In vitro growth inhibition of bovine intramammary streptococci by oxacillin

MELKCONTROLECENTRUM VLAANDEREN

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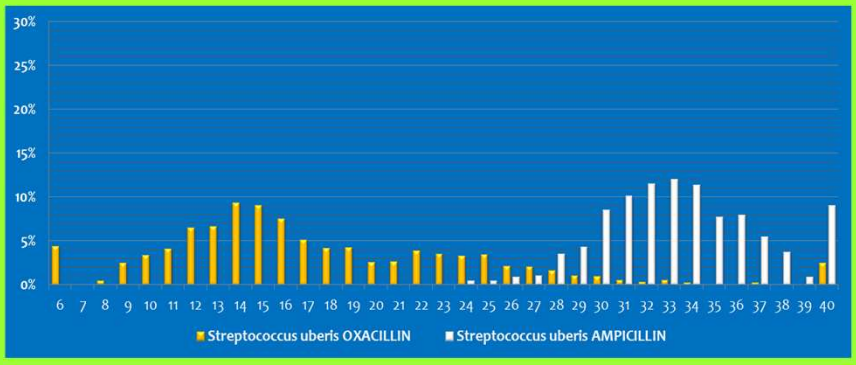
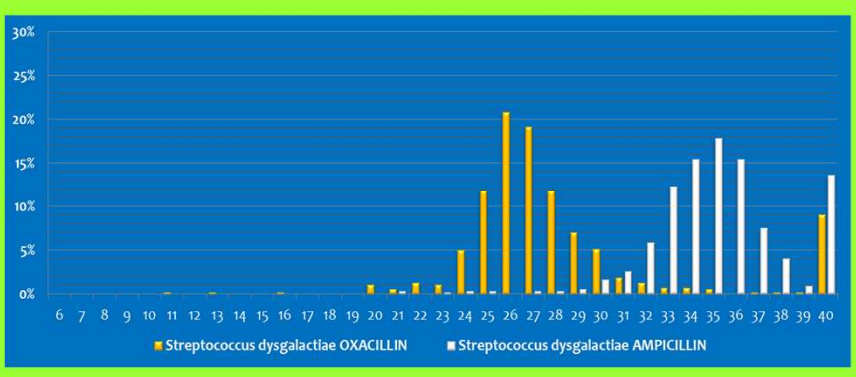
INTRODUCTION

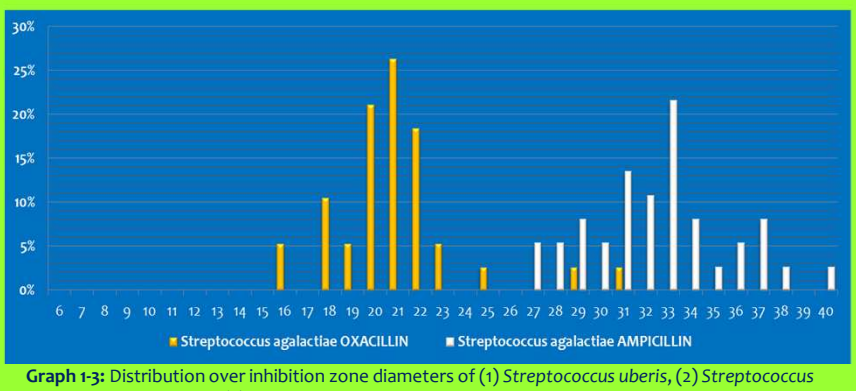
- Cloxacillin is frequently used in intramammary infusions for treatment of bovine mastitis
- Penicillin or ampicillin susceptibility is often used to predict cloxacillin susceptibility of streptococci
- On demand of veterinarians/pharmaceutical companies, labs intent to use oxacillin for this purpose
- No clinical breakpoints nor epidemiological cut-of values have been established for the combination oxacillin/streptococci

AIM

- To provide **epidemiological** insights in the *in vitro* growth inhibition by **oxacillin versus ampicillin** of the **bovine intramammary streptococcal population.**







Graph 1-3: Distribution over inhibition zone diameters of (1) *Streptococcus uberis*, (2) *Streptococcus dysgalactiae*, and (3) *Streptococcus agalactiae*, tested against oxacillin and ampicillin.

MATERIALS AND METHODS

- Routine milk samples from bovine (sub)clinical intramammary infections examined in Flanders Milk Control Centre between 03/2013 – 03/2014
- Identification of streptococci based on morphology, aesculin-reaction, CAMP-test, bile aesculin, NaCl-reaction
- Streptococci included:
  - ***Streptococcus uberis*** **(n = 1,186)**
  - ***Streptococcus dysgalactiae*** **(n = 543)**
  - ***Streptococcus agalactiae*** **(n =38)**
- Susceptibility testing by disk diffusion using paper disks (i2a, Perols, France) impregnated with:
  - Ampicillin (10 µg)
  - Oxacillin (1 µg)
- Measurement of zone diameter with SIR-scan (i2a) and descriptive comparison of histograms

RESULTS

- Ampicillin:
  - Gaussian curve with high similarity between species (although pattern of *Strep. agalactiae* difficult to interpret because of lower number of tested strains)
  - *Strep. dysgalactiae*: mean diameter of inhibition zone slightly larger compared to other species
- Oxacillin:
  - ***Strep. dysgalactiae*****:** Gaussian curve
  - ***Strep. agalactiae*** (lower number of tested strains)**:** bimodal curve with a shift in mean compared to *Strep. dysgalactiae*
  - ***Strep. uberis*****: totally different pattern**; bimodal curve widely distributed over whole range with most strains located at the lowest diameters
- Further study is needed to examine the cure rate of *Strep. uberis* infection after cloxacillin treatment, when small inhibition zone diameter for oxacillin is found

Streptococci show a **species-specific epidemiology** concerning growth inhibition by **oxacillin,**
and thus **species-specific epidemiological cut-off values should be determined.**
If oxacillin is used to predict cloxacillin susceptibility, **species-specific clinical breakpoints** might be necessary as well.

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