Establishing streptomycin epidemiological cut-off values for *Salmonella* and *E. coli*

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Introduction

• Streptomycin is an aminoglycoside used as a resistance marker in monitoring programs for *Salmonella* and *E. coli*

• Ring trials have reported discrepancies on results obtained for this antimicrobial

• Studies carried out in *E. coli* and *Salmonella* have proposed an epidemiological cut-off value of 8 mg/L for both species


EUCAST epidemiological cut-off value for Salmonella

Streptomycin / Salmonella spp
EUCAST MIC Distribution - Reference Database

MIC distributions include pooled data from multiple sources, geographical areas and time periods and can never be used to infer rates of resistance.
EUCAST epidemiological cut-off value for *E. coli*

Streptomycin / Escherichia coli
EUCAST MIC Distribution - Reference Database

MIC distributions include collated data from multiple sources, geographical areas and time periods and can never be used to infer rates of resistance

MIC (mg/L)

% microorganisms

0 10 20 30 40 50 60 70 80

0 ≤ 0.002 ≤ 0.004 ≤ 0.006 ≤ 0.008 ≤ 0.012 ≤ 0.016 ≤ 0.024 ≤ 0.032 ≤ 0.064 ≤ 0.125 ≤ 0.25 ≤ 0.5 ≤ 1 2 4 8 16 32 64 128 256

9917 observations (28 data sources) Clinical breakpoints: S ≤ - mg/L, R = - mg/L

DTU Food
National Food Institute
Materials and methods

• A total of 12 institutes provided data: Germany, Denmark, Norway, Sweden, Spain, Portugal, the Netherlands, France, Italy, Finland, UK and Canada

• Examined by PCR for the presence of the most common streptomycin resistance genes in Enterobacteriaceae (*aadA*, *strA* and *strB*)
  – 217 *Salmonella* and 208 *E. coli* exhibiting MICs between 4 and 32 mg/L

• Each country provided information on the streptomycin MIC distributions for both species during a year period
Streptomycin resistance genes in *Salmonella*

27/217 (9%) presented one, two or the three genes
19 *aadA*, 9 *strA* and 11 *strB*
Streptomycin resistance genes in *E. coli*

80/208 (38.5%) presented one, two or the three resistance genes
69 *aadA*, 18 *strA* and 31 *strB*
Distribution of streptomycin MIC distribution for *Salmonella* and *E. coli*

**MIC distribution for *Salmonella***

- % Isolates vs MIC (mg/L)
- Based on 9257 observations

**MIC distribution for *E. coli***

- % Isolates vs MIC (mg/L)
- Based on 5619 observations
Conclusions

• Complexity of these studies due to a large proportion of isolates exhibiting high MICs despite the lack of a known mechanism of resistance

• The establishment of a common cut-off value based on evaluation of both, MIC distribution of the population and genetic characterization of resistance genes is vital to facilitate a global harmonisation of surveillance programmes
**Salmonella**

- > 8 or > 16 mg/L?

**E. coli**

- > 4 or > 8 mg/L?
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