

Frequency of virulence genes related to diarrheogenic *E. coli* in cattle from Cordillera Department of Paraguay in 2016.

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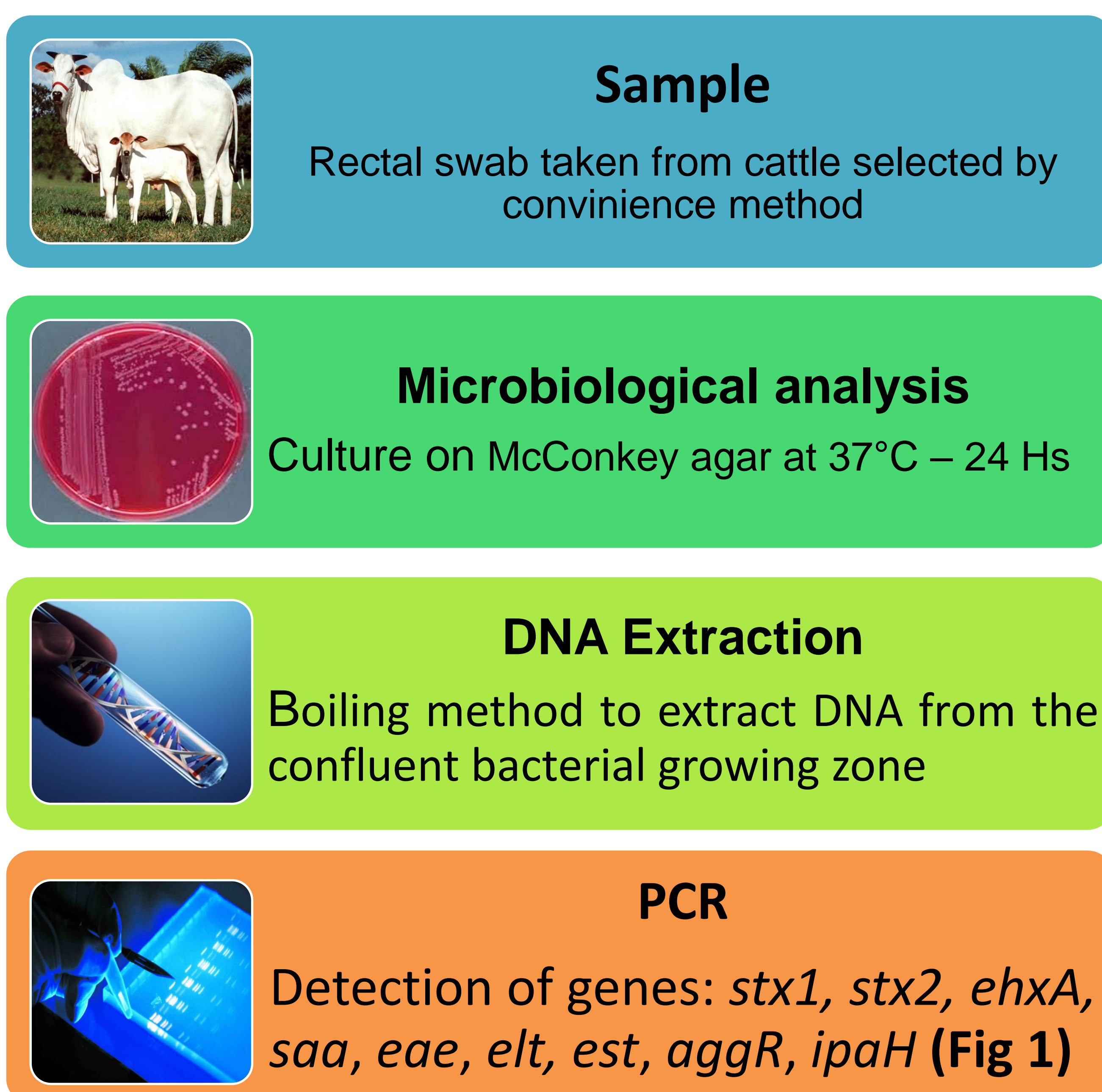
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INTRODUCTION

Escherichia coli are a gram-negative bacillus present in the normal intestinal flora of humans and animals. However, certain strains can cause diarrheal disease, and are called diarrheogenic *E. coli* (DEC). DEC includes enterotoxigenic (ETEC), enteropathogenic (EPEC), enteroinvasive (EIEC), enteroaggregative (EAEC), and Shiga toxin producing (STEC) strains of *E. coli*. The intestinal tract of cattle constitutes one of the main reservoirs of DEC, humans are infected through the ingestion of contaminated meat products. The present work was carried out with the objective of detecting the presence of *stx1*, *stx2*, *ehxA*, *saa*, *eae*, *elt*, *est*, *aggR*, *ipaH* genes all of them coding for virulence factors of DEC in fecal samples of cattle¹⁻³.

MATERIALS Y METHODS

Design: A cross sectional study was approved by the Scientific and Ethics Committees of the Health Science Research Institute of Paraguay. This study included one farm that have cattle for meat production. Fecal samples were taken using a rectal swab and the workflow were as follow



RESULTS

The frequency of animals bearing STEC-related genes was:

- 82% (41/50) for *stx1* and/or *stx2*
- 74% (37/50) for *ehxA*, and 68% (34/50) for *saa*.
- In 2% (1/50) of the animals *eae* was detected, it can mean the presence of EPEC or STEC strains.
- The *elt*, *est*, *aggR*, and *ipaH* genes associated with the ETEC, EAEC, and EIEC pathotypes respectively were not detected. (Table 1)

Table 1. Frequency of animals bearing STEC-related genes

Samples	Virulence Factor - Pathotype							
	<i>elt</i> - ETEC	<i>est</i> - ETEC	<i>eae</i> - EPEC	<i>ipaH</i> - EIEC	<i>aggR</i> - EAEC	<i>Stx 1/2</i> STEC	<i>saa</i> - STEC	<i>ehxA</i> - STEC
%	-	-	2%	-	-	82	68	74
n	-	-	3	-	-	41	34	37

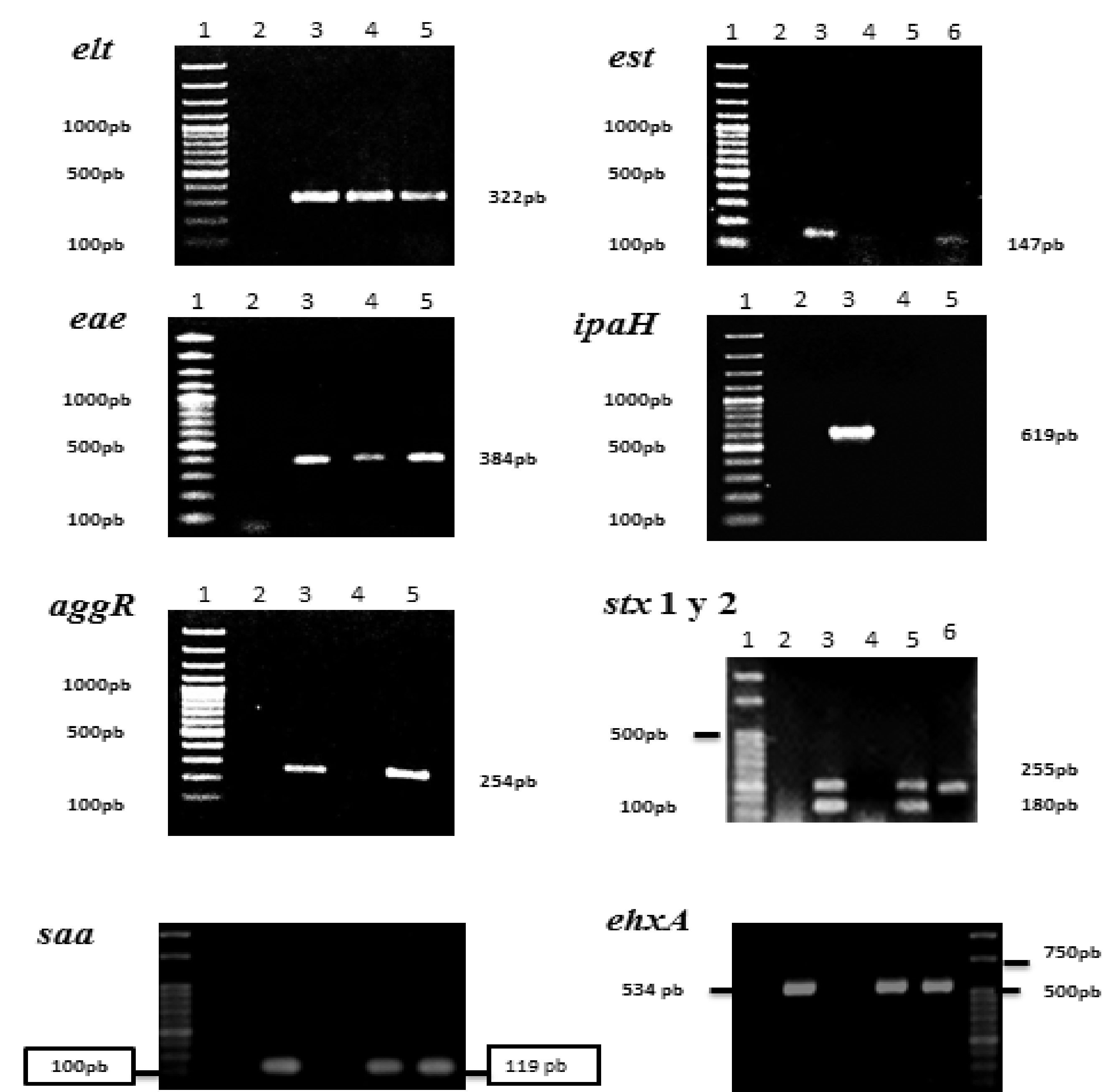


Figure 1. Amplification of DEC genes by PCR. Electrophoresis on 2% agarose stained by ethidium bromide.

CONCLUSIONS

The high frequency of STEC-related gene bovine carriers represents a problem for public health, because failures in good hygiene practices in the production chain can lead to contamination of the meat products that constitute the source of transmission to humans. These results demonstrate the need to establish control systems in the meat production chain, from animal breeding to final product that is why we consider that the molecular methods used in this study are excellent alternative for this purpose.

REFERENCES

1. Nataro JP, Kaper JB. Diarrheogenic *Escherichia coli*. Clin Microbiol Rev. 1998;11(1):142-201.
2. Robins-Browne RM. Traditional Enteropathogenic *Escherichia coli* of Infantile Diarrhea. Rev Infect Dis. 1987;9(1):28-53.
3. Wang F, Jiang L, Yang Q, Prinyawiwatkul W, Ge B. Rapid and specific detection of *Escherichia coli* serogroups O26, O45, O103, O111, O121, O145, and O157 in ground beef, beef trim, and produce by loop-mediated isothermal amplification. Appl Environ Microbiol. 2012;78(8):2727-36.