Development of (cross-)resistances to antimicrobials following the use of biocidal products

Literature review by the de Duve Institute

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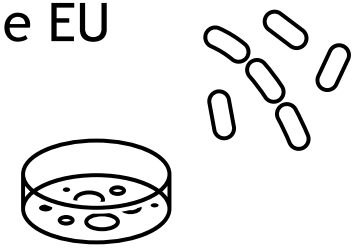
Aims of the study

- Literature review relating to the resistance of microorganisms to biocidal products (health-care sector)
  - PT1: Human hygiene
  - PT2: Disinfectants and algaecides not intended for direct application to humans or animals
- Active substances in the study: alcohols, aldehyde-based compounds, hydrogen peroxide, peracetic acid, chlorhexidine, quaternary ammonium compounds, chlorine releasing compounds and weak organic acids
- + Triclosan: not approved as biocidal a.s. in the EU
- Focus on bacteria



Background of the study

- Belgian National Action Plan to fight AMR:
  - Human health pillar
  - Animal health pillar
  - **Environment pillar**
- = Intersectoral and multidisciplinary approach

- ~33,000 deaths per year
- €1.5 billion in health costs and productivity loss per year

Main conclusions

- The role of biocides in the emergence of resistance to antimicrobials is confirmed in a large number of studies

- The importance of this role depends on:
  - **the type of biocidal product used**
  - **the affected microorganism**
  - **the conditions in which the biocidal product was used (method, setting)**

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Main conclusions

Triclosan

Chlorhexidine, quaternary ammonium compounds

Reactive chlorine species, aldehyde-based compounds

Alcohols, hydrogen peroxide, peracetic acid and weak organic acids

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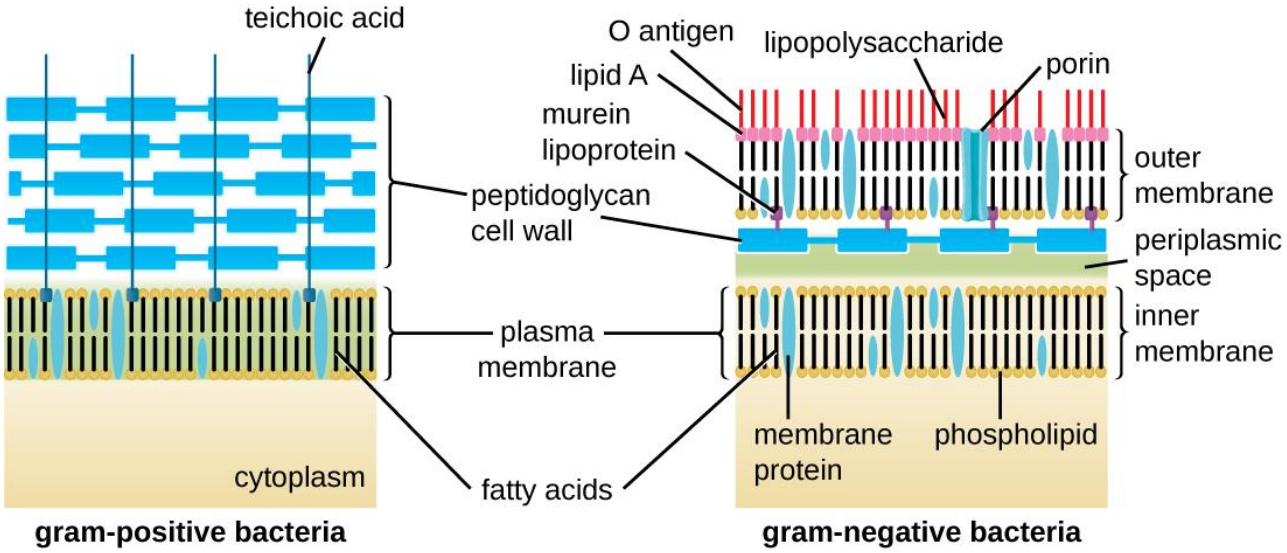
Main conclusions

- In general, Gram-negative bacteria seem to have a higher propensity to develop resistance than other microorganisms.



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Main conclusions

What are the problematic practices?


Use of an insufficient dose


Failure to observe the required contact time

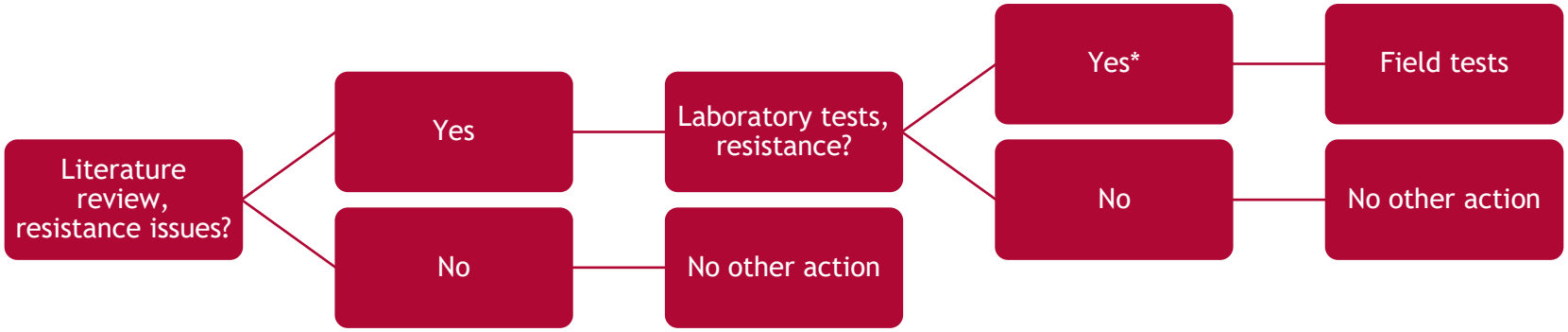

Contamination of stock solutions

Recommendations of the authors

- Establishing **good practices** regarding the use of substances in concertation with the health sector and the manufacturer of the biocidal product.
- Raising the general public's and health sector workers' **awareness** of resistance and cross-resistance related to the use of biocidal products.
- Using **bioindicators** that are not more susceptible than clinically relevant strains **to assess the efficiency** of disinfection.
- **Targeting biocidal products at high risk** of developing **resistance**, such as chlorhexidine and QACs.
- **Monitoring the emergence** of resistance and cross-resistance on a national/European level in all areas of biocide use.

Resistance assessment guidance

A new European guidance includes the following for any active substance or product dossier (including renewals) :

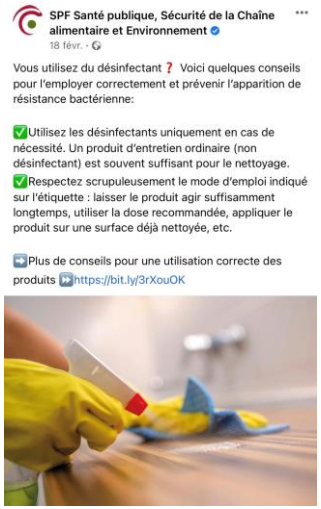


* Taking into account potential cross-resistance phenomena (other biocides and antibiotics)

** Resistance management strategies should be included in the summary of product characteristics

Proposals from the Biocides Department

1. Communication campaign: **General public**
   - ✓ *Publication of the study on our website*
   - ➢ Distribution of a survey *(under analysis)*
     - ❑ **Label reading, instructions? What to improve?**
     - ❑ **Motivations for use? COVID impact?**
   - ➢ Inspection campaigns for online sales *(ongoing)*
   - ➢ Launching of a campaign "Read The Label" *(September)*
   - ✓ *Press releases (1/2)*
   - ➢ Included aspects
     - ❑ **Relevance of use**
     - ❑ **Compliance with use conditions (dose, contact time)**



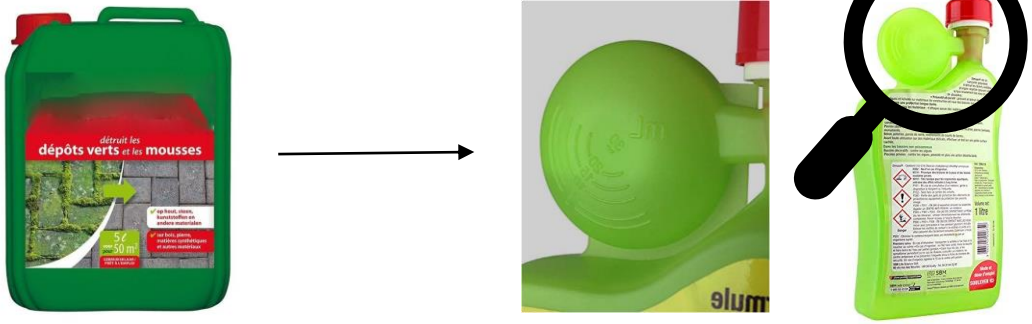
Proposals from the Biocides Department

1. Communication campaign: **Health sector**
   - ✓ *Publication of the study on our website*
   - ✓ *Publication (article) in the digital magazine BeCare*
   - ➢ Dissemination of the study to the sector
   - ➢ Discussion with the sector on "best practices"
   - ➢ Included aspects
     - ❑ Compliance with conditions of use (dose, contact time)
     - ❑ Promoting the use of non-problematic active substances

Proposals from the Biocides Department

2. Reflecting on ammonium IV or chlorhexidine-based products to dilute

- **How?**
  - Reflect on the packaging with the sector *(ongoing)*
  - Brindg the information to the European level



Proposals from the Biocides Department

3. Bringing the study results to the European level

- ✓ *Dissemination of the study to Member States, European Commission and ECHA*
- ✓ *Dissemination of the study to the Efficiency Working Group*
- Implementing recommendations into resistance assessment guidance *(ongoing)*
- Sharing thoughts on packaging and labeling (instructions for use)

Thank you for your attention

Questions

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