



Risk ranking of STEC dairy isolates after characterisation by WGS

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Study

(unpublished, keep it confidentially, please)

- Main goal: **Risk ranking** of 40 STEC dairy isolates after FAO/WHO scheme (2018)
- 40 STEC dairy isolates:
 - From Swiss raw milk intended for raw milk cheese production
 - From cheeses from the Swiss market (of raw milk, 1x of past milk, cow and goat)
 - 7 isolates from Cantonal Labs (thanks to M. Storari & M. Peier)
- Illumina sequencing
 - EURL WGS PT pipeline & CGE vir
 - *stx*-subtyping-PCR in case of <100% match
- Creation of risk rank table



Results I (unpublished, keep it confidentially, please)

Risk level	Trait (genes)	¹ Potential for:	n (%)	Top6Sero	<i>aggR</i>	<i>eae</i>	<i>ehxA</i>	<i>astA</i>	<i>espP</i>	<i>st/lt</i>	<i>efa1</i>
1	<i>stx</i> _{2a} + <i>eae</i> or <i>aggR</i>	D/BD/HUS	0 (0)	-	-	-	-	-	-	-	-
2	<i>stx</i> _{2d}	D/BD/HUS ²	10 (25.0)	-	-	-	5	-	7	-	-
3	<i>stx</i> _{2c} + <i>eae</i>	D/BD ³	1 (2.5)	-	-	1	1	1	1	-	-
4	<i>stx</i> _{1a} + <i>eae</i>	D/BD ³	11 (27.5)	5x O26 2x O145	-	11	11	11	10	-	8
5	Other <i>stx</i> subtypes	D	18 (45.0)	1x O145	-	-	10	6	3	5	-

Total: 40 8 0 12 27 18 5 8



¹ estimated potential to cause D: diarrhoea, BD: bloody diarrhoea, HUS: haemolytic uraemic syndrome, depending on host susceptibility and other factors; e. g. antibiotic treatment.

² association with HUS dependent on *stx*_{2d} variant and strain background

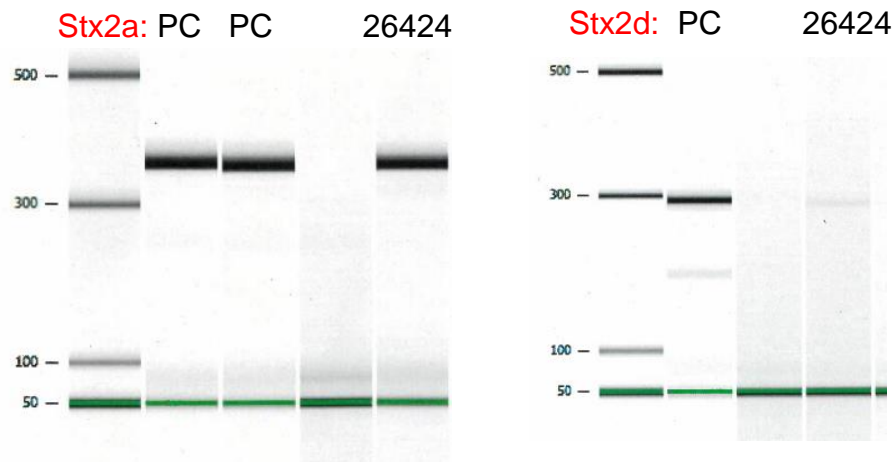
³ some subtypes have been reported to cause BD, and on rare occasions HUS

- Almost half of isolates in the lowest risk group and none in the highest
- Classical STEC O26 only with *stx*_{1a} (NOT *stx*_{2a}); no O80:H2
- No *aggR*-containing hybrid strains found, other hybrids/mosaics present (STEC-EPEC...)
- Two with *stx*_{2a} & *2d* (*eae*-neg, O22:H16 and O113:H21) => Most virulent ones?



Results II (unpublished, keep it confidentially, please)

- Mostly very high agreement between *stx*-subtyping-PCR and WGS
- *stx*-subtyping-PCR useful especially when more than one of the same *stx*-subtype is present (e.g. *stx2a* & *stx2d*), WGS indicating «mixed» results
- Isolate FAM 26424 (O8:H9, ST23, cheese made from goats milk): *stx*-subtyping-PCR caused **false positive results** for *stx2a* and *stx2d* (interfering with risk evaluation)!



WGS (ARIES): *stx2e* (99.76%)

WGS (CGE after Dec 2022): ***stx2l* (100%)**

This is already known from DK (EFSA 2019):
Stx2e-O8-FHI-1106-1092 => *stx2h* => new: *stx2l*

- Not clinically relevant or just diarrhea (NOR)
- O8:H9, ST23, *stx2l* from raw mutton and humans (Yang et al, 2022)

Thanks for updating the databases!

We need help with reference strains & PCR-protocols for the new variants!