# *Diarrheagenic Escherichia coli* PADA DAGING SAPI DI DAERAH ISTIMEWA YOGYAKARTA SERTA POLA RESISTENSINYA TERHADAP ANTIBIOTIKA

## INTISARI

Alvita Indraswari
18/436442/SKH/00108

Kontaminasi bakteri dapat menyebabkan terjadinya penyakit tular makanan. Sejumlah strain *E. coli* patogen yang dikenal dengan nama *diarrheagenic E. coli* (DEC) dapat menyebabkan penyakit diare atau penyakit ekstraintestinal lainnya. Penelitian ini bertujuan untuk mengetahui prevalensi DEC pada daging sapi yang dijual di pasar tradisional di D.I. Yogyakarta, mengetahui karakteristik genetik isolat-isolat bakteri yang diisolasi dari daging sapi di pasar tradisional di D.I. Yogyakarta berdasarkan urutan gen 16S rRNA, dan mengetahui pola kepekaan DEC terhadap beberapa jenis antibiotik. Teknik sampling pada penelitian ini menggunakan teknik sampling sampel random klaster. Isolasi dan identifikasi *E. coli* dilakukan secara konvensional dengan menggunakan uji-uji biokimia dan dikonfirmasi secara molekuler dengan *polymerase chain reaction* (PCR) menggunakan gen target *eae*, *rfbE*, *stx1*, *stx2*, dan *bfp*. Karakteristik genetik isolat diketahui dengan cara mendeteksi gen 16S rRNA. Uji resistensi antimikrobia dilakukan berdasarkan metode difusi cakram Kirby Bauer menurut *Clinical and Laboratory Standard Institute* (CLSI). Data yang diperoleh dianalisis secara deskriptif dan data molekuler dianalisis menggunakan *software* MEGA-X, serta pola kepekaan terhadap antibiotik dianalisis mengikuti CLSI. Hasil dari penelitian ini diperoleh 98 sampel daging sapi dengan ditemukan sebanyak 84,69% (83/98) sampel positif *E. coli* pada media EMBA dan 48,19% (40/83) sampel presumtif *E. coli* O157 pada media SMAC. Prevalensi DEC pada daging sapi diketahui cukup tinggi sebesar 42,17% (35/83). Sebagian besar DEC yang teridentifikasi yaitu sebesar 97,14% (34/35) merupakan EHEC, sedangkan 2,86% (1/35) lainnya merupakan *atypical* EPEC. Isolat DEC yang diteliti memiliki hubungan evolusi dengan isolat referensi yaitu EHEC dan EPEC. Pola kepekaan DEC diketahui 100% (35/35) resisten terhadap *penicillin G*, 37,14% (13/35) resisten terhadap *oxytetracycline*, dan 8,57% (9/35) resisten terhadap *streptomycin* dengan sifat *multidrug resistant* (MDR) sebesar 20% (7/35). Disimpulkan bahwa prevalensi DEC pada daging sapi cukup tinggi, sehingga perlu meningkatkan kewaspadaan dalam mengolahnya. Karakter genetik yang diperoleh dapat digunakan untuk penelusuran kekerabatan dan asal-usul isolat DEC. Isolat DEC yang ditemukan memiliki sifat resisten terhadap beberapa jenis antibiotik dan beberapa di antaranya bersifat MDR, sehingga perlu mempertimbangkan pengobatan yang menggunakan antibiotik.

Kata kunci: *diarrheagenic E. coli*, *foodborne disease*, karakteristik genetik, PCR, resistensi antimikrobia

# DIARRHEAGENIC *Escherichia coli* ISOLATED FROM BEEF IN YOGYAKARTA SPECIAL PROVINCE AND THEIR PATTERNS OF RESISTANCE TO ANTIBIOTICS

## ABSTRACT

Alvita Indraswari
18/436442/SKH/00108

Bacterial contamination can cause foodborne diseases. Several strains of the pathogenic *E. coli* known as diarrheagenic *E. coli* (DEC) can cause diarrhea or another extraintestinal disease. This study aims to determine the prevalence of DEC in beef sold in traditional markets in Yogyakarta Special Province, knowing the genetic characteristics of bacterial isolates isolated from beef in a traditional market in Yogyakarta Special Province is based on the 16S rRNA gene sequence and determines the sensitivity pattern of DEC to several types of antibiotics. The sampling technique in this study used a random cluster. Isolation and identification of *E. coli* were carried out conventionally using biochemical tests and confirmed molecularly by polymerase chain reaction (PCR) using the target genes *eae*, *rfbE*, *stx1*, *stx2*, and *bfp*. The genetic characteristics of the isolates were identified by detecting the 16S rRNA gene. The antimicrobial resistance test was carried out based on the Kirby Bauer disc diffusion method according to the Clinical and Laboratory Standard Institute (CLSI). The data obtained were analyzed descriptively and molecular data were analyzed using MEGA-X software, and the pattern of sensitivity to antibiotics was analyzed using CLSI. The results of this study obtained 98 samples of beef with found as many as 84.69% (83/98) positive samples of *E. coli* on EMBA media and 48.19% (40/83) presumptive samples of *E. coli* O157 on SMAC media. The prevalence of DEC in beef is known to be quite high at 42.17% (35/83). Most of the DECs identified, 97.14% (34/35) were EHEC, while the other 2.86% (1/35) were atypical EPEC. The DEC isolates studied had an evolutionary relationship with reference isolates, EHEC and EPEC. The sensitivity pattern of DEC is known to be 100% (35/35) resistant to penicillin G, 37.14% (13/35) resistant to oxytetracycline, and 8.57% (9/35) resistant to streptomycin with multidrug resistant (MDR) properties of 20% (7/35). The results of this study can be concluded that the prevalence of DEC in beef is quite high, so it is necessary to increase awareness in processing it. The genetic characters obtained can be used to trace the relationship and origin of DEC isolates. DEC isolates were found to be resistant to several types of antibiotics and some of them were multidrug resistant, so it was necessary to consider treatment using antibiotics.

Keywords: diarrheagenic *E. coli*, foodborne disease, genetic characteristics, PCR, antimicrobial resistance