J. Cosmet. Sci., 56, 333–335 (September/October 2005)

Abstracts

International Journal of Cosmetic Science Vol. 27, No. 4, 2005*

Method for evaluation of the efficacy of antimicrobial preservatives in cosmetic wet wipes

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Many cosmetic formulations are now available in the form of wet wipes packaged in sealed sachets or packets. Like the majority of cosmetic products having an aqueous phase, wipes are susceptible to microbial contamination and require the addition of preservatives. The efficacy of such preservatives can be evaluated using a standard challenge test performed on the wetting liquid but this test cannot be regarded as representative for this new type of formulation. The method presented here evaluates the efficacy of preservatives used in wet wipes kept in their original packaging. Dried inoculums were prepared by membrane filtration followed by drying in an incubator. The method is applicable to bacteria (Pseudomonas aeruginosa, Escherichia coli, Staphylococcus aureus and Enterococcus faecalis), Bacillus cereus spores and fungi (Candida albicans and Aspergillus niger). These inoculated carriers were inserted between two wipes in the original package, which was then re-sealed immediately. The test requires one dry inoculum per packet and one packet for each control or test. After incubation at 22.5_C for 1, 2, 7, 14 or 28 days and, for the control, immediately after insertion of the membrane (time 0), microorganism counts were performed on the germ-carrier membranes as well as on adjacent wipes, after transfer into a suitable neutralizing agent. The membranes were shaken in the presence of glass beads and microorganisms were dissociated from the wipes by means of a Stomacher. The supernatants recovered after being left to stand for 20 min are counted by pour plate method or membrane filtration. The feasibility of the method was demonstrated for each of the seven above-mentioned strains. The repeatability and reproducibility of the results obtained is similar to that obtained for preservative efficacy tests in the Pharmacopoeias. The lethal rate of microorganisms during the preparation of dry inoculums ranges from 50 to 90% depending on the strain and the test (generally, a spontaneous reduction of about 1 log up to a maximum of 2 log). The recovery rate for microorganisms from dry inoculums (on membranes) at time 0 (control ¼ T0) is around 90%, regardless of the strain or the test. The number of microorganisms recovered from the wipes (W0) is between 2 and 10% of the number recovered from membranes (T0) and may be considered negligible. Application of this method to different types of wipes demonstrates that the efficacy of preservatives, expressed as the logarithmic reduction in the number of microorganisms at each time point, depends on the type of wipe and on the strain tested. The results obtained are considerably different from those found with the standard challenge tests applied to wetting liquids for wipes. The differences found confirm the need for a specific method applicable to wipes.

Analysis of hair lipids and tensile properties as a function of distance from scalp

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Cuticle cells form the outer covering surrounding and protecting the cortex. The cuticle cells are thin, flat and overlap, and intercellular lipid lamellae are found in the gaps between the cell boundaries. The lipid lamellae are also found within the cortex in the cell boundaries between the long fribrous corticle cells. In addition, the outer surfaces of the cuticle cells are covered by a monolayer of covalently bound fatty acids, a major component of which is 18 methyleicosanoic acid. The fatty acids are thought to be attached through thioester linkages. Together these lipids are thought to be major determinants of the physical properties of the hair. The present study tested the hypothesis that both free and covalently bound lipids are progressively lost during normal environmental exposures. This progressive loss within the cuticle layers may, in part,

* These abstracts appear as they were originally published. They have not been edited by the *Journal of Cosmetic Science.*

lead to an increased susceptibility of the protein and lipid lamellae in the cortex to degradation. This degradation, in turn, would contribute to a progressive decrease in the tensile properties of the hair. Research grade hair was cut into five segments from the root to the distal end. Lipids from each segment were extracted and analyzed by thin-layer chromatography in conjunction with photodensitometry. The major free polar lipid classes in the hair included ceramides, glucosylceramides and cholesterol sulfate. The concentrations of all of the free polar lipids as well as the covalently bound fatty acids decreased in going from the root to the distal end of the hair. In addition, there was a significant reduction in tensile properties of the hair from the root to distal end. In conclusion, the progressive loss of endogenous free and covalently bound lipids from hair, which are probably related to normal weathering of the hair and grooming practices, may help contribute to a marked decrease in tensile properties to the hair.

Determination of phthalate esters in cosmetics by gas chromatography with flame ionization detection and mass spectrometric detection

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A gas chromatography coupled with flame ionization detection (GC-FID) and mass spectrometric detection (MSD) method was developed to determine the six kinds of phthalate esters [dimethyl phthalate (DMP), diethyl phthalate (DEP), di-n-butyl phthalate (DBP), benzyl butyl phthalate (BBP), di(2-ethylhexyl) phthalate (DEHP) and di-n-octyl phthalate (DOP)] in cosmetics (solid, cream and liquid cosmetics). The cosmetics were extracted with methanol by ultrasonic and then separated with high-speed centrifugation. The upper clear layer was dried and filtered through a 0.45 lm pore diameter filter. The filtrate was injected into GC-FID/GC-MS for detection. GC-FID chromatogram was applied for qualitative analysis, external standard method was used for quantitative analysis. Confirmation of phthalate presence was undertaken by GC-EI-MS. The recovery range of all phthalates were between 92.0 and 110.0% with relative standard deviations between 1.95 and 5.92%. The low detection limits of the method were: 0.1 ng for DMP, DEP, DBP and BBP, 0.5 ng for DEHP and DOP. The method had advantages of high precision and sensitivity, simplicity of pretreatment. The method can be used to test the six kinds of phthalate esters in cosmetics.

Clinical and instrumental evaluation of a food supplement in improving skin hydration

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Topically applied cosmetic products can be helpful in improving skin hydration. The study shows how oral supplementation could be helpful in improving and preventing the skin dehydration. A total of 32 healthy female volunteers entered the study. Of which, 16 were treated with a food supplement based on vegetable ceramides, amino acids, fish cartilage, antioxidants and essential fatty acids for 40 days and 16 with placebo. The results of the clinical and instrumental evaluations carried out in this study, have highlighted how the active treatment is effective in improving skin hydration and in reducing the cutaneous smoothness and roughness and the depth of furrows, in comparison to the placebo. In fact, concerning several important parameters, as stratum corneum hydration and skin roughness, the improvement measured exceeded 25%. We therefore suggest that a combination of treatments (oral and topical) can be more effective in improving skin hydration.

Systemic evening primrose oil improves the biophysical skin parameters of healthy adults

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Biophysical skin parameters are indicators of agerelated structural and functional changes in skin tissues. This randomized, double-blind, placebocontrolled study in healthy adults tested the effect of Efamol evening primrose oil [EPO, a gamma-linolenic acid (GLA) containing vegetable oil] on skin moisture, transepidermal water loss (TEWL), redness, firmness, elasticity, fatigue resistance and roughness. Efamol EPO was administered orally in soft gel capsules, 3 · 500 mg b.i.d. for 12 weeks. Measurements were taken at baseline and at weeks 4 and 12. The two treatment groups did not differ at baseline and at week 4. At week 12, however, all measured variables, with the exception of skin redness, were significantly different in the EPO group compared with placebo. Skin moisture, TEWL, elasticity, firmness, fatigue resistance and roughness had significantly improved by 12.9, 7.7, 4.7, 16.7, 14.2 and 21.7%, respectively. The two-sided levels of significance in favour of the EPO treatment ranged between 0.034 and 0.001. These findings lend further support to the notion that GLA is a conditionally essential fatty acid for the skin, i.e. it is unable to synthesize GLA, and therefore depends on preformed GLA for optimal structure and function.

Elastic vesicles as topical/transdermal drug delivery systems

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Skin acts a major target as well as a principle barrier for topical/transdermal drug delivery. Despite the many advantages of this system, the major obstacle is the low diffusion rate of drugs across the stratum corneum. Several

methods have been assessed to increase the permeation rate of drugs temporarily. One simple and convenient approach is application of drugs in formulation with elastic vesicles or skin enhancers. Elastic vesicles are classified with phospholipid (Transfersomes_ and ethosomes) and detergent-based types. Elastic vesicles were more efficient at delivering a low and high molecular weight drug to the skin in terms of quantity and depth. Their effectiveness strongly depends on their physicochemical properties: composition, duration and application volume, and entrapment efficiency and application methods. This review focuses on the effect of elastic liposomes for enhancing the drug penetration and defines the action mechanism of penetration into deeper skin.

Comparative assessment of the performance of two generations of Tewameter_: TM210 and TM300

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The measurement of transepidermal water loss (TEWL) has been established as one of the main parameters in the assessment of skin barrier function. One of the most widely employed devices to measure TEWL is the Tewameter_. Courage and Khazaka launched the TM300 in 2003 and successfully eliminated some of the limitations of the previous model. In the more recent device, the sensors inside the probe head can be pre-heated to a temperature close to that of the skin, which considerably decreases sampling time. Additionally, the new technology of the probe does not require frequent and time-consuming recalibration with different solutions. The main objective of this work was to perform a comparative assessment of the performance of the two different Tewameter_ models. Fifteen volunteers were used in this study, which was conducted in the mid-portion of the volar forearm. The standard measurements assessed differences in the basal values, time necessary for a stable value and coefficient of variability under normal and extreme conditions. The dynamic measurements performed were based on a plastic occlusion stress test (POST), involving the application of an occlusive patch for 24 h, after which the TEWL desorption curves were recorded. A mathematical model was adjusted to the data points using a specially modified simplex routine. Calculated parameters considered relevant to the study were t1/2evap (evaporation half-life) and dynamic water mass (DWM). Results show slight differences in the performance the two models, which are nevertheless statistically significant. The TM300 seems to be more sensitive to differences in TEWL and presents a much quicker measurement capacity. These results confirm a marked improvement in the more recent Tewameter_model, when compared with its predecessor. The main conclusion of this work is that caution is advised when comparing results obtained with the two different models and that studies should be carried out entirely with the same device.