FeF® Quats in oral products

Description

Quats are well-known antiseptics and have a long history of use in a wide range of both human and veterinary products. They act on a wide range of microorganisms, from gram+ to gram- bacteria, moulds, yeasts and enveloped vira such as HIV, herpes and corona.

Our FeF® Quats are odourless and colourless, and their effectiveness in all pH ranges combined with their ability to mix well in most formulations, make them an ideal antimicrobial ingredient.

Applications

No matter the application, for formulations coming into contact with either healthy or damaged buccal tissue, it is necessary to utilize only the purest and safest ingredients.

FeF® Quats can be used either as excipients or active pharmaceutical ingredients (APIs) for oral and dental formulations.

Lozenges: FeF® Benzalkonium Chloride (BKC) is used as an API in lozenges to treat superficial infections in the mouth and throat. Our crystalline product FeF® CTAB is found as an API in lozenges to treat throat infections at typically 1.0 mg/lozenge.

Gels and creams: FeF® Benzalkonium Chloride (BKC) is also often found in gels and creams at typical concentrations of 0,01 to 0,1%, to treat herpes and cold sores infections, or as an excipient in pain-relieving gum gels.

Antiseptic mouth sprays with FeF® Benzalkonium Chloride (BKC) are also common. Dentistry products: FeF® Quats are also used either as an active antiseptic or a preservative in for example rinsing fluids and antiseptic fills.

Product characteristics

Solubility: Quats are miscible with water or lower alcohols, such as methanol, ethanol and propanol in all ratios. Quats are not miscible with benzene or ether. Indicative solubility of Quats in %w/w at 20°C in water:

Tertiary Amine Carbon Chain Length (Alkyl Chain Length)	Methyl bromides	Benzyl chloride – Mix to form BKC
C12		70
C14	Cetrimide: 38	10
C16	CTAB: 6	1.5
C18		1.5

Solubility decreases as the alkyl chain length increases.

Compatibility: Quats can be combined with e.g. alcohol and chlorhexidine and with the most commonly used compounds in oral & dental formulations. Mixing Quats with ordinary soaps and/or with anionic detergents may decrease the activity. As Quats are cationic compounds, they should not be mixed with anionic compounds as this would have a neutralizing effect. Quats can be inhibited by Tween® and by lecithin. Avoid mixing Benzalkonium Chloride (BKC) with citrates, iodides, nitrates, perman ganates, salicylates, silver salts and tartrates. Incompatibilities have also been reported with other substances including aluminium, fluorescin sodium, hydrogen peroxide, kaolin and some sulfonamides.

Stability: 5 years shelf life.

Other: Odourless, Colourless, Easy to formulate, Surface active / adhesive, Non-volatile and very stable.

Antimicrobial effect

FeF® Quats are effective at all pH levels. However their effectiveness increases when the pH increases. The higher the pH, the lower the concentration needed to obtain an antimicrobial effect.

As opposed to bacteriostatic/fungistatic compounds which only prevent micro-organisms from dividing (growing), Quats are bactericidal/fungicidal, meaning they will kill micro-organisms, whether they are in a growth phase or not.

FeF® Quats have been tested against several relevant microbial strains, and shown to be effective against a wide range of micro-organisms at low concentrations. FeF® Quats are compared here with ethanol and with a positive control containing Meropenem (a broad-spectrum antibiotic). See Table 1.

Table 1: Minimal Inhibitory Concentrations. Mean results in % or µg/ml.

Species	ATCC no.	BKC %	CTAB %	Cetrimide %	Ethanol %	Meropenem µg/ml	Control strain/ Meropenem µg/ml	Range of control µg/ml
Candida albicans	2091	< 0.001	< 0.001	0.002	>1	>16	-	-
Corynebacteria amycolatum	CCUG 33685	0.002	0.004	0.004	>1	0.006	0.006	0.06-0.25
Streptococcus dysgalactiae	12394	< 0.001	< 0.001	0.002	>1	< 0.015	0.06	0.06-0.25
Enterococcus faecalis	29212	< 0.001	< 0.001	< 0.001	>1	0.125-8	0.125-8	2-8
Staphylococcus aureus MRSA	33591	< 0.001	< 0.001	< 0.001	>1	16	-	-
Staphylococcus aureus	29213	< 0.001	< 0.001	< 0.001	>1	0.06	0.06	0.03-0.12
Pseudomonas aeruginosa	27853	0.008	0.063	0.016	>1	0.5	0.5	0.25-1
Mycobacterium abcsessus NFM32	-	< 0.001	< 0.001	< 0.001	>1	< 0.001	-	-
Acinetobacter baumannii	19606	0.002	0.002	0.008	>1	1	-	-
Staphylococcus epidermidis	12228	< 0.001	< 0.001	< 0.001	>1	0.06	-	-
Staphylococcus lugdunensis	70328	< 0.001	< 0.001	< 0.001	>1	0.25	-	-

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