Stability Testing of Cosmetic Emulsions

Experiences of a Circular Test

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The stability of a cosmetic emulsion is one of the most important aspects in terms of a product's quality. When comparing conditions and methods to check stability, you will find that they seem to be only slightly different from each other. In practice, these small differences may cause very different test results.

In view of this uncertain situation, the working group on "Skin Care Preparations" of the German Society of Cosmetic Chemists decided to conduct a circular test on the stability of cosmetic emulsions. The members of this working group consist of technical staff of the most important German cosmetic manufacturers, all being engaged either in development or in the production of cosmetic emulsions.

Another important reason for this joint test series was the Cosmetic Regulation of the Federal Republic of Germany, which came into force on January 1, 1978. This regulation prescribes, among other things, certain minimums of durability of cosmetic products. Thus a cosmetic preparation has to remain stable over a period of at least three years (under conditions of normal use and/or storage). In special cases, when sufficient stability of products cannot be realized, as is the case for example, with selftanning preparations, the manufacturer is obliged to label an expiration date on the package of the product.

The investigation of this circular test was conducted during 1979. All participants of the circular test stored the three test emulsions for more than three years and found all three emulsions to be stable. This is enough evidence for publishing the whole test procedure, the results, and the proposed three test methods to predict a three years product stability.

In a first step the working group screened the literature which describes the main important factors for the stability of a cosmetic emulsion[1-4] and the methods to check the stability.[5-10] All test methods used and found in literature were collected.

These various test methods may be classified in three groups, each group containing a number of tests with varying test conditions (e.g., temperature, time).

The first group comprises the storage tests

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condition for this test series. A better conformity of results would be expected in such a case.

Summary

The evaluation of the results obtained from eight different test series independently conducted by nine different teams yielded, upon the whole, a surprisingly good agreement.

This joint test program has definitely shown an unambiguous judgement of emulsion stability to be possible, on condition of carefully preselected and well defined test requirements. It is, of course, open to question whether all of the test procedures outlined above should be conducted in daily practice. Each of the manufacturers of cosmetic emulsions has to decide individually. The evaluation and discussion of the working group on "Skin Care Preparations" aimed at recommending a restricted number of test procedures, out of the eight summarized above, for the assessment of stability of cosmetic emulsions.

This recommendation was intended to give a uniform or standardized frame to anyone interested in or dealing with cosmetic emulsions and, last but not least, to regulating authorities.

On the basis of the long-term experience of the working group with cosmetic emulsions the following three tests are proposed: storage at +40°C for three months; storage at −5°C for one week; temperature swing test +40°C/−5°C with time intervals of 24 hours.

The execution of these three predictive stability tests would then be required in order to ensure a shelf life of several years for cosmetic emulsions. As time has shown, these tests allow a stability guarantee for more than three years.

From case to case it may be necessary to choose one or more of the other tests. The centrifugation test, for instance, is of major interest as it allows a very fast information about the comparable stability properties of different emulsions.

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