



# Multicomponent wound dressing

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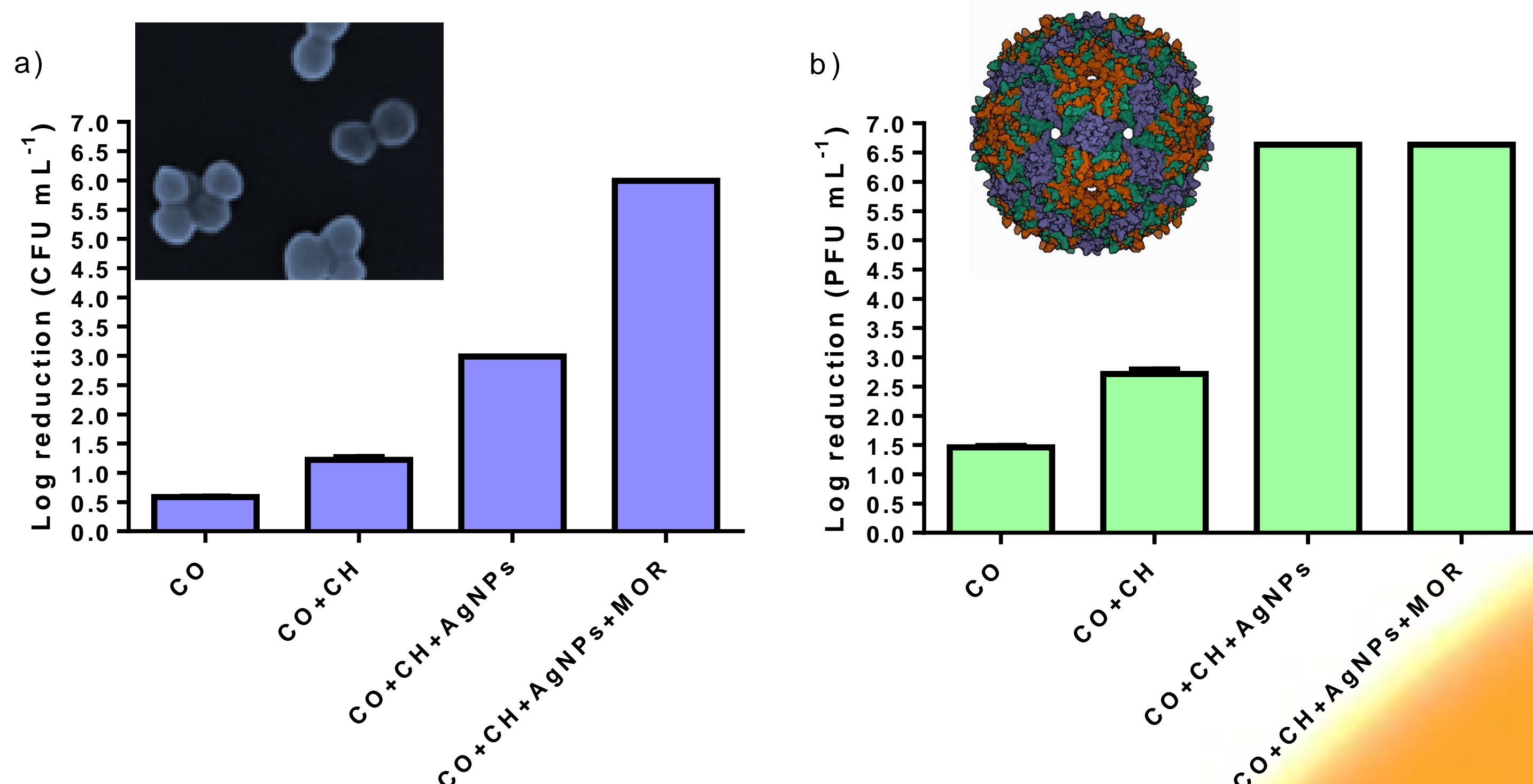
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## 1. Abstract

This work depicts antibacterial and antiviral performance of a multicomponent fabric for wound dressing. The woven fabric comprises a scaffold of plasma activated cotton (CO), enveloped in a matrix of chitosan (CH) containing silver nanoparticles (AgNPs) and the zeolite mordenite (MOR). The antimicrobial efficacy of the cumulative addition of each of these components was evaluated.

## 3. Results

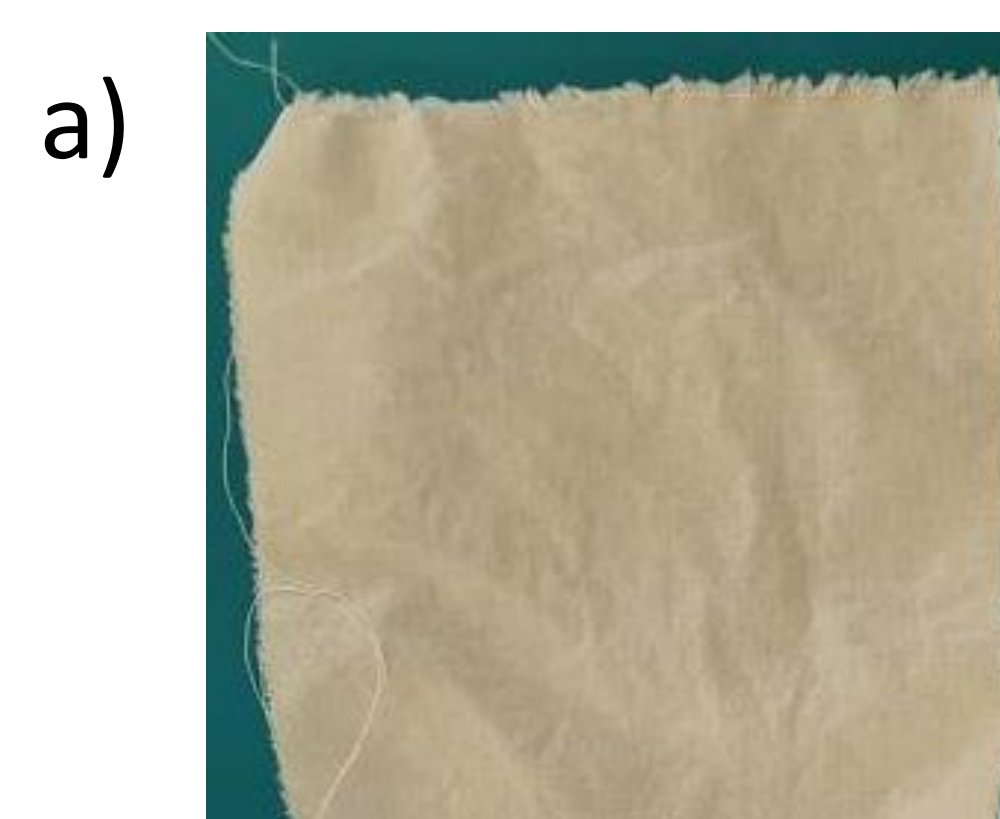
The antimicrobial results are displayed in Figure 2.



**Figure 2 – a) Log reduction (CFU mL<sup>-1</sup>) of *S. aureus* (ATCC 6538) and b) Log reduction (PFU mL<sup>-1</sup>) of MS2 bacteriophage (ATCC 15597-B1), after 1 hour of contact.** The concentration of viable bacterium and virus was estimated based on standards AATCC 100-TM100 and International Organization for Standardization ISO 18184, respectively.

*S. aureus* SEM image retrieved from doi: 10.3390/antibiotics9060314 and MS2 representation from Protein Databank.

## 2. Materials and methods



### 100 % CO

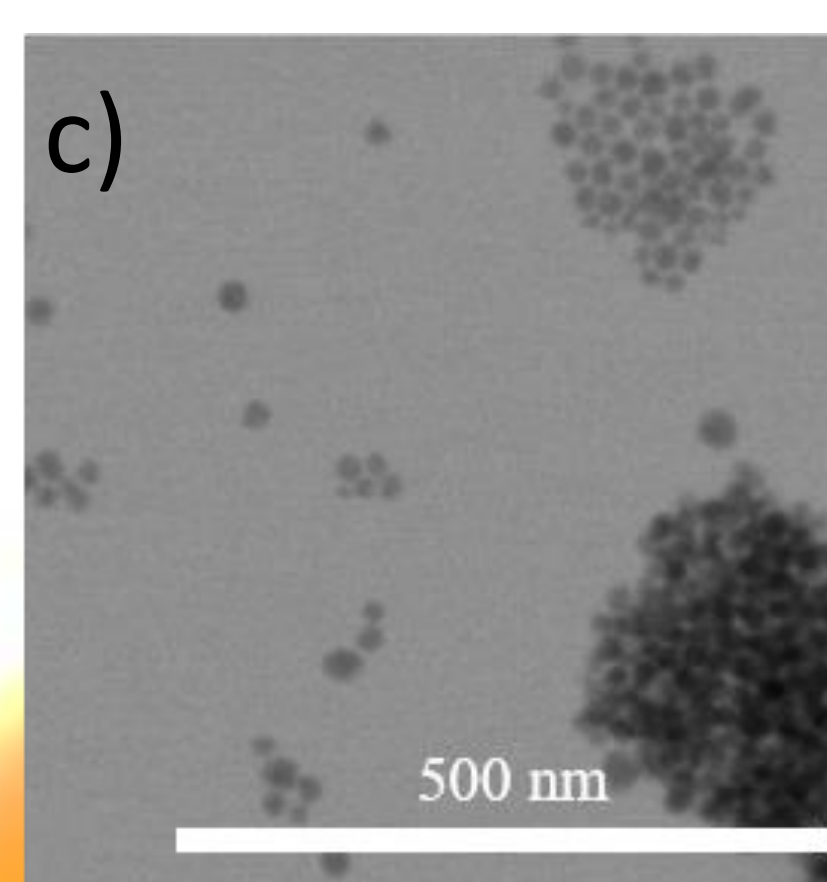
Advantages:

- fibrous natural biopolymer
- biocompatibility
- biodegradability
- fully established in the industry

### CH

Advantages:

- natural biopolymer
- biocompatibility
- biodegradability
- well established in the industry



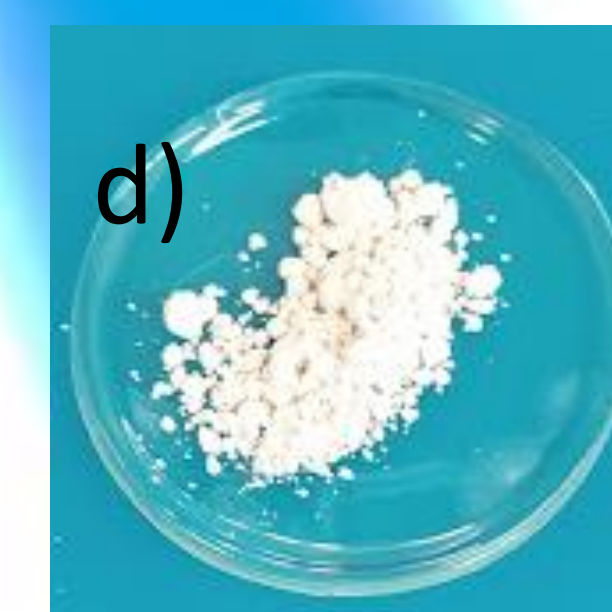
### AgNPs

Advantages:

- Potential highly effective biocidal

Disadvantages:

- Systemic cytotoxicity (able to permeate blood brain barrier)



### MOR

Advantages:

- Natural component

**Figure 1 – a) CO, b) CH, c) AgNPs and d) MOR.**

CH image: <https://www.indiamart.com/proddetail/white-chitosan-powder-21072444733.html>

## 4. Conclusions & future perspectives

- The multicomponent fabrics exhibited a > 99.9 % bactericidal and virucidal effectiveness
- Solidity tests must be performed to ensure AgNPs adequate immobilization
- Cytotoxicity tests will also be performed

## Acknowledgments

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