KARAKTERISASI BAKTERI *EXTENDED SPECTRUM BETA-LACTAMASE* DAN UPAYA PENGHAMBATAN PERTUMBUHAN DENGAN *CLAY-PYRITE*

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INTISARI

Limbah cair rumah potong ayam (RPA) terdiri atas campuran senyawa organik seperti *feces*, darah, dan lemak. Kandungan senyawa organik pada limbah cair menjadi tempat yang sempurna bagi bakteri extended spectrum beta lactamase (ESBL) untuk tumbuh. Bakteri ESBL bersifat patogen sehingga sangat berbahaya bagi manusia dan perlu dilakukan upaya untuk menghambat pertumbuhan bakteri tersebut. Pada penelitian ini limbah cair RPA yang berasal dari 5 kecamatan di Kabupaten Bantul digunakan untuk analisis cemaran bakteri ESBL. Jumlah sampel yang digunakan pada penelitian ini adalah 24 sampel limbah cair RPA. Berdasarkan hasil, dari total keseluruhan sampel ditemukan 17 sampel yang mengandung bakteri ESBL. Tingkat cemaran bakteri ESBL di limbah cair RPA Bantul dapat dikategorikan cukup tinggi. Upaya penghambatan pertumbuhan bakteri ESBL dapat dilakukan dengan memanfaatkan bahan alam yang ramah lingkungan. Material geologi tanah liat seperti *clay* dan ion besi seperti *pyrite* sangat potensial untuk mengontrol pertumbuhan bakteri ESBL. Pada penelitian ini digunakan *clay* dari Tuban, Jawa Timur, Indonesia dengan kandungan utamanya yang berupa *montmorillonite*. Mineral *pyrite* yang ditambahkan pada *clay* Tuban terbukti mampu menurunkan pH sampai 3,75 dengan kategori perubahan keasaman dari asam lemah menjadi asam kuat. Perbandingan *clay* : *pyrite* yang digunakan pada penelitian ini adalah 95% : 5% dengan medium pelarut berupa H_2O_2 10%. *Clay* Tuban-*pyrite* dengan konsentrasi 4 mg/mL terbukti mampu menurunkan pertumbuhan *Escherichia coli* ESBL setelah 24 jam.

Kata kunci : Antibiotik, *clay-pyrite*, *Escherichia coli*, ESBL, limbah

CHARACTERIZATION OF BACTERIAL EXTENDED SPECTRUM BETA-LACTAMASE AND GROWTH INHIBITION WITH CLAY-PYRITE

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ABSTRACT

Chicken slaughterhouse (CS) wastewater consists of organic compounds mixture such as faeces, blood and fat. Organic compounds in CS wastewater is the perfect place for extended spectrum beta lactamase (ESBL) bacterial to grow. ESBL bacteria are pathogenic, very dangerous for humans and it is necessary to inhibit the bacterial growth. In this study, CS wastewater was collected from 5 sub-districts in Bantul Regency and was used for analysis of ESBL bacterial contamination. The total number of samples used in this study were 24 CS wastewater samples. Based on the results, of the total samples, 17 samples were found to contain ESBL bacterial contamination. The level of ESBL bacterial contamination in the Bantul CS wastewater can be categorized as quite high. Efforts to inhibit the growth of ESBL bacteria can be carried out by utilizing natural materials that are safe for the environment. Geological materials such as clay and iron ions such as pyrite have the potential to control the growth of ESBL bacteria. In this study, clay from Tuban, East Java, Indonesia was used, with the main content being montmorillonite. The mineral pyrite that has been added to Tuban clay cause a decreasing in pH to 3.75 with a acidity alteration from weak acid to strong acid. The ratio of clay : pyrite used in this study was 95% : 5% with 10% H_2O_2 as the solvent. Tuban clay -pyrite with a concentration of 4 mg/mL has been shown to reduce the growth of *Escherichia coli* ESBL after 24 hours.

Keywords: Antibiotics, *clay-pyrite*, *Escherichia coli*, ESBL, wastewate