COMPARATIVE ANALYSIS OF STX2E SECRETION IN SHIGA TOXIN-PRODUCING ESCHERICHIA COLI (STEC) FIELD STRAINS FROM SWINE

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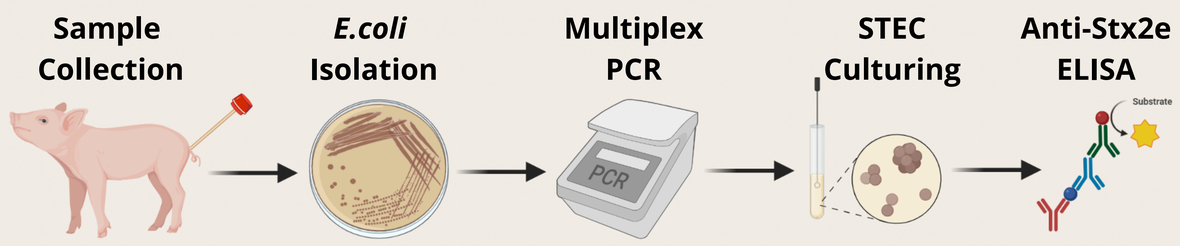
INTRODUCTION

Shiga toxin-producing *Escherichia coli* (STEC) often causes post-weaning diarrhoea and oedema disease in pigs, leading to significant losses in the pig industry. Previous research showed that Stx2e secretion varies between different STEC, which likely plays a role in their pathogenesis and potentially in the severity of clinical manifestation. These studies however only looked at relative amounts of released toxin and did not take into consideration the presence of other virulence factors. Therefore, the aim of this study was to characterize STEC field isolates recently collected on farms with oedema disease and quantitatively compare their Stx2e secretion.

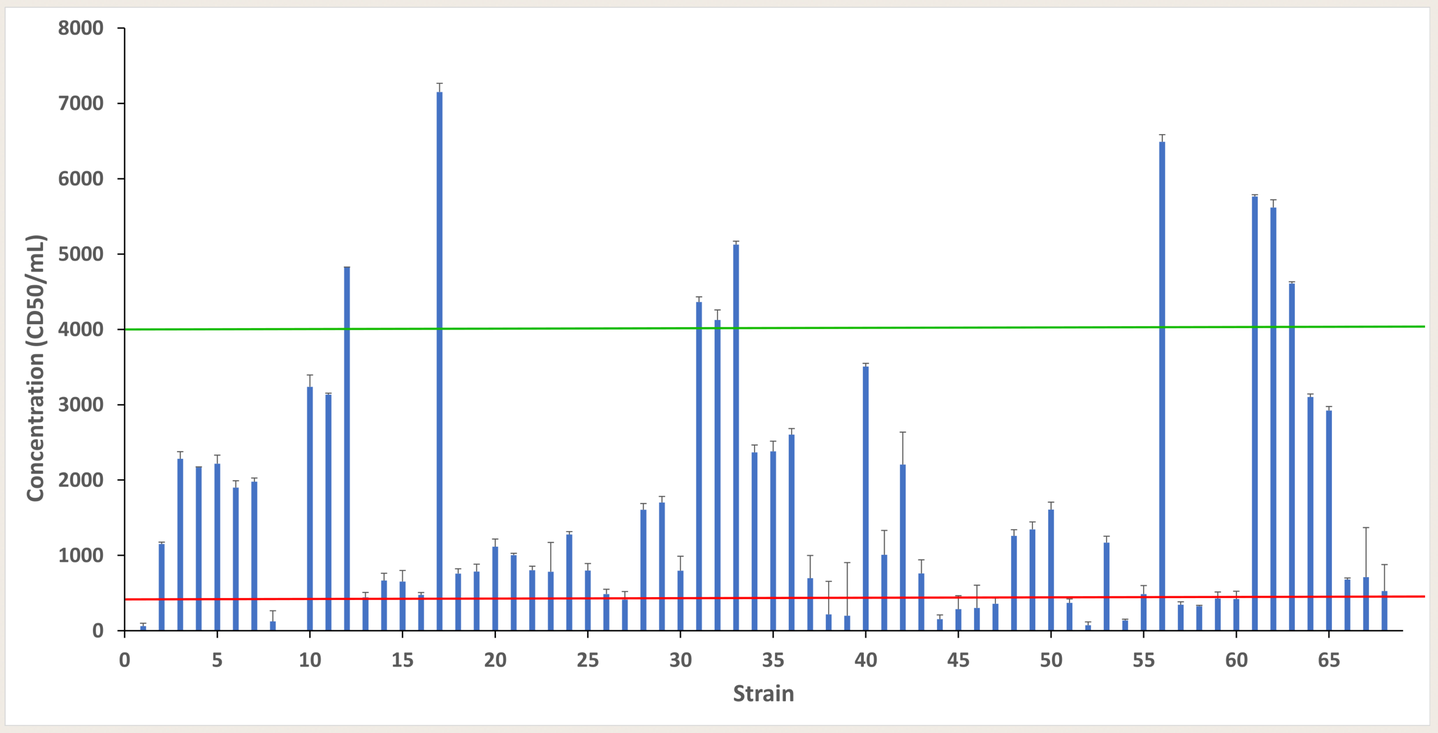
METHODS



Samples are collected using rectal swabs on pigs between 4-7 weeks old. Plating on differential agars allows for single, pure colonies to be isolated. These are tested for 6 ETEC & STEC virulence genes using a multiplex PCR. STEC-positive strains are cultured overnight in broth medium, after which the Stx2e in the supernatants is quantified using a sandwich-ELISA and recombinant Stx2e.

RESULTS

In total, 88 *E. coli* field strains were isolated, 68 of which were identified as STEC; 39 were single-virulent for Stx2e, while 20 were STb+Stx2e, and 2 were LT+STb+Stx2e+. Of these, 18, 14, and 2 were F18-positive, respectively.



The secreted Stx2e concentrations ranged from 62 to 7152 CD50/mL in a non-normal distributed way ($p<0.001$). The isolates were divided into three categories: undetectable-to-low secretors (33), moderate secretors (25), and high secretors (10). These are defined by the lower (400, red) and higher (4000, green) limits. No significant difference in Stx2e secretion was observed between either F18-positive and -negative strains, or single- and multi-virulent isolates. Furthermore, no significant differences could be found in the number of strains for every secretion category based on their virulence status.

CONCLUSIONS

Stx2e secretion varied greatly between STEC field strains with up to 100-fold differences. Strains could be divided into three categories, However, no significant differences were observed based on F18-status, and a similar amount of strains per secretion category were found for single- and multi-virulence factor-containing strains. Further research is warranted to understand the nature of this variation in Stx2e between strains.

References:

Skinner, C., Patfield, S., Hernlem, B. J. & He, X. New Stx2e Monoclonal Antibodies for Immunological Detection and Distinction of Stx2 Subtypes. PLoS One 10, e0132419 (2015).