Range of O-serogroups of Shiga toxin-producing (STEC) and enteropathogenic (EPEC) Escherichia coli in cattle in Wallonia

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INTRODUCTION

Escherichia coli producing Shiga toxins (STEC or ShigaToxigenic E. coli) and/or the attachment-effacement (AE) histological lesion (EPEC or EnteroPathogenic E. coli) cause enteritis with (bloody) diarrhea in humans and young calves and the haemolytic uremic syndrome (HUS) in humans. Infection of humans through consumption of foodstuffs (indirectly) contaminated by cattle faeces (which are healthy intestinal carriers) is proved for STEC and suspected for EPEC. Besides the O157:H7 serotype, STEC and EPEC can belong to more than sixty O serogroups. Of them, 10 are regularly identified in humans and/or calves worldwide: O5, O26, O45, O103, O104, O111, O118, O121, O145 and O165. This study aimed at identifying the O serogroups of STEC and EPEC isolated from (i) diarrheic calves and (ii) healthy bovines at 2 slaughterhouses in Wallonia.

MATERIALS and METHODS

(i) 233 enterohaemolysin-positive E. coli were isolated at ARSIA from diarrhoeic calves after growth on EHYL Medium. They all were tested with a triplex PCR targeting the stx1, stx2 (Shiga toxins) and eae (AE) lesion genes (Fig. 1; Bardiaux et al., 2010).

(ii) large intestine contents were sampled at 2 slaughterhouses in Wallonia from (165 <1 year-old bulls, 23 cows and 4 heifers) and grown overnight at 37° C in Lauryl sulfate Enterobacteriaceae selective broth. The enrichment broths were assayed with the stx1/stx2/eae triplex PCR. Positive broths were inoculated onto agar plates (McConkey’s, Chromagar ES with tellurite and Chromagar STEC, Fig. 2) and 10 colonies from each plate were picked up for testing with the same triplex PCR.

(iii) all triplex PCR-positive E. coli were further assayed with a multiplex PCR targeting the specific genes coding for the O serogroups listed above (Mekata et al., 2014). (Fig 3)

RESULTS

(i) the triplex PCR was performed in duplicate by two different manipulators on the E. coli isolated from diarrheic calves: 69 tested positive with the PCR for the stx1 and/or stx2 and/or eae genes (Table 1) and 81 negative for the 3 genes. 83 strains gave conflicting results and are being checked.

(ii) 69 enrichment broths of slaughterhouse samples tested positive with the PCR for the stx1 and/or stx2 and/or eae genes (Table 2). The PCR-positive broths are being inoculated onto the 3 agar plates and 10 colonies from each plate are being picked-up and stored before further testing.

(iii) Right now, STEC and EPEC from diarrheic calves are being tested with the PCR for the O serogroups.

DISCUSSION

- Animals for slaughter are, to some extent, holders of EPEC and STEC strains and thus represents a potential public health hazard.
- Moreover, there is no full correlation between the enterohaemolysin postive phenotype and the presence of the eae gene and / or those encoding the Shiga toxin. The use of enterohaemolysin agarm might not be the best diagnostic test to isolate STEC and EPEC from diarrheic calves.

REFERENCES