

# Copper-Coated Uniform for Health Care Professional Could Help Reduce Cross Infection in Hospitals

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## Abstract

Nosocomial infections are a more common health issue in each health care setting across the worldwide. Pathogenic flora spread throughout medical and surgical care facilities on surfaces and uniforms, contributing to damage both of human life and money. These issue turn into worse still after increase of drug resistance in most of the strains, which is rendering the broadspectrum antibiotic more powerless. So we require another ways instead of antibiotics. Precious metal is also a key role in great antibacterial and antimicrobial agents such as gold, silver and copper, which have superb antimicrobial properties. Gold or silver are more expensive for use against infection as compare to copper. Copper is good option that we can use in view of cost as well as copper having very good at killing power for pathogenic flora.

**Keywords:** Copper • Hospital uniform • Nosocomial infections

## Introduction

Copper had been used in Ancient Egypt (2000 BC) to disinfect water. During the time of Hippocrates, the ancient Greeks recommended Copper used for lung diseases and for drinking water purification. For centuries, copper ions were used to disinfect solids, liquid and human tissue, whether alone or in copper complexes [1]. Copper and copper compounds having very good biocide properties as such they can be used as antifungal, antiviral agents and antibacterial and can be emphasised on novel health related aspects also. The fungicidal properties of copper were shown in controlled laboratory experiments starting in the early 1950s [1,2] and since then, it has been shown that copper compounds ultimately kill a large variety of pathogens [3].

## Hospital Acquired Infection and Copper

As a major concern, bacterial contamination has arisen from bacterial attachment, growth and proliferation on surfaces [4-6]. A large number of scientific studies have been carried out to prepare new antibacterial products [7]. Gold and silver having very well known antibacterial properties they are very effective limiting the growth of several pathogen. [8-10]. Chemists have concentrated their efforts on exploring the possibility of using copper as the ultimate antimicrobial agent due to high silver and gold prices [11-14]. Copper is a good substitute, as silver and gold have similar properties at a fraction of the price.

## Copper Clothing

Infections are a serious health alarm in universal. They can travel inside hospitals through materials and hospital uniforms. Dr Xuqing Liu et al says *Staphylococcus aureus* (*S. aureus*) and *E. coli* were quickly destroyed by the copper-coated materials during laboratory experiments.

It was very difficult and challenging to adhesive copper with cloth in the past. But in 2018, researchers from The University of Northwest Minzu and

the Manchester and Southwest University in China have partnered to create a special method that effectively coats fabric with copper nanoparticles. These fabrics may be employed as antibacterial and antiviral hospital uniforms. These effects are very promising, and some industries are already showing interest in improving this technology.

The University of Nebraska-Gregory Lincoln's Grass has researched the ability of dry copper to destroy microbes upon contacting surfaces. Although he thinks that copper surfaces should not replace other important methods of hygiene preservation in healthcare facilities, he claims that the costs associated with hospital-acquired infections will certainly decrease and curb human disease, as well as save lives."

Metals have been used for thousands of years as antimicrobial agents and were substituted in the mid-20th century by organic antibiotics. Raymond Turner of the University of Calgary writes in a 2017 paper entitled "Metal-based antimicrobial strategies," "While research to date on MBAs (metal-based antimicrobials) has considerable promise, there is a lack of knowledge of the toxicology of these metals on people, crops, livestock and the microbial ecosystem overall."

In the future, health care workers will start wearing copper-coated uniforms. Uniforms polished onto the fabric with tiny copper nanoparticles can help prevent the spread of pathogens through clothing vectors; infections such as *Staphylococcus* and *Escherichia coli* (*E. coli*) [15].

Together with universities in China, materials research scientists from the University of Manchester have built a "long - lasting and easy to clean, concrete-like" material that contains antimicrobial copper nanoparticles. Bound chemicals, like copper, have been thought of as antibacterial effects in the past, but it was a struggle to directly bind the copper to fabric. A method of adding the compound to textile fabrics such as cotton and cotton was developed by UM researchers.

The researcher draw conclusion from this research that after 30 washings, cloth made from cotton and polyester was still resistant to *E. coli* and *Staphylococcus aureus* [16].

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