

# THE SEARCH IS ON FOR PARABEN ALTERNATIVES IN COSMETICS

MARKETING DEPARTMENTS throughout the cosmetic industry have jumped on the anti-paraben bandwagon in recent years. All the attention has forced formulating chemists to search for preservative alternatives. One of them is Stabil, a preservative manufactured by Akema Fine Chemicals of Italy. The product is distributed in the U.S. by



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International Sourcing Inc., Franklin Lakes, NJ. Stabil is a mixture of phenylethyl alcohol (56-60%) and caprylyl glycol (40-44%).

Phenylethyl alcohol (C<sub>8</sub>H<sub>10</sub>O) is found in fruits and flowers such as rose, banana, apple and lily. It has a floral odor with a rose character. In cosmetics, it can be used as a fragrance and deodorant. It has antimicrobial

activity, especially against gram-negative bacteria and fungi. In pharmaceuticals, it serves as a fragrance, flavoring agent and as a preservative in ophthalmic solutions. Caprylyl glycol (C<sub>8</sub>H<sub>18</sub>O<sub>2</sub>) is a linear diol that acts as a skin humectant, wetting agent and

solubilizer. It gives a pleasant skin-feel and has antimicrobial properties.

Apparently, the combination of the two actives shows a synergistic antimicrobial effect as the wetting ability of the glycol may enhance the intracellular penetration of the alcohol, which inhibits cellular processes and macromolecular synthesis.

Stabil is very stable in glycerine, propylene glycol and ethanol. Up to 5% can be added in mineral oil, but only 0.6% in water. It is stable and effective in the pH range of 4-8, but the best activity is obtained in acid pHs.

The activity of Stabil was determined by running Minimum Inhibitory Concentration (MIC) and Minimum Biocidal Concentration (MBC) tests using the following organisms: gram-positive bacteria (*S. aureus*), gram-negative bacteria (*E. coli* and *P. aeruginosa*), yeast (*C. albicans*) and mold (*A. niger*).

The tests were run with and without disodium EDTA chelating agent. It was discovered that disodium EDTA enhanced the antimicrobial effectiveness of Stabil, resulting in a big reduction of MIC and MBC values, and allowing for lower levels of Stabil to be used. The same five microorganisms listed above were added to cosmetic formulas and checked for microbial growth initially and after 2, 7, 14, 21 and 28 days. One of the test formulas was the following:

### O/W Emulsion with a Nonionic Emulsifier

Ingredients:	%Wt.
PEG-100 stearate,	5.0
glyceryl stearate	
Octyl octanoate	4.0
Glycerine	4.0
Paraffinium liquid	3.0

Caprylic/capric triglyceride	3.0
Cetyl alcohol	2.0
Dimethicone	0.5
Allantoin	0.5
Carbomer	0.2
Disodium EDTA	0.1
Sodium hydroxide (10%)	q.s.
Water	77.7
Stabil	0.8

The above formula was also made with no preservative and with 1% Stabil. The results showed that both Stabil concentrations totally inactivated the gram-negative bacteria (*E. coli* and *P. aeruginosa*) within two days. The 0.8% formula inactivated the *S. aureus* in 7 days, the *C. albicans* in 14 days, but it took 28 days to control the *A. niger*. The 1% Stabil was better. All of the organisms were killed within seven days.

Other formulas were tested with similar (but not exactly the same) results. The *A. niger* mold took from 1-1.2% Stabil (depending upon the formula) to kill within seven days. Up to 1.5% is recommended for formulas which are more susceptible to molds.

Some formulating tips include adding it to an emulsion after it has been formed at a temperature of 60°C or less. It can be dissolved in surfactants in a shampoo, without heating, before adding the other ingredients. Alcohols or glycols will help solubilize it in an aqueous solution to its limit of 0.6%. The use of chelating agents is always suggested to improve the antimicrobial efficacy of Stabil.

Some companies insist on marketing their products as preservative-free. But if a product contains Stabil or another non-traditional preservative, the claim, "self-preserving," would be a more accurate description. ●