *fixed dome*, *slurry*.

ABSTRACT

Ayunda Puspa Dwi Prihandari, 2026. Development of a Research-Based Monograph: Isolation and Characterization of Bacteria from a Fixed Dome Biogas Reactor. Undergraduate Thesis. Biology Education Study Program, Faculty of Teacher Training and Education, Universitas PGRI Madiun. Advisors: (I) Dr. Pujiati, S.Si., M.Si., (II) Nurul Kusuma Dewi, S.Si., M.Sc.

The development of a research-based monograph is one of the innovations in developing teaching materials that integrates research findings into learning. This study aimed to develop a monograph based on the results of the isolation and characterization of bacteria from slurry in a fixed dome biogas reactor, as well as to describe the colony morphological characteristics of the successfully isolated bacteria. The research employed a descriptive exploratory method with a qualitative approach through the observation of macroscopic colony morphological characteristics and microscopic bacterial characteristics based on Gram staining. Slurry samples were taken from a fixed dome biogas reactor in Jabung Village, Magetan Regency, and were then isolated and characterized in the laboratory. The results showed that seven bacterial isolates (IS-1 to IS-7) were obtained with diverse colony morphological characteristics. Based on the compatibility of colony morphological characteristics and Gram properties with reference literature, the isolates were presumed to belong to the genera *Proteus* sp. (IS-1 and IS-4), *Pseudomonas* sp. (IS-2), *Methanobacterium* sp. (IS-3), *Serratia* sp. (IS-5), *Acinetobacter* sp. (IS-6), and *Enterobacter* sp. (IS-7). The research results were subsequently developed into a research-based monograph, which obtained a "very valid" feasibility level based on assessments by material experts (93.75%) and media experts (96.88%), making it suitable for use as teaching material in microbiology and environmental biotechnology courses.

Keywords: monograph, bacterial isolation, bacterial characterization, fixed dome biogas reactor, slurry.