**Background**

- Carbapenem-resistant Enterobacteriaceae (CRE) have broad resistance to most β-lactam antibiotics and are a growing problem worldwide.
- CRE infections are difficult to treat, have been associated with substantial mortality, and are involved in healthcare-associated outbreaks via medical equipment and environmental surfaces.
- Colistin-resistant Enterobacteriaceae carrying the mcr-1 are currently a global health concern since colistin is often a last-line antibiotic used to treat multidrug-resistant organisms, including CRE.
- Susceptibility to germicides (e.g., disinfectants, antiseptics) for these pathogens is poorly understood.
- We tested 21 different germicides with 2 dilutions of sodium hypochlorite among 3 species of Klebsiella pneumoniae carbapenemase (KPC)-producing Enterobacteriaceae (clinical isolates of K. pneumoniae, Enterobacter cloacae, and an ATCC strain of E. coli, BAA-2340) and Escherichia coli carrying mcr-1 (MRSN 388634).
- The disc-based quantitative carrier test method was used to assess the bactericidal activity of chemical germicides since it is believed to produce results similar to those actually encountered in healthcare settings compared to suspension testing.
- An inoculum containing approximately 10⁶ test organisms with 5% fetal calf serum (FCS) was placed on each disk.
- The dried inoculum was exposed to the test germicide for 1 minute exposure time at room temperature then neutralized.
- Compared to mean carrier control counts, the log₁₀ reduction of the test organism for each germicide was calculated.

**Methods**

- We tested 21 different germicides with 2 dilutions of sodium hypochlorite with 5% fetal calf serum (FCS) placed on each disk.
- The dried inoculum was exposed to the test germicide for 1 minute exposure time at room temperature then neutralized.
- Compared to mean carrier control counts, the log₁₀ reduction of the test organism for each germicide was calculated.

**Results**

- **K. pneumoniae**
  - 2% acetic acid, 7.5% p-aminophenol, undiluted (Betadine Solution)
  - 4% chlorhexidine gluconate, undiluted (Scrub-Stat 4%)

- **E. cloacae**
  - 2% acetic acid, 7.5% p-aminophenol, undiluted (Betadine Solution)
  - 4% chlorhexidine gluconate, undiluted (Scrub-Stat 4%)

- **MCR-1 E. coli**
  - 2% acetic acid, 7.5% p-aminophenol, undiluted (Betadine Solution)
  - 4% chlorhexidine gluconate, undiluted (Scrub-Stat 4%)

**Figure. Germicidal Activity against Carbapenem/Colistin Resistant Enterobacteriaceae**

**Conclusions**

- Our study suggests that germicides commonly used in healthcare facilities may be effective against carbapenem/colistin-resistant Enterobacteriaceae when used appropriately.
- We are investigating selected germicides under different conditions (e.g., inoculum, exposure time, with/without 5% FCS) since some germicides seem to be less effective under challenging test conditions.

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