

## 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).

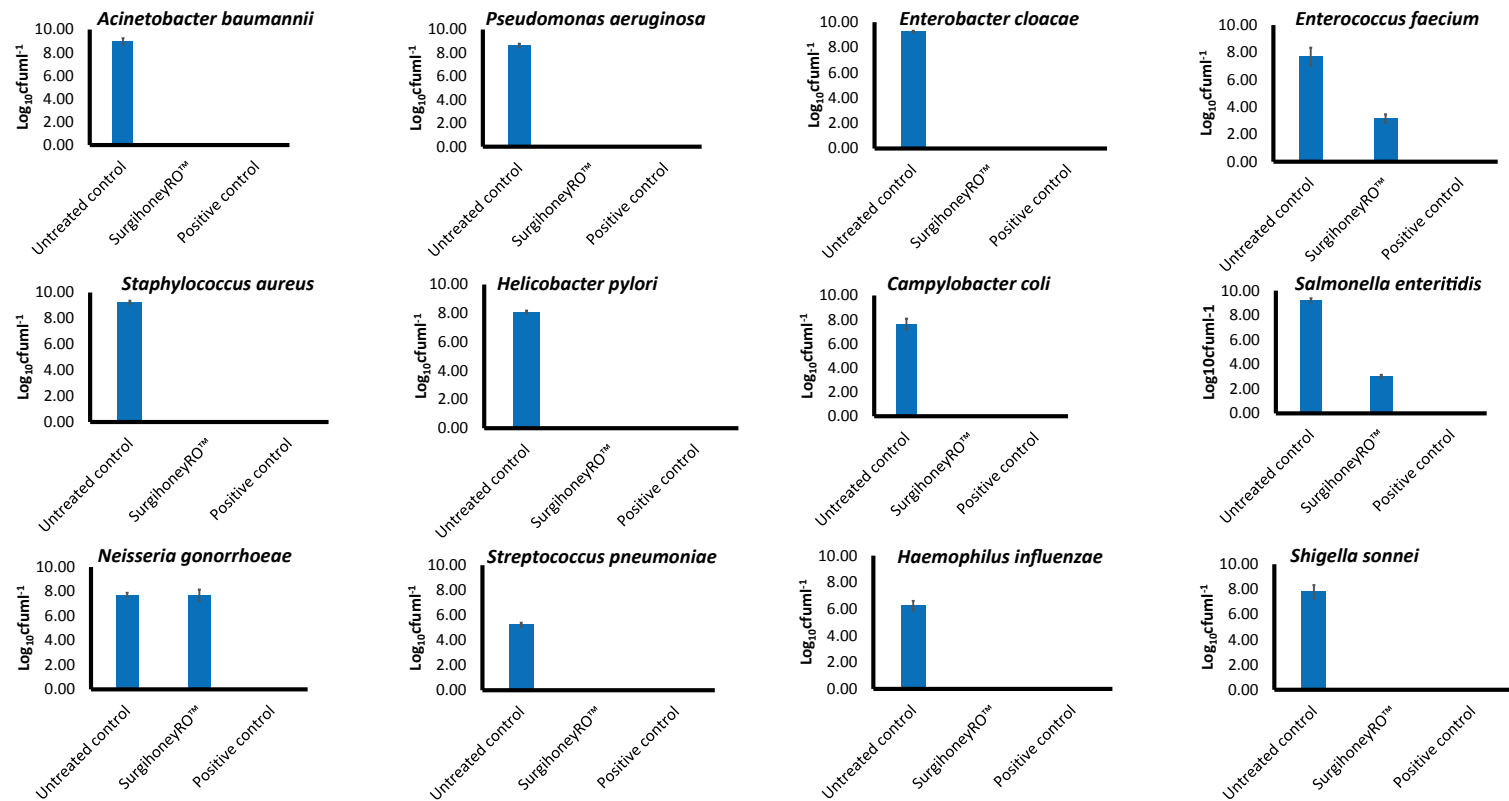


Figure 1. Quantity of viable *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Enterobacter cloacae*, *Enterococcus faecium*, *Staphylococcus aureus*, *Helicobacter pylori*, *Campylobacter coli*, *Salmonella enteritidis*, *Neisseria gonorrhoeae*, *Streptococcus pneumoniae*, *Haemophilus influenzae*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