Quaternary Ammonium Compounds

Quaternary ammonium compounds are the most commonly employed broad-spectrum hard surface disinfectants employed in animal research facilities.

From: Laboratory Animal Medicine (Third Edition), 2015

Sanitization

C.P. Chauret, in Encyclopedia of Food Microbiology (Second Edition), 2014

Quaternary Ammonium Compounds

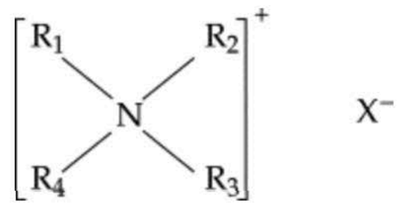
Quaternary ammonium compounds (QACs) are sometimes referred to as *quats*. These compounds are among the most commonly used disinfectants in the food industry, and there are numerous commercially available products and formulations. They are cationic surfactants (positively charged surface-active agents) that impact cell walls and membranes after relatively long contact times. Their permanent positive charge makes them bind readily to the negatively charged surface of most microbes. QACs are used at concentrations ranging from 200 to 400 ppm for various food-contact surfaces. QACs are generally very stable, mostly unaffected by pH levels, and remain effective on a food-contact surface for a long time. Their antimicrobial activity is more selective than that of other disinfectants, they are inactivated by organic soil, and they should not be diluted in hard water. QACs are, however, generally very effective against bacterial biofilms. An example of a QAC is benzalkonium chloride, which is often used as a cleaner and sanitizer for various food surfaces, both at home and in industrial applications such as dairy equipment.

CLEANING PROCEDURES IN THE FACTORY | Types of Disinfectant

J. Fisher, in Encyclopedia of Food Sciences and Nutrition (Second Edition), 2003

Quaternary ammonium compounds

Quaternary ammonium compounds (QACs) were first introduced in 1917 and are probably the best known cationic surface-active agents. Their general formula is as follows:



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X is usually a halide but sometimes a sulfate ion. R_1, R_2, R_3, and R_4 may be a variety of alkyl or aryl groups.

QACs are generally poor detergents but good wetting agents. In solution, they ionize to produce a cation, the substituted nitrogen part of the molecule, which provides the surface-active property. The length of the carbon chain in the R groups affects the disinfectant ability; usually, C_8 to C_{18} are the most effective.

The surface-active nature of these molecules tends to make them too