

Cosmocil CQ antimicrobial – effective use in personal hygiene wipes

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Introduction

An article outlining the beneficial attributes of Cosmocil CQ, and their relevance to the use of Cosmocil CQ in a range of cosmetic and personal care products was presented in the 2002 issue of *Cosmetics and Toiletries Manufacture Worldwide*.

Cosmocil CQ finds application in products such as:

- Skin creams and lotions
- Hair conditioners and shampoos
- Under-arm deodorants
- Contact lens cleaning solutions
- Body and facial wipes

This utilisation of Cosmocil CQ is primarily underpinned by its combination of favourable skin toxicology at typical use levels, high order antimicrobial efficacy, and unique physical attributes. This combination allows product formulators to use Cosmocil CQ for product preservation, and further to confer added-value benefits such as deodorising and sanitising action. Consequently, Cosmocil CQ has been enjoying expanded use in the growth product category of impregnated wet wipes for use in skin care products, such as body cleaning and refreshing wipes.

As a result of an increasingly sophisticated consumer demand for more convenient and effective products, the wipes market has witnessed an explosion of new and innovative products. Such products are the fastest growing product category in the household and personal care sectors, having more than doubled, at the retail level, since 1997, and are predicted to grow at a further 6-7% annually for several

years⁽¹⁾. Wipes are further seen to be expanding into additional market sectors, such as the professional beauty (salon) industry. This in turn, has driven the demand for raw materials that offer formulators the means by which to improve their functionality and effectiveness, with safety in use being of paramount importance.

Physical properties

The physical properties of Cosmocil CQ were discussed in the 2002 issue of *CTMW*.

The key properties of Cosmocil CQ are:

- Colourless
- Odourless
- Formaldehyde-free and solvent-free
- Water soluble
- UV stable

These product features, coupled to the polymeric nature of the active ingredient in Cosmocil CQ (polyaminopropyl biguanide, also known as poly(hexamethylene biguanide) hydrochloride, PHMB), result in skin care wipe products that do not leave any sticky feel on the skin, or confer undesirable odour or stains.

Regulatory information

Polyaminopropyl biguanide is listed in Annex VI of the European Cosmetic Directive 76/768/EEC relating to preservatives for use in cosmetic products, with a maximum authorised use concentration, as a preservative, of 1.5% Cosmocil CQ. However, the listing carries a (+) notation, which allows for use at concentrations other than

those laid down in the Annex for other specific non-preservative uses, which are apparent from the presentation of the cosmetic product.

In the USA, Cosmocil CQ is listed by the CTFA (Cosmetic, Toiletry and Fragrance Association) in its Cosmetic Ingredient Dictionary.

PHMB (CAS # 27083-27-8) has been notified by Avecia under the First Review Regulation 1896/2000 of the European Biocidal Products Directive 98/8/EEC. Notification has been accepted for various product types including "01-Human Hygiene Biocidal Products".

Cosmocil CQ is supported by an extensive mammalian toxicology package, which shows it to have low acute toxicity via dermal and oral routes, low skin and eye irritancy potential at in-use concentrations, and low toxicity following long-term exposure.

Spectrum of activity

The biocidal efficacy of **Cosmocil CQ**, in comparison to commonly used antimicrobials, was discussed in the 2002 issue of CTMW.

Cosmocil CQ is effective against the following broad classes of organisms:

- Gram-positive bacteria such as *Staphylococcus aureus* (including methicillin resistant strains)
- Gram-negative bacteria such as *Pseudomonas aeruginosa*
- Odour causing bacteria such as *Staphylococcus epidermidis*, *Corynebacterium xerosis*, and *Proteus vulgaris*
- Viruses (naked and enveloped), such as Rotavirus

This broad-spectrum activity of Cosmocil CQ supports its use as both a product preservative, and also as an added value antimicrobial for delivering efficacy claims to the finished product.

Formulating Cosmocil CQ into wet wipes

Cosmocil CQ is currently utilised in a range of skin contact hygiene wipes. Examples of such include:

- Freshening alcohol-free body wipes
- Refreshing and deodorising body wipes
- Deep cleansing facial wipes
- Cleaning and disinfecting hand towels containing alcohol
- Eye cleaning wipes, which also provide mild disinfection

As with use of any antimicrobial, Cosmocil CQ is seldom used as the sole active ingredient in wet wipe formulations. Outlined in **Table 1** is an indication of how Cosmocil CQ may be co-formulated with additional antimicrobial agents to provide complementary and wider spectrum activity:

Functionality	Ingredient	Guide Dose (% w/w in lotion)
Preservation against bacteria, yeast and fungi	Cosmocil CQ	0.10
	2-phenoxyethanol	0.75
	Methyl parabens	0.10
	Propyl parabens	0.05
Preservation against bacteria, yeast and fungi	Cosmocil CQ	0.700
	Potassium sorbate	0.140
	Citric acid	0.115
Preservation against bacteria, yeast and fungi	Cosmocil CQ	* See below
	Iodopropynyl butylcarbamate	
Enhanced skin disinfection activity	Cosmocil CQ	1.0
Eye Care	Ethyl alcohol	10
	Cosmocil CQ	0.10
	Boric acid	1.24
	Propylene glycol	0.10

**Detailed levels of each component not available. A stabilised combination of polyaminopropyl biguanide and iodopropynyl butylcarbamate is available from Schulke & Mayr as Euxyl™ K 600, with a recommended use concentration in wet wipes of 0.5 to 1.5%.*

The above formulation guide involves the use of antimicrobials commonly used in the cosmetics and personal care sector, and indeed forms the basis of the existing product examples outlined previously.

Whilst the choice of the antimicrobial package is of clear importance, so is the choice of additional ingredients, such as surfactants, fragrances etc. Amphoteric surfactants have been used in the cosmetics industry for many years, and are used in sensitive skin cleansers due to their favourable surfactant properties and low skin irritation properties. Cosmocil CQ has been studied in combination with two amphoteric surfactants – disodium cocoamphodiacetate and disodium cocoamphodipropionate. When used in combination with Cosmocil CQ, both these surfactants have been shown to deliver the optimum performance contribution from the Cosmocil CQ

component. As a guide, when formulating with 0.5% Cosmocil CQ, these surfactants may be incorporated at 0.3-0.4%.

Dependent upon the composition of the wipe substrate, desired performance criteria and co-formulation package, the recommended additions of Cosmocil CQ in the wipe liquor range from between 0.1% and 1.0% for preservation of the wipe lotion, and between 0.5% and 1.5% for conferring a 'sanitising' action to the skin.

Summary

Cosmocil CQ has been a widely utilised antimicrobial for many years, providing reliable preservation of a diverse range of cosmetic and personal care products. With the continued growth in the personal wipes product category, Cosmocil CQ is well suited for development of skin contact wipes which can offer excellent skin mildness and added value performance attributes. Through judicious choice of both surfactant and co-active package, utilisation of Cosmocil CQ in wet wipe lotions can offer enhanced broad activity performance.

References

(1) Nonwovens Industry, October 2003

- "Cosmocil" is a trademark, the property of Avecia Limited. All references in this article to "Cosmocil CQ" are references to Avecia Protection & Hygiene's Cosmocil CQ antimicrobial product.

- The information and recommendations in this article are to the best of our knowledge, information and belief accurate at the date of publication. Nothing herein is to be construed as a warranty, express or otherwise. In all cases, it is the responsibility of users to determine the applicability of such information or the suitability of any products for their own particular purpose.

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