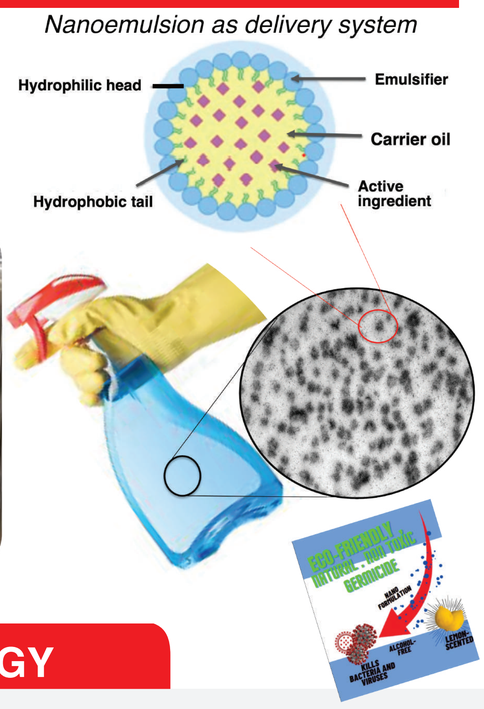
# Dual-targeted therapy of Natural Plant-Based Antimicrobial Agent via Nano emulsion-Based Technologies as a novel therapeutic strategy for the management of infections

**PATENT NO. PI 2020004195**

## Natural and Non-Toxic Germicide Solution

*Nanoemulsion as delivery system*




**For medical equipment purposes*

## BRIEF TECHNOLOGY

The invention is plant based nano emulsion solution, a novel non-toxic germicide agent against *methicillin-resistant Staphylococcus aureus* (MRSA) and *Acinetobacter baumannii* infection, which is a common threat to public health but with limited therapeutic options. The formulation is also effective in killing viruses including human coronavirus OC43 (hCoV-OC43) in vitro which is a beta coronavirus under the same group as the SARS-CoV-2. It also exhibited good antioxidant properties. Thus, making the invention as unique which be used as dual therapy in managing the infections.

## PROBLEM STATEMENT & CURRENT ISSUES

COVID-19 patients admitted in ICUs are coinfected and superinfected with multidrug resistance bacteria such as Acetinobacter baumii. Recent study also found that more than 25% of all co-infections in COVID-19 patients were related to *Staphylococcus aureus* (S. aureus), more than half of which were MRSA.

**Current challenge in treating *MRSA* and multidrug resistance *Acinetobacter baumannii* (MDRAB)**

Resistant to biocides or disinfectants in the hospital settings has been a global issue. Several biocide resistance genes have ben detected including FabL gene in these isolates. More importantly, the presence of different resistance genes (biocide and antibiotics) would encourage their combination into the same genetic element (plasmids and integrons) which can then be transmitted between species via horizontal gene transfer.

## INVENTIVENESS & NOVELTY

The formulation is nanoemulsion, made from 100% food-grade ingredients, has potential as a germicide agent with minimum toxicit, non-alcoholic and biodegradable.The operational process is green synthesis, simple and affordable.

## ISSUES

Elsevier Public Health Emergency Collection

Public Health Emergency COVID-19 Initiative

Sci Total Environ. 2020 Nov 10; 742: 140561. PMCID: PMC7320712
Published online 2020 Jun 27. doi: 10.1016/j.scitotenv.2020.140561 PMID: 32623176

**COVID-19 and frequent use of hand sanitizers; human health and environmental hazards by exposure pathways**

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WEBMD HEALTH NEWS

**Antimicrobial Resistance Threat Continues During COVID**

By Damian McNamara

July 1, 2021 -- The stark realities of antimicrobial resistance – including rising rates of difficult-to-treat infections, a lack of robust pipeline of future antimicrobials, and COVID-19 treatments that leave people more vulnerable to infections -- remain urgent priorities, experts say.

For some patients, the pandemic and antimicrobial resistance (AMR) are intertwined.

Coronavirus Outbreak

CORONAVIRUS HOME

See WebMD's Complete Coverage of COVID-19

COVID-19 VACCINES

## SOLUTION

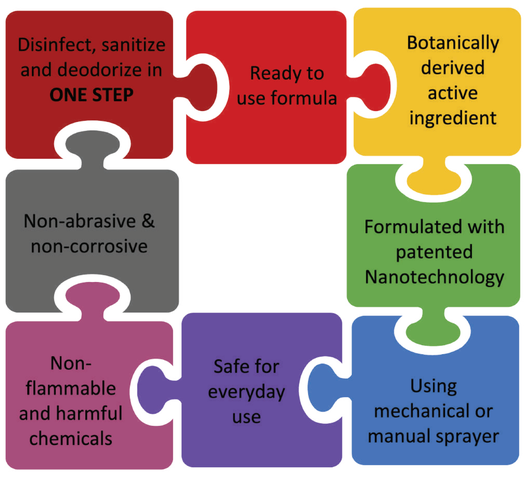
*Sample preparation and Testing*

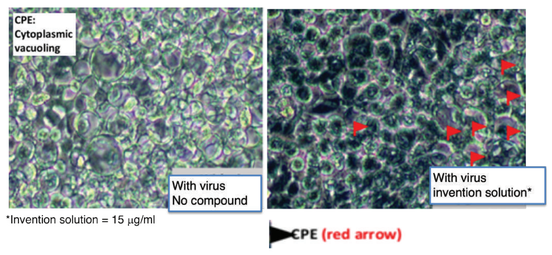
*Product ready to use*

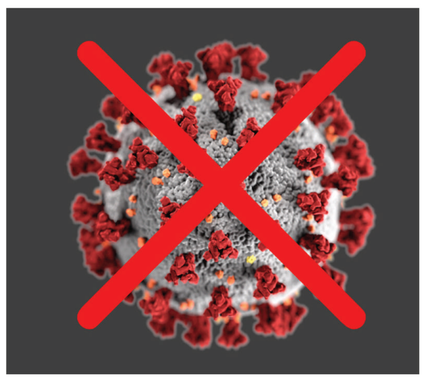
| | Methicillin-resistant Staphylococcus aureu Mean | Acinetobacter baumannii |
|---|---|---|
| Sample (mg/ml) | Mean | Mean |
| Invention solution | 1.56 | 1.56 |
| Tetracycline | 0.0013 | 0.64 |

**Minimum inhibitory concentration of (MIC) values*

## USEFULNESS & APPLICATION



## IMPACT OF THE PRODUCT

- The involvement of an industry partner enable the product to be produced at massive production and commercialization.
- The product is an eco-friendly hand sanitizer, antiseptic and hospital decontaminant agent.
- The product is made from natural resources which are effective, biodegradable, low cost and affordable.

## MARKET POTENTIAL

Creation of New Business. The formulation can be effectively used as a natural, green and eco-friendly germicide agent for medical application, it will open the door for many business opportunities mainly in the pharmaceutical industry.

TRL : 4 - Lab validation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