not contain environmentally problematic constituents and is readily biodegradable.

SUMMARY OF THE INVENTION

The inventors have discovered a way to synergistically boost the kill-time rate of hydrogen peroxide by dispensing it as part of a nanoemulsion formulaton.

The present ~~invention~~disclosure provides a chemical composition comprised of hydrogen peroxide in a nanoemulsion of long-chained alcohols which in combination these constituents act synergistically boost the kill-time rate of hydrogen peroxide. Without being limited to any theory, it is believed that a high-energy state is formed in the nanoemulsion particles when manufactured using either a mechanical means (high-speed mixer) or chemical means (chemical types and ratio of nanoemulsion-forming surfactants).

The active ingredient and the emulsification's high energy level are believed to be important for the antimicrobial mechanism of action. The obtained emulsions are fluid in consistency and milky in appearance. If desired, additional thickeners may be added to increase its viscosity and prevent running in specific applications.

Accordingly the present ~~invention~~disclosure provides a peroxide based nanoemulsion formulation for application to skin, comprising:

at least one peroxide containing compound present in a range to give from about 0.1 to about 4 wt./wt. % released hydrogen peroxide;

at least one organic acid present in a concentration from about 0.01 to about 5 wt./wt. % for adjusting a pH of the formulation in a range from about pH 1 to about pH 4;

at least one long-chained (C9 to C22) aryl and/or alkyl alcohol, present in a concentration from about 0.1 to about 20 wt./wt. %;

at least one emollient present in a concentration from about 0.1 to about 40 wt./wt. %;

water present in an amount sufficient to obtain a nanoemulsion and at least one non-ionic and/or anionic emulsifier present in a concentration from about 0.1 to about 20 wt./wt. %, thus rendering the formulation a nanoemulsion.

In one aspect, there is provided a peroxide based antimicrobial formulation comprising a nanoemulsion for application to skin for disinfection thereof, wherein the nanoemulsion comprises:

at least one peroxide containing compound present in a range to give from about 0.1 to about 4 wt./wt% released hydrogen peroxide;

at least one organic acid present in a concentration from about 0.01 to about 5 wt./wt. % for adjusting a pH of the formulation in a range from about pH 1 to about pH 4;

at least one long-chained (C9 to C22) aryl and/or alkyl alcohol, present in a concentration from about 0.1 to about 20 wt./wt. %;

at least one emollient present in a concentration from about 0.1 to about 40 wt./wt. %;

at least one non-ionic and/or anionic emulsifier present in a concentration from about 0.1 to about 20 wt./wt. %; and

water present in a concentration from about 20 wt./wt. % to about 95 wt./wt. %.

In another aspect, there is provided the use of the formulation as defined above in the manufacture of a medicament for use as a skin disinfectant.

A further understanding of the functional and advantageous aspects of the invention can be realized by reference to the following detailed description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention will now be described, by way of example only, with reference to the drawings, in which:

Figure 1 is a diagrammatic representation of the process of pathogen destruction using the compositions disclosed: **(a)** nanomicelles in contact with a bacteria; **(b)** nanomicelles fuse with the bacterial cell wall; **(c)** bacterial cell wall and membrane disrupt, killing the cell.