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A Reliable Alternative for Traditional Preservative Systems
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Keywords: cosmetic preservation, enhanced phenoxyethanol, traditional paraben mixtures

Abstract

Cosmetic preservation is increasingly under pressure. Industry sensitivity towards the toxicology of biocides has been raised. Europe and the U.S. have started re-evaluating the safety of cosmetic preservatives. As more cosmetic manufacturers want to go »global«, the public debate around the world regarding traditional cosmetic preservatives limits the options available to cosmetic manufacturers. Cosmetic formulators are realising the need for alternative approaches to product protection. To meet these market requirements Euxyl® PE 9010, a new concept in preserving cosmetics, has been introduced. In the following article, the antimicrobial efficacy of Euxyl® PE 9010 is compared to a traditional preservative mixture for leave-on cosmetics.

Introduction

One of the most commonly used preservative systems for cosmetics are standard blends of phenoxyethanol and parabens.
tested in more than 350 different cosmetic products, both alone and in comparison studies vs. different traditional cosmetic preservative systems. These tests have proven Euxyl® PE 9010 to be an interesting alternative for cosmetic preservation.

**Method**

Challenge tests have been performed according to the S&M Koko test method (5, 6) (Fig. 1). The S&M Koko test is a repeated challenge test designed and validated by Schülke & Mayr. A mixed suspension of Gram-positive and Gram-negative bacteria, yeast and mould is used for six inoculations at weekly intervals. Parallel to each inoculation a sample of the tested product is streaked out onto nutrient media, incubated and evaluated semi-quantitatively. The longer the time before the occurrence of the first microbial growth, the more effective is the preservative. Experience has shown that a well-preserved product should remain growth-free for six inoculation cycles to ensure the shelf-life required in practice (30 months in the original packaging).

**Results**

The results of the testing done shows that Euxyl® PE 9010 is most suitable for the preservation of leave-on cosme-

<table>
<thead>
<tr>
<th>Products tested</th>
<th>44</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products with the same result</td>
<td>40</td>
</tr>
<tr>
<td>Products where the paraben mixture is slightly better</td>
<td>2</td>
</tr>
<tr>
<td>Products where Euxyl® PE 9010 is slightly better</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 1 Comparison of the efficacy of Euxyl® PE 9010 vs. phenoxyethanol based paraben mixtures in leave on

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<table>
<thead>
<tr>
<th>Test material/Product</th>
<th>Inoculation Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand and nail cream, unpreserved</td>
<td></td>
</tr>
<tr>
<td>+ 1.0 % paraben mixture *</td>
<td>++</td>
</tr>
<tr>
<td>+ 1.0 % Euxyl® PE 9010</td>
<td>++</td>
</tr>
<tr>
<td>LV Sun spray, unpreserved</td>
<td></td>
</tr>
<tr>
<td>+ 0.5 % paraben mixture *</td>
<td>++</td>
</tr>
<tr>
<td>+ 1.0 % Euxyl® PE 9010</td>
<td>++</td>
</tr>
<tr>
<td>+ 1.0 % Euxyl® PE 9010</td>
<td>++</td>
</tr>
<tr>
<td>Fragrance free dry skin Cream, unpreserved</td>
<td>++</td>
</tr>
<tr>
<td>+ 1.0 % paraben mixture *</td>
<td>++</td>
</tr>
<tr>
<td>+ 1.0 % Euxyl® PE 9010</td>
<td>++</td>
</tr>
</tbody>
</table>

**Fig. 2** Comparison of the efficacy of Euxyl® PE 9010 vs. a traditional paraben mixture during six inoculation cycles (* methyl-, ethyl-, propyl-, butyl- and isobutylparaben in phenoxyethanol)
COSMETICS

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tics such as creams, lotions, wet wipes, hair care and hair styling products. For these products one of the market-leading preservative systems is the combination of methyl-, propyl-, ethyl-, butyl- and isobutylparaben in phenoxyethanol. To study the efficacy of the combination of phenoxyethanol and the preservative enhancer ethylhexylglycerin vs. traditional phenoxyethanol/paraben mixtures, S&M Koko tests were performed. The results are impressive. 40 out of the 44 products tested showed the same challenge test result whether preserved with Euxyl® PE 9010 or the paraben mixture (Table 1).

Slight differences in the efficacy between the two systems could be observed in only 4 products. Based on the main application area for paraben mixtures – leave-on products – 90 % of the products tested show nearly identical results in preservative efficacy for the traditional paraben mixture and Euxyl® PE 9010. If the paraben blend passed the test Euxyl® PE 9010 passed also and vice versa. If the paraben mixture was not effective in preserving a cosmetic formulation the enhanced phenoxyethanol failed as well.

The comparable efficacies of the traditional paraben mixture and Euxyl® PE 9010 is shown for different customer products (Fig. 2).

Discussion

As all three examples – a hand and nail cream, a sun spray and a fragrance free dry skin cream – show, the challenge tests have the same test characteristics irrespective of whether the preservative is a paraben mixture or Euxyl® PE 9010. While the hand and nail cream and the sun spray stay well preserved during six inoculation cycles with 1.0 % of the paraben mixture as well as 1.0 % Euxyl® PE 9010, the fragrance free dry skin cream shows slight growth of bacteria during the entire challenge test with both preservatives.

The test results show that Euxyl® PE 9010 is as effective as a traditional phenoxyethanol/paraben mixture when used at equivalent concentrations. It is recommended to check the stability and preservative efficacy in individual cosmetic products as any change in the preservative system may affect the performance of the formulation.

Conclusion

Due to ongoing discussions regarding preservative actives, formulators are increasingly looking for new options. With Euxyl® PE 9010 a reliable alternative to the commonly used phenoxyethanol-based paraben mixtures was introduced. As proven in several challenge tests, it is particularly effective for the preservation of leave-on cosmetics, such as creams, lotions, wet wipes, hair care and styling products. This new preservative system has been proven effective in almost every product where the standard paraben mixture is effective and it is an alternative to classical preservative blends.

References

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