

Introduction

The World Health Organisation (WHO) published a catalogue of 12 families of bacteria that pose the greatest threat to human health. They are antibiotic-resistant "priority pathogens". By publishing the list, the WHO aimed to guide and promote research and development (R&D) of new antibiotics and antimicrobial treatments to address growing global resistance to antimicrobial medicines. The list highlights a number of gram-negative bacteria that are resistant to multiple antibiotics, have built-in abilities to find new ways to resist treatment and can pass along genetic material that allows other bacteria to become drug-resistant as well.

Aim

The aim of this study was to assess the efficacy of SurgihoneyRO™ antimicrobial wound gel against a range of antibiotic resistant bacteria on the WHO priority pathogens list.

Method

Cultures of Priority 1 (Critical) *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and *Enterobacter cloacae*, Priority 2 (High) *Enterococcus faecium*, *Staphylococcus aureus*, *Helicobacter pylori*, *Campylobacter coli*, *Salmonella enteritidis* and *Neisseria gonorrhoeae*, and Priority 3 (Medium) *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Shigella sonnei* were harvested from agar plates and used to prepare individual bacterial suspensions. A total of 100 µL of SurgihoneyRO™ antimicrobial wound gel, 20 µL of bacterial inoculum and 80 µL of organism-specific broth were added to each well of a 96-well microtitre plate and incubated at 37°C ± 2°C for 24 hours. Following incubation, test suspensions were serially diluted in organism specific broth and plated onto appropriate agar. Log reductions were calculated compared to the negative control.

Results

There were no viable organisms recovered from SurgihoneyRO™ antimicrobial wound gel samples inoculated with *A. baumannii*, *P. aeruginosa*, *E. cloacae*, *S. aureus*, *H. pylori*, *C. coli*, *S. pneumoniae*, *H. influenzae* and *S. sonnei*. A reduction in the quantity of viable organisms recovered from SurgihoneyRO™ antimicrobial wound gel samples inoculated with *E. faecium* and *S. enteritidis* was observed, compared to the negative control. No reduction in samples inoculated with *N. gonorrhoeae* was observed following 24 hours treatment (Figure 1).

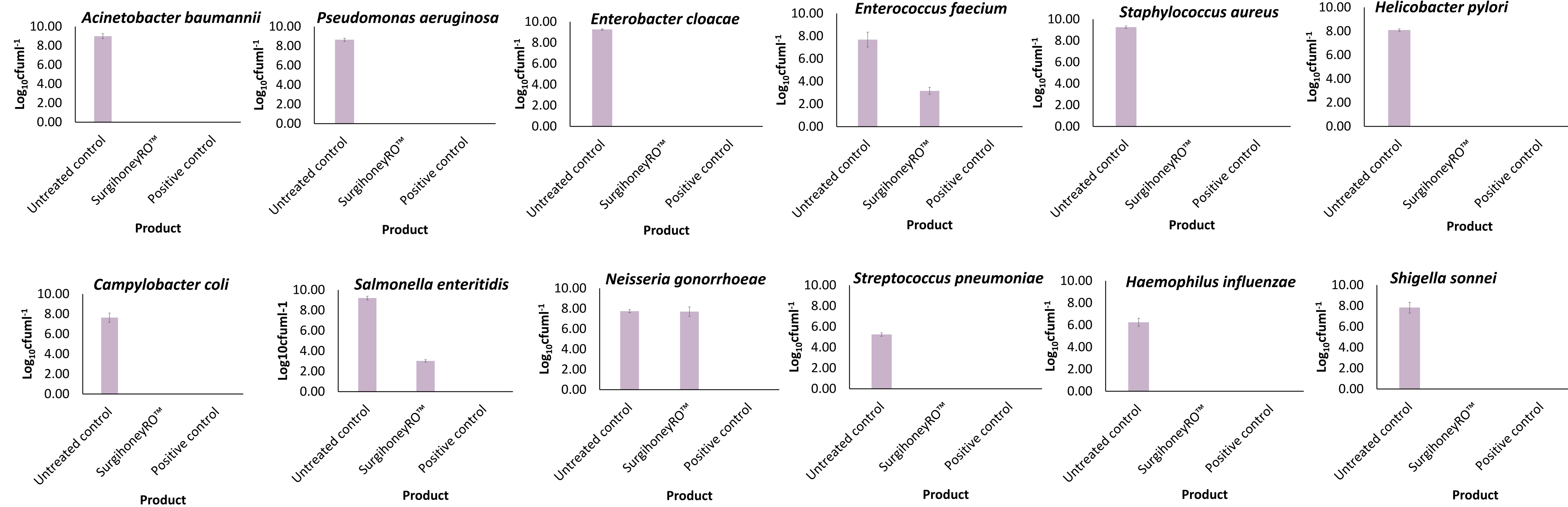


Figure 1. Quantity of viable *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Enterobacter cloacae*, *Enterococcus faecium*, *Staphylococcus aureus*, *Helicobacter pylori*, *Campylobacter coli*, *Salmonella enteritidis*, *Neisseria gonorrhoeae*, *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Shigella sonnei*.

Discussion & Conclusions

Wound infections resulting from antibiotic resistant bacteria may result in prolonged debility of the patient and increased healthcare costs. Treatment with SurgihoneyRO™ antimicrobial wound gel was shown to be effective against drug-resistant microorganisms commonly found in chronic wounds e.g. carbapenem-resistant *A. baumannii*, carbapenem-resistant *P. aeruginosa*, VRE and MRSA, found on the WHO priority pathogen list. The observation that the reactive oxygen species was not effective against *N. gonorrhoeae* echoed previous data. Simons *et al.* (2005) quantified *N. gonorrhoeae* and showed that a significant population resisted killing from the Reactive Oxygen® burst. This was shown for four different *N. gonorrhoeae* strains and suggests that *N. gonorrhoeae* displays some resistance to reactive oxygen species. Treatment with SurgihoneyRO™ effectively treated a range of the WHO priority pathogens, thus presenting as a viable treatment option where antibiotic resistant organisms are suspected.