

INTISARI

Penggunaan kotoran ternak sebagai pupuk diperhitungkan sebagai salah satu penyebab penyebaran residu antibiotik, *antibiotic resistant bacteria*, dan *antimicrobial resistance gene* (ARG) di sistem pertanian. Bakteri patogen yang resistensi terhadap antibiotik ditemukan pada kotoran ternak dan tanaman hortikultura di Indonesia. Kotoran sapi dan kompos dari kotoran sapi didapatkan dari peternak skala kecil di Yogyakarta dan peternakan intensif di Lampung. Kotoran sapi dan kompos diaplikasikan sebagai pupuk pada selada dan bawang merah. Bakteri diisolasi dari kotoran sapi, kompos, dan tanaman hasil pemupukan menggunakan media selektif (EMB, SSA, TCBS, dan MacConkey Agar). Deteksi ARG dilakukan pada komunitas bakteri yang tumbuh dengan primer *tetW*, *vanT_C2*, *aadA7*, dan *ermX2*. Koloni bakteri yang mengkode ARG disubkultur untuk kemudian diidentifikasi dengan sequencing 16S rRNA. Uji sensitivitas antimikroba dilakukan pada bakteri yang telah teridentifikasi dengan metode difusi cakram terhadap tetracycline HCl, streptomycin sulfat, dan kanamycin sulfat. *Kosakonia sp.* (yang memiliki gen resistensi *tetW*, *vanTC2*, dan *ermX2*) dan *Klebsiella aerogenes* (yang memiliki gen resistensi *tetW* dan *ermX2*) ditemukan pada akar selada yang dipupuk dengan feses sapi peternakan Yogya. *Pseudomonas aeruginosa* yang memiliki gen resistensi *tetW* dan *ermX2* ditemukan pada daun selada yang dipupuk dengan feses sapi peternakan Yogya. *Kosakonia sp.* (yang memiliki gen resistensi *tetW*, *vanTC2*, dan *ermX2*) dan *Citrobacter amalonaticus* (yang memiliki gen resistensi *tetW*) ditemukan pada daun selada yang dipupuk dengan feses sapi peternakan Lampung. *Proteus myxofaciens* (yang memiliki gen resistensi *tetW* dan *ermX2*) ditemukan pada kompos dari feses sapi peternakan Lampung. Semua isolat dalam ordo Enterobacterales menyandi *tetW* namun menunjukkan sensitivitas terhadap tetracycline, kecuali *Proteus myxofaciens* yang intemediet. Semua isolat dalam ordo Enterobacterales tidak menyandi *aadA7* namun *Kosakonia sp.* dan *Citrobacter amalonaticus* menunjukkan intemediet terhadap kanamycin dan resistensi terhadap streptomycin.

Kata kunci: *Antimicrobial resistance gene*, enteropatogen, kotoran sapi

ABSTRACT

The use of livestock manure as fertilizer is one of the causes of the spread of antibiotic residues, antibiotic resistant bacteria, and antimicrobial resistance genes (ARG) in agricultural systems. Pathogenic bacteria that are resistant to antibiotics were found in livestock manure and horticultural plants in Indonesia. Cattle manure and compost from cattle manure were obtained from small-scale farmers in Yogyakarta and intensive farms in Lampung. Cattle manure and compost are applied to fertilize lettuce and shallot. Bacteria were isolated from cattle manure, compost, and fertilized plants using selective media (EMB, SSA, TCBS, and MacConkey Agar). ARG detection was carried out on bacterial communities growing with primers *tetW*, *vanT_C2*, *aadA7*, and *ermX2*. Bacterial colonies with ARGs were subcultured and then identified by 16S rRNA sequencing. Antimicrobial susceptibility tests were carried out on the identified bacteria using the disc diffusion method against tetracycline HCl, streptomycin sulphate, and kanamycin sulphate. *Kosakonia sp.* (with ARGs *tetW*, *vanTC2*, and *ermX2*) and *Klebsiella aerogenes* (with ARGs *tetW* and *ermX2*) were found on lettuce roots fertilized with cattle manure from Yogya. *Pseudomonas aeruginosa* with ARGs *tetW* and *ermX2* were found on lettuce leaves fertilized with cattle manure from Yogya. *Kosakonia sp.* (with ARGs *tetW*, *vanTC2*, and *ermX2*) and *Citrobacter amalonaticus* (with ARGs *tetW*) were found on lettuce leaves fertilized with the cattle manure from Lampung. *Proteus myxofaciens* (with ARGs *tetW* and *ermX2*) was found in compost from the cattle manure from Lampung. All isolates in the order Enterobacterales encoded *tetW* but showed sensitivity to tetracycline, except *Proteus myxofaciens* which was intermediate. All isolates in the order Enterobacterales did not encode *aadA7* but *Kosakonia sp.* and *Citrobacter amalonaticus* showed intermediate to kanamycin and resistance to streptomycin.

Keywords: *Antimicrobial resistance gene*, enteropathogen, cattle manure