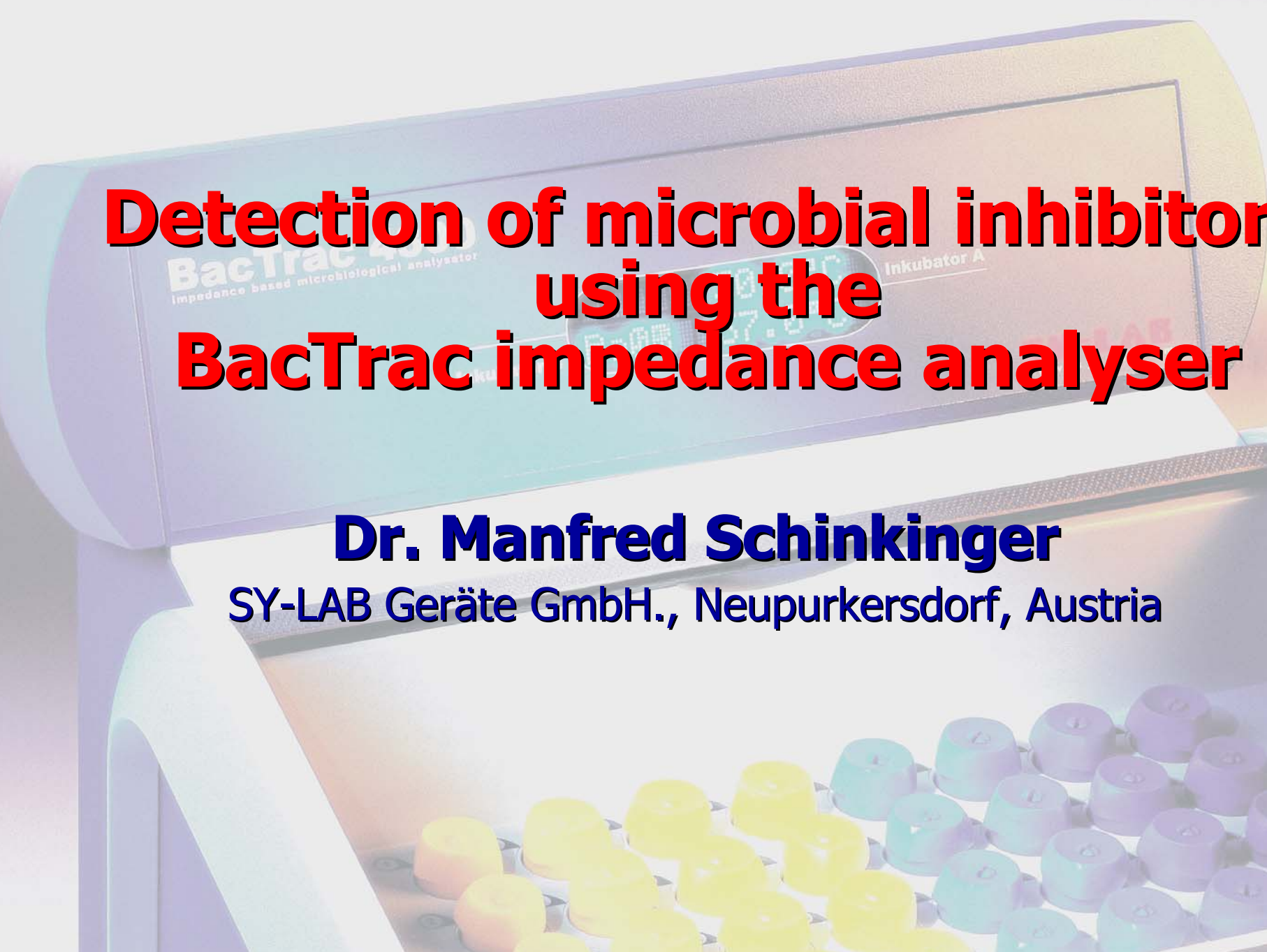

# Detection of microbial inhibitor using the BacTrac impedance analyser

**Dr. Manfred Schinkinger**

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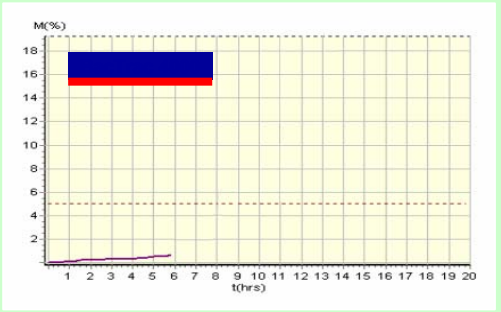
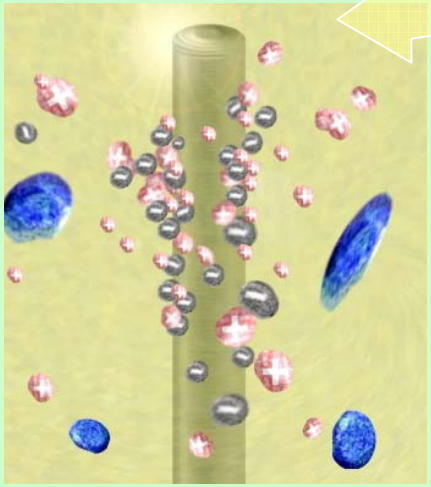
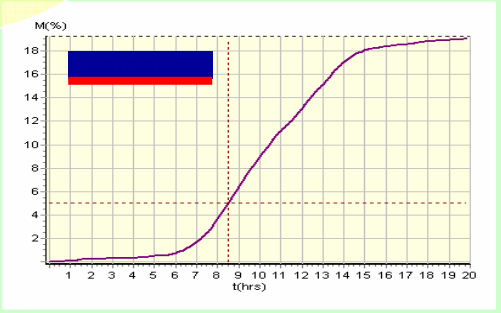
# Impedance analysis principles






Uncharged or weekly charged components of the growth media are metabolised by the bacteria.

Low molecular components (ions) cause a decrease in impedance.

The characteristic BacTrac signal registers the relative signal change over the measuring time

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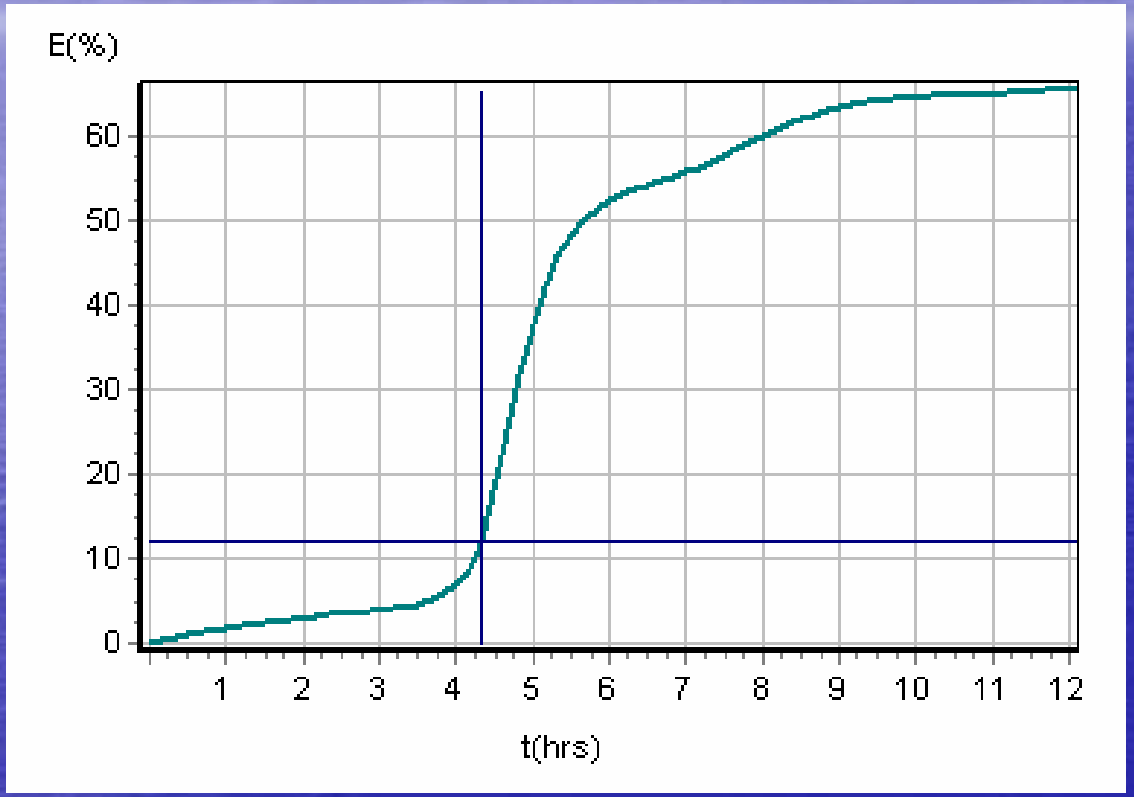
# Impedance signal (curve)

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# Influence of inhibitors on signal development

- Delayed curve development = increase in detection time
- Influence on the curve slope = increase in detection time at a certain curve threshold
- Change in curve amplitude (detectable only when using M-value)
- No signal at all – complete inhibition

# Quantification of unknown inhibitor concentartions

- Sensitive reference strain as inoculum (inoc. dose $10^3$ – $10^5$ CFU/ measuring cell
- Establish the range of inhibitor concentrations where a linear relationship between inhibitor concentration and increase in detection time can be established
- Establish a calibration curve using different standard concentrations of inhibitors
- Quantify the unknown concentration by interpolation from the calibration curve

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# Inhibitor Quantification - essentials

- The dose – response curve is dependent from the inoculation dose of the reference strain used
- The effect of the inhibitor can vary with the growth condition of the reference strain

- **A standard curve (calibration) has to be established on a daily basis**

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# Detection of inhibitors - applications

- Screening of inhibiting substances
- Find effective preservatives (i.e. foods, cosmetics)
- Preservative efficacy tests
- Check products for absence of inhibiting substances (i.e. when analysing preserved substances for bioburden or for the validation of pharm. sterility tests of parenteral antibiotic formulations
- Activity testing (microbial activity) of antibiotics.
- Direct testing of inhibiting substances on biofilms
- Check the efficacy of desinfectants
- Detect novel inhibitors in food

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# Detection of inhibitors - literature


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