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## STUDIES LIST SKIN-pH-METER®

*Tronnier, H.Kuhn-Bussius, Zur Brauchbarkeit optischer Methoden für die Bestimmung des Hautoberflächenfettes*, Hautklinik Dortmund, Kosmetologie 06/1974

*S. Dikstein, Instrumental Analysis in Individual Cosmetic Consultation*, Cosmetics & Toiletries, Vol. 98, Nov. 1983

*Zlotogorski, Distribution of skin surface pH on the forehead and cheek of adults*, Arch Derm Res, 1987

The skin surface pH on the forehead and cheek of 574 men and women aged 18/95 was measured. No differences were found between men and women regarding forehead and cheek pH distribution. The group over the age of 80 showed higher pH values on both the forehead and the cheek. In 89% of the subjects measured, the skin surface pH on the cheek was higher than on the forehead. The central 90%, i.e., the "representative range", for the population below the age of 80 is between 4.0-5.5 on the forehead and between 4.2-5.9 on the cheek.

*Korting, Bau, Baldauf, pH-Abhängigkeit des Wachstumsverhaltens von Staphylococcus aureus und Propionibacterium acnes*, Ärztliche Kosmetologie,01/02/1987

Five different cutaneous isolates of staphylococcus aureus and seven of propionibacterium acnes were investigated in a buffered liquid medium with respects to the dependence of their growth on different pH-values kept constant. With both species a strong dependence of the growth rate on the pH-value was found. The S. aureus strains showed a distinct value of optimum of growth at pH 7.5 with P. acnes a range of optimum growth could be determined between pH 6.0 and 6.5. The conclusion can be drawn that even minor shifts of the skin pH from its normal value of 5.5 towards more alkaline values- as they result from washings with soaps- remarkably enhance the growth of P. acnes while a similar phenomenon could only be expected from major shifts with respects to S. aureus.

*S. Dikstein, The normal range of the skin`s parameters*, o.V., o.J.

In order to define the normal values of any measurement, we have to study its variation in the population according to age, sex, etc. We wish to present the normal biological variation and the age dependency of the following parameters on the forehead skin of women: Indentation, as measured by low-pressure indentometry; Elastic recovery (rebound), as measured by low-pressure indentometry; Skin slackness, as measured by levarometry, and Skin surface pH, as measured a by pH meter equipped with a planar surface electrode. Statistical analysis showed age dependence of these parameters. The mean values at the ages of 20 and 70, were respectively; low pressure indentation:0.043-0.054 cm, elastic recovery: 80.5%;-65.5%; levarometry (slackness). 0.037-0.068 cm; and skin surface pH:5.25-5.61. The correlation coefficient was low but significant at  $p < 0.05$  for indentometry, elastic recovery and skin surface pH (0.21-0.32-0.16) and good for levarometry (0.57). The above measurements and calculations allowed us to decide on the "normal" versus "desired" range. In analogy, for an antipyretic drug we need to know at

what body temperature to start using it and what the desired normal temperature is. Such analysis is very important if we wish to develop skin care products with scientifically proven value to combat aging aspects of the skin.

*Elsner, Maibach, Ein PC/AT - gestütztes Datenerfassungssystem für das Hautphysiologielabor, Workshop "Computer in der Dermatologie", 6.10.1989*

Für die quantitative Untersuchung physiologischer Parameter des Hautorgans wurde eine Reihe nichtinvasiver Methoden entwickelt, die Anwendung v.a in der Dermatopharmakologie und der Dermatotoxikologie gefunden haben. Zu diesen Methoden zählen die Evaporimetrie zur Messung des transepidermalen Wasserverlustes, konduktive und kapazitative Verfahren zur Messung des epidermalen Wassergehaltes und die Messung der Hautdurchblutung mittels des Laser-Doppler-Verfahrens. Die Reproduzierbarkeit von Evaporimeter- und Laser-Doppler-Messungen wird durch dynamische Veränderungen der Meßgrößen beeinträchtigt. Ferner fallen bei experimentellen Studien mit den genannten Geräten erhebliche Datenmengen an, deren manuelle Erfassung unökonomisch ist. Wir haben daher ein Datenerfassungssystem entwickelt, mit dem die Meßwerte von Hautoberflächen-Thermistor, Evaporimeter, Kapazitometer, pH-Meter und Laser-Doppler direkt in ein Spreadsheet auf einem PC eingelesen und sofort statistisch ausgewertet werden können. Hardwareseitig besteht das System aus einem AT-kompatiblen Computer mit 2 seriellen Schnittstellen und einem Metrabyte DAS-16-A/D-Board, das die simultane Erfassung von bis zu 16 Datenkanälen erlaubt. An Software werden Lotus 1-2-3 und Lotus Measure eingesetzt. Der Aufbau des Systems und Einsatzmöglichkeiten werden erläutert.

*U. Zeidler, Einfluß des pH-Werts von Körperreinigungsmitteln auf die Hautquellung, Forschung Klinik Praxis, 1989*

The epidermis, especially the horny layer, frequently comes into contact with cosmetic cleansing agents containing surfactants. Interactions are characterized among other things by swelling processes. Swelling was investigated on isolated pig epidermis which had been treated with different surfactants at varying pH-values. With increasing pH-value, anionic surfactants increased epidermal swelling, whereas it decreased by treatment with cationic surfactants. Amphoteric surfactants increased swelling in both acid and basic solution and formed a minimum in the neutral range. The degree of ethoxylation, the chain length and the type of anionic group changed the swelling behaviour characteristically at varying pH value. The results obtained show that swelling, as an osmotic process, is primarily attributable to ionic interactions between the surfactant ions and the amphoteric protein structure, but it is also influenced by hydrophobic interactions. Increased swelling of the superficial skin layer can favor the extraction of lipids and moisturizing factors, thereby promoting dryness and roughness of the skin. Therefore, the knowledge of the swelling behaviour can contribute to the development of improved cleansing agents leading to minimal swelling.

*M. Gehse, pH-Wert der jungen und der reifen Haut und seine Beeinflussung durch waschaktive Substanzen, Kosmetik International 08/89*

*J.L. Antoine, J.L. Contreras, D. van Neste, pH Influence on surfactant-induced skin irritation, Dermatosen in Beruf und Umwelt, Band 37, 1989, 3, 96 - 100*

Even though various experimental methods have been proposed for in vitro testing of detergents such as SLS ( sodium laurylsulfate) no absolutely relevant clinical information can be inferred from them as to the irritancy of a given compound. In particular the relative importance of pH needs further assessment. This study reports on in vivo evaluation of skin function changes under given experimental conditions with SLS applied at 3 different pH values. There is a dramatic increase of transepidermal water loss (TEWL), i.e. a substantial reduction in the barrier function of the skin, when SLS is applied under occlusion for 48 H. The alkaline control solution (NaOH pH 9) induced low-grade, but significant TEWL increases, as compared to the other controls ( distilled water pH7; HCl pH5), which had no influence on TEWL. The changes obtained with the controls were much lower than those observed with SLS. The barrier-function changes induced by the surfactant SLS could, however, promote transepidermal passage

of acid and/or alkaline molecules, hence increasing toxic damage of the skin; yet no such effects could be observed, indicating that the main effects are due to detergency. Assessment of cutaneous blood flow values (CBFV) by laser Doppler velocimetry showed increased values after SLS. When pH-adjusted SLS solutions were compared, there was neither a difference in relation to pH nor did the control solutions induce any significant CBFV change. This study reveals that TEWL and CBFV are probably the most reliable methods to investigate acute irritancy by SLS. Accordingly, pH cannot be considered as a major contributive factor of irritancy when SLS solutions are applied under occlusion (48H). The current level of sebaceous secretion and the electrical properties of the skin surface were not parameters to evaluate acute SLS-induced skin damage, but longitudinal studies are presently being conducted in order to assess their significance in monitoring epidermal repair after SLS insults.

**W. Gehring, Die Bedeutung des pH-Wertes bei der Hautreinigung (The importance of the pH in skin cleansing), M. Gloor, Parfümerie + Kosmetik, 04/90**

The irritant potential of the pH was determined according to morphological criteria by using frozen sections of human skin. In vivo the dehydrating effect on the cornea was analysed by means of corneometry and infrared spectroscopy after washing the skin with a surfactant solution adjusted to different pH values. No morphological changes were produced in the range of pH 4-pH 8. The least dehydration of the cornea was caused by surfactant solutions which were adjusted to an acidic pH.

**A. del Pozo, Carras Cosa, Dispensacion dermofarmacutica: Apoyo tecnologico al rol del Farmaceutico, Departamento de farmacia, Unidad docente de Farmacia Galenica, Universidad de Barcelona, 1991**

**Seiler, Rückfettung: Balsam für die Altershaut, Moderne Geriatrie, 03/91**

**W. Gehring, M. Gloor, Angelika Post, Über den Einfluß der Hautwaschung auf den pH-Wert (About the effect of skin-washings on pH-value), Parfümerie + Kosmetik, 11/92**

A report is given about the effect of skin-washings with sodium lauryl sulfate on alkali-neutralisation, pH-value, moisture in the stratum corneum on the skin surface (infrared spectroscopy) and in the depth (corneometry). Capacity for alkaline neutralisation, pH-value and moisture in the depth of the stratum corneum normalized very slowly. In contrast, moisture in the upper stratum corneum normalized after only four hours. Repeated washings after two and five hours respectively did not lead to any significant changes in the mechanisms of regenerations. Changes of pH-value and moisture in the stratum corneum normalized in a similar way after the first and second washing. The relationship between the capacity of the skin for alkaline neutralisation and the water-binding substances in the depth of the stratum corneum is discussed.

**G. Yosipovitch, E. Tur, O. Cohen, Y. Rusecki, Skin Surface pH in Intertriginous Areas in NIDDM Patients, Diabetes Care, Volume 16, No. 4, April 1993**

We measured the skin surface pH and moisture in the axillary, inframammary, inguinal, and forearm skin with a pH meter with a flat-glass electrode and skin corneometer. The subjects were 50 NIDDM patients from the diabetic outpatient clinic at Bellinson Medical Center, Petah Tiquva, Israel, and 40 healthy control subjects from hospital personnel. The main outcome measures were skin surface pH, skin moisture, and skin culture for *Candida*.

**R. Marks, C. Edwards, Methods to aid the choice of shade from a range of colour disguise cosmetics, University of Wales College of Medicine, 26 May 1993**

The range of cosmetic camouflage products for major disfiguring skin conditions are well known, and are available in a wide range of shades. They require considerable skill and training for their blending and application which also needs a finishing layer of powder for best effect. These products are admirably suited to their use on major blemishes, but would be difficult to apply by a consumer at home for minor blemishes.

*A.M. Grunewald and M. Gloor, Value of barrier creams against skin damage due to repeated washings*, Second International Symposium on Irritant Contact Dermatitis (ISICD), Zurich, April 14-16, 1994

The aim of our study was to evaluate the protective effect of barrier creams onto irritant contact dermatitis. Therefore the following skin function parameters were evaluated: corneal lipids (sebumetry), water content of the corneal layer (corneometry), transepidermal water loss (TEWL), pH of the skin, skin reddening (colorimetry) and skin blood flow (laser doppler flow). We did standardized washings of both arms on the first and the 8th day. The subjects were asked to wash 5 times daily for one week.

In a first study we evaluated the irritating effect of repeated washings with 0.01 mol/l sodium lauryl sulphate solution on 20 subjects. We were able to show that there is a more than 12 hours lasting change in skin function parameters after one week of repeated washings. Concerning corneometry, corneal lipids, tewl, pH and laser doppler flow there were highly significant differences before and after repeated washings ( $p < 0.01$ ). In a second study we evaluated the irritation reducing effect of 3 barrier creams on 15 subjects for each cream. Using the same method as in our first study, one selected arm was additionally treated with a barrier cream 5 times daily. Barrier creams had a highly significant ( $p < 0.01$ ) effect on laser doppler flow, corneometry and tewl. Nevertheless they were not able to offer complete protection. The different barrier creams showed significant differently positive effects onto skin function parameters.

*W. Matthies, Assessment of skin compatibility of consumer products / Current strategy and methods in industry (exemplified on a dishwashing liquid)*, Second International Symposium on Irritant Contact Dermatitis (ISICD), Zurich, April 14-16, 1994

Improvement of skin compatibility is a priority task in formulating consumer products. Experience shows, that control of typical skin diseases like desiccation eczema of the hands may be reached by adequate protection and skin care, but these proportions being not always followed by the consumer. Therefore, it is a special task for industry to optimize products with respect to skin compatibility using milder surfactants, refatting agents, or other caring substances, whenever possible.

Decisive instruments for improvement of formulations are standardised test models, which help comparing characterising and quantifying effects of formulations for their differentiation, and generating use related data.

Modern laboratories work with in vitro screening, e.g. cell culture techniques, skin explants or physiologic membranes in order to evaluate toxic effects of substances and formulations (Neutreal red test, skin culture, HET-CAM Model on the Chorioallantoic membrane of hen's eggs). After generating those screening data, further investigation can be performed directly in human volunteers, if general toxicity for man can be assessed as negligible and local tolerance is foreseeable good.

In humans maximal short term exposition (contact with undiluted product) can be tested in an open epicutaneous test after Burckhardt. This model is suitable for classification of products according to their irritation potential, but also for assessment of use conditions, when the product is intended to be used for short time contact with the skin, only.

Occlusive patch test techniques are useful for comparison of numerous variants in the same individual regarding primary irritation and kinetics of local toxic effects. Besides primary irritation mainly chapping and dryness reactions give hints for different mechanisms of action of substances on or in the stratum corneum. Assessment of the in-use situation needs test methods, which reflect the foreseeable overuse/misuse or the real home use condition. Measurements of physiologic function with physical methods (Laser Doppler Flow, TEWL, Capacity, pH-value measurement, image analysis etc) enable the investigator to objectify results and to survey studies with larger numbers of participants who are using products under real use conditions. As an example results with a new dishwashing liquid show, that this procedure is suitable to demonstrate improvement of products towards better compatibility which also can be experienced by the consumer condition.

*S. Sirigu, S. Giogilli, C. Dederen, **Functionality and Mildness of Solid Detergents: A Study of Correlation among Formulative Aspects, Instrumental Data and Sensorial Results***, 18th International IFSCC-Congress, Venice, October 1994

The aim of our study was to find a correlation between chemical and formulative aspects of different solid detergents and their features of functionality, skin mildness and sensorial properties. Eight different products were chosen for the test: five syndets, two combars and one alkaline soap. Several cutaneous parameters were investigated in vivo, by using different techniques of measure. The cutaneous innocuity was evaluated on 15 volunteers by means of an occlusive 48 hours patch test. Skin compatibility (respect of pH physiological values, skin barrier functionality and skin roughness) was evaluated on 12 subjects before and after repeated standard washing with the products. Measurements were taken for TEWL, pH skin colorimetry and image analysis. Sensorial performances were assessed, according to the Quantitative Descriptive Analysis method by a panel of 12 well trained evaluators. Results obtained from different methods were then correlated. As far as the cutaneous compatibility is concerned, correlations were found between visual and colorimetric evaluations of acute irritation, and between acute irritation and composition. No correlation was found between repeated wash test results and acute irritation. A good correlation was evidenced by comparing instrumental dryness and roughness evaluations with the correspondent skin sensorial perceptions. Sensorial foam evaluations were well correlated to the composition.

*B. Seybold, K. Seidel, K. Beck-Devalle, F. Hevert, K. Klein, T.L. Diepgen, **Distribution and Variation of Basic Physiological Characteristics of Uninvolved Skin in the General Population - a Bioengineering Study***, The 10th International Symposium on Bioengineering & the Skin, Cincinnati, Ohio, June 13-15, 1994

*S.R. Hartmann, H. Pietsch, G. Saueremann, R. Neubert, **Untersuchungen zur Hautverträglichkeit von alkoholischen Händedesinfektionsmitteln***, *Dermatosen* 42, 6, 241-245, 1994

Ziel der vorliegenden Arbeit war die Untersuchung der Wirkung von alkoholischen Händedesinfektionsmitteln auf die menschliche Hautoberfläche hautgesunder, volarer Unterarme. Die Untersuchung erfolgte im Rahmen einer Cross-over Studie über einen Beobachtungszeitraum von acht Monaten an 56 randomisiert ermittelten Probanden unter praxisrelevanten Bedingungen. Die Studie fand von September 1992 bis April 1993 statt. Die 56 Probanden waren Mitarbeiter einer pharmazeutischen Firma. Ein Unterarm aller Mitarbeiter wurde volar im Durchschnitt sieben mal pro Arbeitstag im Rahmen der Vorschriften über die hygienische Händedesinfektion behandelt. Der andere Kontrollunterarm blieb während des gesamten Beobachtungszeitraums unbehandelt. Behandelte Areale konnten mit den unbehandelten Arealen verglichen werden. Die Erfassung und Beurteilung möglicher Hautzustandsveränderungen erfolgte durch dermatologische Bewertung und durch sechs weitere Untersuchungsmethoden. Bestimmt wurden: Grad der Schuppung der Haut (Abschuppungsrate), Hautfeuchtigkeit, Haut-pH-Werte, transepidermaler Wasserverlust (TEWL), Hauttemperatur und Hautmikrotopographie. Der Einfluß saisonaler Gegebenheiten wie Außentemperatur und Luftfeuchtigkeit auf unbehandelte wie behandelte Areale konnte durch die vergleichende Versuchsanordnung berücksichtigt werden. Die Abschuppungsrate lag an den behandelten Arealen an den meisten Meßzeitpunkten unter dem Niveau der unbehandelten Areale. Der TEWL lag an den behandelten Arealen zu jedem Meßzeitpunkt hochsignifikant über dem Niveau der unbehandelten Areale.

*D.A. Comes, E.J. Fendler, M.J. Doland, R.A. Williams, Poster Presentation, **Skin Bioengineering Instrumentation: Automation and Use***

*H.C. Korting, **Rationale der Hautreinigung mit sauren Syndets***, 38. Tagung der Deutschen Dermatologen Gesellschaft, Berlin, 29. April - 03. Mai 1995

*E. Weißhaar, R. Sabel, C. Smith, M. Coißbau, E.-M. Röpke, H. Gollnick, Does a New Lipidizing Agent in a Medical Soap Prevent Lipid Loss Induced by Repetitive Washing, Skin Pharmacology Society: 12th Annual Meeting 1995*

Skin care e.g. choosing a suitable soap is an important factor in preventing skin disease. Various medical soaps claim to minimize the strain put on the skin by repetitive washing. The aim of this study was to determine whether a new relipidising agent in a medical soap which supposedly counteracts lipid loss induced by repetitive washing leads to a significant change in transepidermal waterloss, pH, sebum excretion and 8 epidermal lipids.

*J. Welzel, pH and Ions, Biogeninering of the Skin: Methods and Instrumentation, CRC Press 1995*

In the early part of the century skin pH was investigated using colorimetric methods. pH indication showed changes in different pH ranges. A large area of skin was required for the use of several indicators. A simplification of this method was the foil colorimetry in which indicator-impregnated sheets of adsorbing strips were placed on the skin with a drop of water.

*J. Woodruff, Testing time, Cosmetics, June 1996*

In his continuing series on impending EC cosmetics-legislation, John Woodruff looks at the requirements for proof of efficacy, and takes a trawl around available testing facilities.

*N. Issachar, I. Gall, C. Gall, C. Carduner, M.C. Poelman, The Behaviour of Sensitive Skin Against Lactic Acid Aggression. Proceedings of the 19th IFSCC Conference, Sydney.10/96*

There is an important need for screening methods which can detect and distinguish the relative discomfort caused by cosmetic formulations for an increasing part of the population. Indeed when certain materials are applied to the skin, some persons report subjective complaints such as burning, stinging, itching, tight feeling, and sometimes, exhibit signs of irritation. This peculiar susceptibility is not hardly documented. The aim of our study was to find a quantitative test to identify subjects who present this unusual susceptibility to cosmetic products, using lactic acid as a stinging reagent.

A preselection of reactive subjects "stingers" among volunteers was firstly carried out by application of a 10% aqueous solution of lactic acid on the nasolabial fold. The stinging effect is scored each minute during 10 minutes, over a range from 0 (no stinging) to 3 (severe stinging). The mean values allow to select 15 "stinger" and 15 "non-stinger" volunteers. The kinetic of skin pH of the stingers and non stingers after lactic acid application under the same conditions was checked.

The data pointed out that the kinetic of the pH-sensitive skin is significantly different from normal skin: pH increases faster on sensitive skin than on normal skin.

These findings support the suggestions that individuals who behave as stingers may have an enhanced buffering ability, or a more permeable stratum corneum, compared to people with normal skin.

The measurement of the recovery of the cutaneous pH in subjects with sensitive skin versus normal skin could be a useful tool for a better understanding of this phenomenon.

*D.A. Comes, E.J. Fendler, M.J. Dolan and R.A. Williams, Bioengineering Instrumentation: Automation and Use. Skin Research and Technology, Vol.2, No.4, Nov. 1996*

Objective: The increasing complexity and use of bioengineering skin test instrumentation has created a critical need for unified software that controls the instruments, collects and stores data, performs analysis, and generates reports. In this study, user-friendly software programs were developed and applied to perform panel testing on a large number of test subjects utilising bioengineering skin test instrumentation.

Methods/Results: Generic software programs were developed to integrate and automate operation, data storage, and data analysis of multiple bioengineering skin instruments. The software was applied to the following instruments:- Courage and Khazaka - Sebumeter SM810, Corneometer CM 820, skin pH-meter 900, Tewameter TM210; Minolta Chromameter CR300, and NOVA DPM 9003. Conclusions: Automation of skin bioengineering instrumentation allows evaluation studies to be performed using a

large number of test subjects (with multiple variables). This greatly increases the statistical validity of data and overall efficiency, whilst negating the historical constraints which required a large commitment of resources.

*F.L. Ruedisueli, N.J. Eastwood, N.K. Gunn, T.G.D. Watso, Skin pH in Dogs of Different Breeds. Skin Research and technology, Vol. 2, No.1 February 1996*

Normal skin pH in humans ranges from pH 5.4-5.9, but can vary between anatomical sites. No such pH data are known for dogs. In this study skin pH was measured in dogs of different breeds, demonstrating variation between measuring sites, breeds, sex, and coat colour. All animals were fed the same commercial dry dog food. Skin pH was measured with a flat membrane skin pH meter (Courage and Khazaka, Germany) on the head, pinna, flank, axillary and inguinal region. All sites were clipped except head and pinna. The mean pH for 12 Labradors, measured over 5 days, for flank, head, and pinna were (mean±SE) 7.48±0.04, 8.10±0.06 and 6.11±0.03, respectively. Inguinal and axillary measurements showed day-to-day variability. For interbreed comparison skin pH on the flank was measured on three male and three female Miniature schnauzers 7.25±0.17, Springer spaniels 6.65±0.08, Yorkshire terriers 7.71±0.13, and Labrador retrievers 7.13±0.10. The overall data showed effects of site ( $p<0.001$ ), sex ( $p<0.001$ ; males>females<9, neutering( $p<0.01$ ; neutered>entire), colour( $p<0.01$ ; black>yellow) and breed( $p<0.01$ ) and a sex effect within breeds. These findings demonstrate that skin pH measurements are possible in dogs and that the variability due to site, sex, breed, and coat may be important in the aetiology and management of dermatological disorders in relation to susceptibility, hypersensitivity, and treatment response.

*K.P. Wilhelm, proDERM institut for applied Dermatological Research GmbH, Schenfeld, Germany. Client-Server based On-Line Data Acquisition for Skin Bioinstrumentation Devices.*

During dermatological safety and efficacy studies, huge amounts of data- both instrumental data as well as evaluator scores may accumulate. We have developed an integrational data with on-line data acquisition capability. The program runs in a Macintosh network. A graphical interface facilitates data entry. A multilevel password system secures unauthorised use. In order to comply with GCP/GLP requirements all data entries and any possible changes relating to experimental studies- both scores and instrumental values -are secured in a log file together with date, time, and initials of the person entering the data. The program can at present acquire data from: Chromameter(Minolta), Tewameter, Corneometer, pH-Meter, Sebumeter, Mexameter,(all Courage and Khazaka). However, the open architecture would easily allow to incorporate more instruments with a serial interface. Data can be exported in DOS, windows or Macintosh format for easy import into any spreadsheet or statistics programs. The program has been completely validated and successfully used in a contract research organisation for over 12 months. Automatic data acquisition has proven to be very useful tool to facilitate and speed up data analysis and to enhance the quality and reliability of test results.

*JS. Dikstein, Inna Oreper, Liquid Make-up and Skin Surface pH. Skin Research and Technology, Vol.2, No.4, Nov 1996.*

It was suggested that, if a cosmetic agent changes the skin surface pH outside its normal range for more than 3 hours, then a chronic study is indicated to show lack of undesirable side effects (Biogeng. and Skin 1, 57-58, 1985), since it is desirable to keep any skin parameter within its „representative" or „desired" range.

*M.A.Francomano, K. Mantovani, P. Pepe, A. Di Nardo and S. Seidenari, Basline Biophysical Skin Parameters in Subjects with Sensitive Skin. Skin Research and Technology, Vol.2, No.4, Nov 1996.*

*Yosipovitch, G. MD; Maibach Howard I. MD, Skin Surface pH: A Protective Acid Mantle. Cosmetics & Toiletries Magazine Dec 1996.*

*M. Arens-Corell, Reinigung und Pflege der Babyhaut, Kosmetische Medizin 1997 18,2*

Baby skin is highly sensitive concerning dehydration and irritation. Mild cleansing agents with maximum skin compatibility and adaptation of the pH of the cleansing product to 5.5 in accordance with the developing acid mantle of the skin are necessary. For skin care water-in-oil emulsions with a strong protective effect are predominantly used. Occlusion has to be avoided. Skin compatibility and care effect should be examined by Dermatologists. The diaper region must be protected from urine and feces by mild cleansing and special creams.

*A.O.Barel, R. Lambrecht, P.Clarys, B.M.Morrison, M.Paye, Comparative study of the effect on the skin of two soap bars in normal use and in the soap chamber test*, Experimental Dermatology Vol 6 No 5, ISICD and ISBS Meeting Rome 2-4 October 1997

A double-blind study of the normal use during 10 weeks of two soap bars (soap and a syndet) was carried out on 25 female subjects. Eventual skin changes were evaluated by bioengineering measurements during the ten weeks treatment. Characterization of the skin was carried out using measurements of the skin colour, hydration, skin surface pH and TEWL.

*E.J. Fendler, M.J. Dolan, and R.A. Williams, Characterization and Treatment of Occupational Contact Dermatitis*, GOJO Industries 1997

*N.Issachar, Y.Gall, M.T.Borell, M.C.Poelman, pH measurements during lactic acid stinging test in normal and sensitive skin*. Contact Dermatitis, 1997

*T. Hariya, K. Inoue, Y. Umino, H. Ichikawa, Alteration of physiological parameters and the amount of skin sIgA in sensitive skin*, Australian Journal of Dermatology: Abstracts 19th World Congress of Dermatology, Sydney, June 1997

In recent surveys, more than 30% of healthy female as well as patients suffered from certain skin diseases such as atopic dermatitis or rosacea-like dermatitis believe that they have sensitive skin, and the population of this group has been expanding. It has been reported that a symptom of atopic dermatitis is influenced by exacerbating factors such as physical conditions. In this study, we examined the effects of these exacerbating factors on skin physiological parameters and secretory IgA amount in healthy female volunteers with sensitive skin.

*T. Fischer, C. Greif, W. Wigger-Alberti, P. Elsner, Instrumentelle Methoden zur Bewertung der Sicherheit und Wirksamkeit von Kosmetika*, Kursprogramm Sicherheitsaspekte in der Kosmetik, Basel, Mai 1998

Durch die Erfordernisse eines Wirksamkeits- und Sicherheitsnachweises für Kosmetika gewinnen nichtinvasive biophysikalische Meßmethoden zunehmend an Bedeutung. Neben der Bestimmung des transepidermalen Wasserverlustes und der Messung der Hautfeuchtigkeit, des Oberflächenfettes, des pH-Werts, und der Elastizität kommen der Bestimmung des Oberflächenreliefs, der Farbe und der Hautdurchblutung große Bedeutung zu. Mit diesen Methoden können u.a. die hautfeuchtigkeitsfördernden, glättenden und straffenden Wirkungen von Topika sowie der Grad der Irritation durch Externa valuiert werden. Zur Messung der Vergleichbarkeit dieser unterschiedlichen Funktionsparameter sind standardisierte Meßbedingungen erforderlich.

*Dr.R. Ward, The Human Factor* - SPC March 1998

With the proposed ban on animal testing on the horizon, Dr. Rachel Ward looks at the ethical aspects of human volunteer testing.

*M. Arens-Corell, J. Welzel, HH Wolff, Beurteilung von Hautreinigungsmitteln für trockene und empfindliche Haut*. Kosmetische Medizin 1/1998.

Die zunehmende Problematik trockener und empfindlicher Haut in der Bevölkerung macht die Entwicklung geeigneter Reinigungsmittel notwendig. Ihre Hautverträglichkeit und minimierte

Austrocknungswirkung kann in dermatologisch kontrollierten Anwendungsbeobachtungen unter Einbeziehung der Messung hautphysiologischer Parameter objektiv geprüft werden. Das Beispiel eines Duschöls und einer Waschemulsion für trockene und empfindliche Haut zeigt, daß durch einen hohen Ölanteil ebenso wie durch die Auswahl milder Syndetsubstanzen bei Anpassung des pH-Wertes im Hautphysiologischen, leicht sauren Bereich die Hautreinigung unter Praxisbedingungen ohne Austrocknung und Irritationen möglich ist.

#### **Einfluß des pH-Wertes von Kosmetika.** Kosmetische Praxis 2/98

Der saure Oberflächen-pH-Wert der Haut erfüllt wichtige Schutzfunktionen. Über die Einwirkung von Reinigungsprodukten auf die Residentflora, die Barrierefunktion und die Regeneration der Haut liegen umfassende Untersuchungen vor. Wie übersieht es beim pH-Wert von Hautpflegepräparaten aus, die auf der Haut verbleiben ?

#### **Sauer und alkalisch.** Kosmetische Praxis 2/98

Der pH-Wert der Hautoberfläche schwankt zwischen 5,0 und 6,0. Da Lösungen mit einem pH-Wert kleiner als 7 sauer reagieren, zeigt die Haut demnach eine saure Reaktion. Dieser Säuremantel hemmt die Aktivität krankmachender Bakterien und Pilze. Mit ein wichtiger Grund diesen Säureschutzmantel nicht zu zerstören.

*J. Gottfreund, T. Meyer, Die Bedeutung des pH-Wertes 5,5 in Emulsionen.* Kosmetische Medizin Nr. 3, 1998.

Es wird die Bedeutung des pH-Wertes 5.5 in Emulsionen dargestellt. In einer W/O-Emulsion wurde der pH-Wert der Wasserphase auf einen Wert von 5,5 eingestellt. Es ließ sich zeigen, daß der durch Umwelteinflüsse tiefe pH-Wert der Haut sich an 5,5 anpaßt. Bei der Auswahl der Rohstoffe für den Fettkörper einer Emulsion müssen die speziellen Bedingungen, die durch den pH-Wert bedingt sind, berücksichtigt werden.

*St.B. Hoath, D.E. Bare, K.A. Munson, M.O. Visscher, R.R. Wickett, Changes in Stratum corneum Hydration, Acidity, And Optical Properties in Newborn Infants During The First Hours of Life.* 12th ISBS, Boston, 06/98.

*E. Berardesca, S Lazzarini, F. Pirot, M. Singh, H.I. Maibach, Racial Differences in pH and TEWL Gradient into Superficial Stratum Corneum,* 12th ISBS, Boston, 06/98.

*Y. Yazan, M. Seiller, S. Avcier, M. Demirel, Comparison of Glycolic, Lactic and Glycolic + Lactic Acids in Multiple Emulsion Systems.* 20th IFSCC Congress Cannes, 09/1998

*D.S. Orth, J. Widjaja, L. Ly, N. Cao, Stability and Skin Persistence of Topical Products.* Cosmetics&Toiletries, October 1998.

Using several commercially available cosmetic and OTC-drug products, the authors determined the chemical stability of selected topical ingredients in a hydroalcoholic vehicle with 2% hydroquinone.

*F.Morizot, I. Le Fur, E. Tschachler, Sensitive Skin.* Cosmetics & Toiletries Vol.113, November 1998

Studies on skin reactions to irritant substances and topical preparations have a long history. Clinical signs and symptoms of irritant reactions in the dermatological sense are well defined and are synonymous with skin inflammatory reactions.

*Uta Bornschein, Der Schuß ins Waschwasser....* Die Schwester/Der Pfleger 12/98

Die Ganzkörperwaschung der Patienten durch Pflegende ist im Krankenhaus eine täglich wiederkehrende Verrichtung. In vielen Einrichtungen ist dafür ein Pflegestandard geschaffen worden. Dabei kommt es oft zu einer Diskussion um en Waschwasserwechsel, und dies nicht nur aus hygienischen Gesichtspunkten.

*C. Greif, W. Wigger-Alberti, M. Arens-Corell, P. Elsner, Beurteilung einer Körperlotion für trockene und empfindliche Haut.* Kosmetische Medizin Nr. 5, 1998.

In einer offenen kontrollierten Anwendungstudie über 3 Wochen wurde an 30 Probanden eine Body Milk auf Hautverträglichkeit und Wirksamkeit getestet. Dazu wurden folgende hautphysiologische Parameter erfaßt: Hautfeuchtigkeit, transepidermaler Wasserverlust, Hautelastizität, pH-Wert sowie Hauttemperatur.

*M. Bock, H.J. Schwanitz, Modulation der epidermalen Permeabilitätsbarriere durch die topische Anwendung von CO<sub>2</sub> – imprägniertem Wasser* klinische und hautphysiologische Untersuchungen. Allergologie 3, 03/1999

*T.Fischer, W. Wigger-Alberti, C. Greif, P. Elsner, Irritative Wirkung von abrasiven Reinigungsmitteln auf die Barrierefunktion der Haut.* Allergologie 3, 03/1999

*H+G Band 74, Heft 6, 1999. Hautmeßgeräte unentbehrlich für Klinik + Praxis*

Eine Notwendigkeit für die dermatologische Praxis ?

Die apparative Bestimmung von Hautparametern

*M. Maruno, FC Facco, PA Rocha Filho, Hydration, Oily and PH of Skin In Vivo Evaluation After Application of Both Simple and Complex Emulsions Containing Hydrolyzed Proteins.* IFSCC May 1999

*SH Perez Damonte, GM Cuomo, RL Galimberti, Evaluacion Instrumental de la Piel Sensible.* IFSCC May 1999

*E. Saling, Vaginale pH-Messung gibt rechtzeitig Alarm.* Medical Tribune Nr. 9 – 03/90

*B. Gabard, Dry Skin and the Cosmetic Benefit of moisturization.* Skin Research and Technology, Vol.5 No. 2, May 1999

*Arens-Corell, Einfluss des pH-Wertes von Kosmetika.* Kosmetische Praxis, Sonderdruck 2/98

Der saure Oberflächen-pH-Wert der Haut erfüllt wichtige Schutzfunktionen. Über die Einwirkung von Reinigungsprodukten auf die Residentflora, die Barrierefunktion und die Regeneration der Haut liegen umfassende Untersuchungen vor. Wie aber sieht es beim pH-Wert von Hautpflegepräparaten aus, die auf der Haut verbleiben?

*A. Fendl, Einzelheiten der Hautdiagnose.* Natürlich schön/Grundlagen der Ganzheitskosmetik, Handwerk und Technik – 1999

*S. Tamburic, Changing the Skin Surface,* Parfümerie&Kosmetik 11/12, 1999

As shown in this article personal care products exert different changes of skin surface pH, depending on their composition and pH status. The alteration in skin pH by soaps and detergents are not seen as a source of irritancy per se, but may be a contributing factor to skin malfunctioning. Skin pre-treatment with an anionic polymer-based lotion has proven to be non-efficient in terms of pH protection. The same lotion used after the washing with loap has shown an insant and profound effect in reducing the skin pH changes.

*M.O.Visscher,S. Maganti, K.A.Munson, D.E.Bare, S.B.Hoath, Early adaptation of human skin following birth: a biophysical assessment.* Skin Research and Technology, Vol.5, No. 4, November 1999.

Successful adapation to postnatal life requires rapid physiological transitions in multiple organ systems. Mechanisms regulating stratum corneum water interactions and evaporative heat loss, for example, are pivotal in making the transition from the warm, aqueous prenatal state to a cold, dry postnatal

environment. Understanding these mechanisms is important in formulating skin care guidelines in early infancy.

*I.Le Fur, C.Guinot, S.Lopez, F.Morizot, V.Lambert, E.Tschachler, Age-Related Reference Ranges for Skin Biophysical Parameters in Healthy Caucasian Women.* 13<sup>th</sup> ISBS Jerusalem, March 2000.

*S.Tamburic, Changing the Skin Surface.* Parfümerie + Kosmetik 11/12, 1999

*M.O.Visscher, S.Maganti, K.A. Munson, D.E. Bare, S.B.Hoath, Early Adaptation of Human Skin Following Birth: a Biophysical Assessment.* Skin Research and Technology, Vol.5, No. 4, November 1999

*M.Fischer, I.M.Schneider, R.Neubert, W.Wohlrab, Über den Einfluss methylverzweigter Fettsäuren auf die Barrierefunktion des Stratum corneum. Dermatosen in Beruf und Umwelt, 47/221-264/NovDez 1999*

*V.Lambert, I. Le Fur, Ch. Guinot, F. Morizot, S. Lopez, E.Tschachler, Comparaison des Parametres Biophysiques Cutanes en Hiver et en ete chez des Femmes Caucasiennes.* IIième Congrès de la Société D'Ingénierie Cutanéé, Juin 2000

*I.Le Fur, C.Guinot, S.Lopez, F.Morizot, V.Lambert, E.Tschachler, Age-Related Reference Ranges for Skin Biophysical Parameters in Healthy Caucasian Women.* 13<sup>th</sup> ISBS Jerusalem, March 2000 and Skin Research and Technology, Vol. 6, No. 3, August 2000

*N. Vidakovic, M. Primorac, M. Stupar, G. Vuleta, In Vivo Study: Influence of Polyacrylic Anticellulite Gels on Hydration and pH-Value of the Skin.* SÖFW-Journal 11-2000

The effect on hydration and pH-value of the skin has been investigated on 22 female subjects during the thirty-day treatment. The following formulations have been tested: polyacrylic gel with 2% of caffeine, ployacrylic gel with propylene-glycol plant extract of Ivy – 2%, Horse Chestnut – 2%, Seaweed – 1,5%, as well as ployacrylic gel with caffeine and above-mentioned plant extracts.

*D.Schmid, A.Lang, T.Allgäuer,Ch.Bayerl, E.G.Jung, Beurteilung der Veränderung der Hautbeschaffenheit durch die Heilpflanzensäfte Brennnessel und Löwenzahn.* Akt.Dermatol. 2000.

Wir führten eine Anwendungsbeobachtung über die Beeinflussung von objektiven und subjektiven Parametern der Hautbeschaffenheit durch die Kombination der Heilpflanzensäfte Brennnessel und Löwenzahn bei gesunden Probandinnen durch. Zehn Probandinnen (Versuchsgruppe) nahmen über 6 Wochen die Kombination der Heilpflanzensäfte oral ein, gleichzeitig erhielten sie eine standardisierte Körperpflege mit Basiscreme DAC, weitere 10 Probandinnen (Kontrollgruppe) benutzten lediglich die standardisierte Körperpflege mit Basiscreme DAC.

*H.Dobrev, Immediate effects of cosmetic series for men “Karo Royal” on the skin water content and pH.* 7<sup>th</sup> National Congress of Dermatology and Venereology, May 2000

*D.Iliev, U.Hinnen, P.Elsner, Skin Bioengineering Methods in Occupational Dermatology.* Skin Bioengineering Vol. 26, March 2001

Measruing biophysical properties of the skin is not only useful to study cutaneous physiology and pathology but may also be of value for the prediction of eczema risk, for the detection of subclinical eczema and for therapy control in occupational dermatology.

*T.Reuther, S.C.Behrens-Williams, M.Kerscher, Untersuchungen zur Wirkung von Mometasonfuroat-Fettcreme auf die epidermale Barriere.* H+G, Supplement 2/2001

*Ch.Fox, Literature and Patent Review: Analytical and Test Methodologies* 1990-2000, Part I. C&T, Vol. 116, No. 4, April 2001-05-21

*I.Le Fur, F.Morizot, S.Lpez, C.Guinot, J.Latreille, E.Tschachler, Seasonal changes in skin biophysical properties in healthy Caucasian women.* Congress Stratum Corneum III, Basel, September 2001.

*G. G. Hillebrand, M. J. Levine, K. Miyamoto, The Age-Dependent Changes in Skin Condition in African Americans, Asian Indians, Caucasians, East Asians, and Latinos,* IFSCC Magazine, October/December 2001, Vol. 4, Nr. 4

Understanding the similarities and differences in skin characteristics as a function of age, race and geography should aid in the development of skin care products that better meet consumers' skin care needs around the world.

*Le Fur I., Lopez S., Morizot F., Latreille J., Guinot C., Tschachler E., Age-Related Reference Ranges for Skin Biophysical Parameters in Healthy Women,* 20<sup>th</sup> World Congress of Dermatology, Paris

Purpose: The aim of this study was to establish age-related reference ranges in healthy Caucasian women for some widely used skin biophysical parameters.

*Le Fur I., Reinberg A., Lopez S., Morizot F., Tschachler E., Facial Skin Circadian Rhythms of Healthy Women Investigated Using Non-Invasive Methods,* 20<sup>th</sup> World Congress of Dermatology, Paris

Purpose: The aim of this study was to document around the clock changes in a set of skin biophysical parameters.

*U. Uksal, C. Atasavun, B. Özcelik, S. Utas, A. Ferahbas, The effects of hormone replacement therapy on the skin of postmenopausal women (abstract),* 11<sup>th</sup> Congress of the European Academy of Dermatology and Venereology, Prag 2002.

The study was performed to compare skin pH, transepidermal water loss (TEWL), skin surface lipids and hydration in postmenopausal women receiving hormone replacement therapy (HRT) and those who not. Two parallel age-matched groups (each 24) of 48 postmenopausal women evaluated by tewameter, sebumeter, pHmeter and corneometer.

*I Le Fur, F. Morizot, S. Lopez, C. Guinot, J. Latreille, E. Tschachler, Seasonal changes in skin biophysical properties in healthy Caucasian women,* The Essential Stratum Corneum, 2002 Martin Dunitz Ltd.

The human skin surface has to adapt constantly to changing environmental conditions, such as temperature and relative humidity. Several studies have demonstrated the detrimental effects of winter weather in our countries on the skin and seasonal changes in certain biophysical parameters. The work presented here examines seasonal variations of biophysical parameters on facial skin in Caucasian women in France.

*Ken-ichiro O'goshi, Makiko Iguchi, Hachiro Tagami, Functional analysis of the stratum corneum of scalp skin:studies in patients with alopecia areata and androgenetic alopecia,* Arch. Dermatol. Res. (2000) , Springer-Verlag

Because of the presence of thick long hairs on the scalp, little information is available concerning the functional characteristics of the stratum corneum (SC) of scalp skin. We therefore conducted a functional study of the SC of lesional scalp skin of patients with alopecia areata and of patients with androgenetic alopecia. We compared the scalp with the cheek and the flexor surface of the forearm (volar forearm). The water barrier function of the scalp SC of both patient groups, in terms of transepidermal water loss (TEWL), was almost comparable to that of the volar forearm, and was far better than that of facial skin.

*J.W. Fluhr, A.J. Fowler, J.-P. Hachem, D. Crumrine, P.M. Elias, K.R. Feingold, **Stratum corneum acidification in neonates: impact on permeability barrier homeostasis and integrity/cohesion**, 2002 U.S. Symposium of the International Society for Bioengineering and the Skin, Baltimore Oct. 24-26, 2002*  
Mammalian newborn stratum corneum (SC) displays a near-neutral surface pH, which declines during the early post-natal period to adult levels. We developed a model to study the mechanisms and consequences of SC acidification in the neonatal period. In newborn rats the surface pH, measured with a flat glass electrode (pH-Meter, Courage+Khazaka) declined from an almost neutral pH (6.8) after birth to physiologic levels (5.6) over 5 days.

*M-H. Lee, S-J. Hong, J-H. Park, H-C. Kim, H-S. Oh, C-H. Oh, **Quantitative evaluation of patch test results – comparing the studies between new skin color analysis technique and other bioengineerin tools**, 2002 U.S. Symposium of the International Society for Bioengineering and the Skin, Baltimore Oct. 24-26, 2002*  
Contact dermatitis is a common problem occurring in the field of dermatology and patch test is the only reliable procedure for the detection of the causative agent. In evaluation of patch test result, visual scoring system is wide being used as a objective method. However, it is well known that variations exist even in the interpretations by experienced dermatologist.

*I. Le Fur, S. Lopez, F. Morizot, et.al., **Age-related reference ranges for skin biophysical parameters in healthy women**, Posters of the 22nd IFSCC Congress, Edinburgh 23.-26. Sep. 2002*

*L. Ambroisine, C. Guinot, et. al., **Relationship between visual and tactile skin characteristics and skin biophysical parameters**, Posters of the 22nd IFSCC Congress, Edinburgh 23.-26. Sep. 2002*

*A. Kramer, T. Bernig, G. Kampf, **Clinical double-blind trial on the dermal tolerance and user acceptability of six alcohol-based hand disinfectants for hygienic hand disinfection**, Journal of Hospital Infection, 2002, 51: 114-120*

Six commercially available available alcohol-based hand rubs (AHD 2000, Desderma, Muscasept A, Manorapid (Poly-Alkohol, Spitacid, and Sterillium)) were investigated in a clinical double-blind trial involving 10 participants who had no previous experience of using hand rubs (Group 1) and seven who had substantial professional experience of using hand rubs (Group 2, viro laboratory staff).

*G. Yosipovitch, J. Hu, **The Importance of Skin pH**, Skin & Aging, March 2003 p. 89*

It's well known that the skin is the first line of defense against all elements, such as microorganisms, wind and pollutants. And it's the acid mantle, a fine film with a slightly acidic pH on the surface of the skin, which provides a protection for the skin. It plays a very important role as an integral part of the barrier function of the stratum corneum.

*R. Huei Chen, W. Yuu Chen, **Skinhydration effects, film formation time, and physicochemical properties of a moisture mask containing Monostroma nitidium water-soluble mucilage**, Journal of Cosmetic Science, Vol. 54, No. 1, Jan./Feb. 2003*

The objectives of the study were to explore the effects of using the water-soluble mucilage of *Monostroma nitidium* to replace the humectant and half of the thickening agent on the rheological properties, color, storage stability, water-holding capacity, and film formation time of moisture masks thus prepared. Results showed that moisture masks containing water-soluble mucilage were pseudoplaxtic fluids.

*Thomas Förster, Henkel KgaA, **Cosmetic Lipids and the Skin Barrier**, 2001 by Marcel Dekker*

There is no doubt that the application os cosmetic lipids has many positive effects on the structure and function of the skin. These effects are pleiotropic, caused either by direct interaction with the epidermis, particularly the stratum corneum, or indirectly, by influencing the physiologic, homeostatic condition of the skin.

*M. Setaro, A. Sparavigna, It is possible to define a “biological age” of the skin?, Skin Research and Technology, Vol. 9, No. 2, May 2003*

The evaluation of global skin performance as compared to anagraphical age of the subject is until today dependent on clinical evaluation. By doing so, “pre-clinic” alterations of skin aging, are often missed, loosing the possibility to set up adequate strategies of prevention and treatment. Non-invasiev evaluations based on the measurements of skin parameters allow to monitor functional alterations of the skin with age in objective, sensitive specific and reproducible way.

*L.P.L. van de Vijver, E. Boelsma, R.A. Bausch-Goldbohm, L. Roza, Subjective skin condition and its association with objective skin measurements, Cosmetics & Toiletries, Vol. 118, No. 7, July 2003*

From a group of 302 volunteers, the authors obtained both selfreported subjective evaluations of skin condition and objective measurements of skin conditions, and then looked for correlations between the subjective and objective kin measures.

*H. Lambers, H. Pronk, S. Piessens and E. Voss, Natural human skin surface pH is on average below 5, Gordon Conference, Aug. 2003*

The acidic surface pH and the pH gradient over the stratum corneum (SC) are important for optimal condition of the skin, supporting the following functions: regulation of skin microflora, thereby preventing pathogenesis, optimal structure and function of the lipid barrier, optimal stratum corneum homeostasis.

*F. Rippke, V. Schreiner, H-J. Schwanitz, The acidic milieu of the horny layer, Am J Clin Dermatol 2002; 3 (4): 261-272*

The acidic pH of the horny layer, measurable on the skin surface, has long been regarded as a result of exocrine secretion of the skin glands. The ‘acid mantle’ was thought to regulate the bacterial skin flora and to be sensitive primarily to skin cleansing procedures. In recent years, an increasing number of investigations have been published on the changes in, and constituents and functions of, the pH of the deeper layers of the stratum corneum, as well as on the influence of physiological and pathological factors.

*S. Stenzaly-Achtert, A. Schölermann, J. Schreiber, K.H. Diec, F. Rippke, S. Bielfeld, Axillary pH and influence of deodorants, Skin research and Technology 2000;6:87-91*

A significant pH reduction was shown during the treatment period when compared to the run-in phase. The Deodorant Roll-on induced a reduction of the mean pH values from 6.1 to 5.3, the Deodorant Balsam Spray from 6.5 to 5.7 and the Deodorant Cream from 6.2 to 5.3. During the wash-out period all pH values returned to baseline.

*I. Le Fur, F. Morizot, S. Lopez Seasonal changes in skin biophysical properties in healthy Caucasian women, The Essential Stratum Corneum, chapter 60, ed. by R. Marks, J.-L. Lévêque, R. Voegeli, Martin Danitz Ltd., London, 2002.*

The human skin surface has to adapt constantly to changing environmental conditions, such as temperature and relative humidity. Several studies have demonstrated the detrimental effects of winter weather in our countries on the skin and seasonal changes in certain biophysical parameters. The work presented here examines seasonal variations of biophysical parameters on facial skin in Caucasian women in France.

*P-A. Wendling, G. Dell’acqua, Skin biophysical properties of a population living in Valais, Switzerland, Skin Research and Technology 2003, 9, 306-311*

On average we observed low values of skin capacitance that identify subjects with dry skin. Measures of skin visco-elasticity ratios were also particulary low, while skin pH and sebum content were in the normal range. Age was correlated with a decrease of skin elasticity and sebum content, but there was no correlation with hydration or pH.

*Suk-Jin Choi, Min-Gyu Song, Whan-Tae Sung, Dong-Youn Lee, Comparison of TEWL, Capacitance, and pH Values in the Skin between intrinsic and extrinsic atopic dermatitis patients, J Korean Med Sci 2003, 18, 93-6, pp. 93-96.*

Atopic dermatitis (AD) is characterized by an intensely pruritic skin disease with typical distribution and morphology. The age of onset is nearly always within the first 5 yr of life, and lifetime prevalence in children is roughly 10 to 15% in industrialized countries.

*M. I. Nogueira de Camargo Harris* **Propriedades biomecânicas da pele**, Pele : estrutura, propriedades e envelhecimento, Editora Senac, Sao Paulo, 2003.

A biometrologia cutânea, ramo da ciência que avalia quantitativamente as propriedades biomecânicas da pele, tem encontrado na cosmetologia um importante aliado, pois o apelo mercadológico dos produtos destinados aos cuidados com a pele e com os cabelos tem-se baseado cada vez mais em evidências científicas e técnicas sensíveis, precisas e validadas, ao invés de serem fundamentadas em especulações.

*E. Hernandez* **Bioengineering in Dermatology and Cosmetology: Methods, Studies and Prospects**, SÖFW-Journal, 129. Jahrgang 11-2003.

One of the trends in modern dermatology and its perspectives for the near future are skin bioengineering and imaging. The 1<sup>st</sup> joint meeting of two scientific societies focusing on measurements and visualisation of skin function, structure and physiology – the International Society for Skin Imaging (ISSI) – took place in Hamburg, May 21-24, 2003. Before that, the meetings and conferences organised by these societies had been held separately.

*H. Ranc, A. Elkhyat, C. Servais, B. Launay, Ph. Humbert*, **Coefficient de friction et mouillabilité de la muqueuse linguale : influence d'une couche de mucus salivaire**, Nestlé Research Center, Nestec Ltd. P.O. Box 44, 1026 Lausanne, Suisse.

Les aliments, une fois en bouche, sont cisailés et comprimés entre la langue et des surfaces telles que les dents et le palais. La tribologie appliquée aux surfaces interagissant en bouche devrait permettre d'expliquer certains phénomènes physio-chimiques qui régissent la perception orale de la structure des aliments.

*A. Elkhyat, C. Courderot-Masuyer, S. Mac-Mary, S. Courau, T. Gharbi, Ph. Humbert*, **Assessment of spray application of Saint GERVAIS water effects on skin wettability by contact angle measurement comparison with bidistilled water**, Skin Research and Technology 10, pp. 283-286, 2004.

The skin is responsible for protecting the body from physical, chemical and microbial injuries. The stratum corneum is the top layer of the epidermis and it plays a key role in helping to contain moisture. When the skin becomes damaged, its ability to perform these functions is compromised. Dry skin is a common form of skin damage. Contact angle  $\theta$  between a surface and water is a good indicator of hydrophobic or hydrophilic tendency of surfaces.

*H. Lambers, S. Piessens, A. Bloem, H. Pronk, P. Finkel, E. Voss*, **Natural skin surface pH is on average below 5, which is beneficial for its resident flora (abstract)**, Skin Research and Technology 10, Abstracts, 2004.

The acidic surface pH as well as the pH gradient over the gradient over the stratum corneum (SC) are important for a good skin condition, supporting optimal structure and function of the lipid barrier and SC homeostasis.

*I. Arsic, S. Tamburic, S. Bulatovic, I. Homsek, G. Vuleta*, **Exploring moisturising potential of naturals: The cases of St. John's wort, chamomile and blackthorn**, Euro Cosmetics 3-2005, pp. 14-21.

The application of plant extracts in cosmetics and toiletries has been a distinct trend over the last decade and, given consumers' interests in naturals, will probably continue. Both cosmetic and dermatological practices have benefited from the use of new and re-discovered plants, as well as plant biotechnology extracts.

*A. Bornkessel, M. Flach, M. Arens-Corell, P. Elsner, J. W. Fluhr, **Functional assessment of a washing emulsion for sensitive skin: mild impairment of stratum corneum hydration...***, Skin Research and Technology, 2005-11, May, pp. 53-60.

Sensitive skin has been described as a skin type with higher reactivity than normal skin and exaggerated reactions to external irritants. Washing with soaps is harmful for barrier-related parameters.

*G. Korinth, Th. Göen, H. M. Koch, Th. Merz, W. Uter, **Visible and subclinical skin changes in male and female dispatch department workers of newspaper printing plants***, Skin Research and Technology 2005-11, May, pp. 132-139. Irritant hand dermatitis is one of the major occupational diseases.

Approximately 90% of all cases of hand eczema are caused by occupational exposure. It is a well-established fact that wet work and skin exposure to detergents or solvents often trigger irritant contact dermatitis. Even water can be a skin irritant itself.

*D. Kowatzki, C. Machold, K. Krull, P. Elsner, J.W. Fluhr, **Regeneration kinetic of sweating, Stratum Corneum hydration, Surface pH, Sebum production and mechanical properties is not altered by regular sauna bathing***, Presentation on the ISBS Meeting 2005 in Philadelphia, USA, abstract.

Wellness and especially sauna bathing are of growing interest in modern health care. The positive effect of sauna for general health is well documented. However, to our knowledge no controlled studies have been published on the effect of sauna on skin physiology.

*J.W. Fluhr, M. Breternitz, M. Flach, P. Elsner, **Acute experimentally induced barrier disruption by tape stripping is influenced by pressure, time and anatomical location: Integrity and Cohesion assessed by sequential tape stripping***, Presentation on the ISBS Meeting 2005 in Philadelphia, USA, abstract.

Tape stripping is a well-known procedure in stratum corneum physiology research. Adhesive films are pressed to the surface of SC and then removed. The superficial layers of SC adhere on the film and are accessible for further investigations. Although this method is widely used, only few information about standardization are known.

*S. Son, S. Park, S. Ha, G. Park, G. Lee, C. Oh, **Analysis of the skin hydration states using high resolution magnetic resonance microscope***, Presentation on the ISBS Meeting 2005 in Philadelphia, USA, abstract.

Magnetic Resonance (MR) technique have been rapidly developed, and Magnetic Resonance Image (MRI) is now the most versatile non-invasive diagnostic tool with a much higher resolution than other imaging modalities such as conventional X-ray, or Computed Tomography (CT).

*R. Voegeli, J. Heiland, S. Doppler, T. Schreier, **Efficient and Simple Quantification of Stratum Corneum Proteins on Tape Strippings***, Presentation on the ISBS Meeting 2005 in Philadelphia, USA, abstract.

Tape stripping is established as a common technique in dermatological research and is used in a broad range of applications. However, a concurrent colorimetric determination of protein content and enzyme activity on the same tape is circumstantial.

*E. Houben, K. De Paepe, V. Rogiers, **Skin condition associated with intensive use of alcoholic gels for hand disinfection : a combination of biophysical and sensorial data***, Contact Dermatitis 2006 : 54, pp. 261-267.

Hand hygiene of healthcare workers (HCWs) is of major concern to avoid nosocomial infections (1-4). Therefore, hospitalwide infection control programmes prescribe disinfection of the hands after each patient contact (5, 6).

*D. Khazaka, **Objective Measurement at all Stages of the treatment***, 5<sup>th</sup> Asia Pacific Conference on Antiaging Medicine, Bali, September 2006.

The days are over when a dermatologist only looked at the skin to make a diagnosis and to decide about the following treatments and to recommend skin care products to use. For almost 20 years now there is scientific equipment available to measure different parameters on the skin, such as hydration and sebum level, pH, elasticity, pigmentation skin texture and wrinkles and many more.

*Rainer Voegeli, Anthony V Rawlings, Stefan Doppler, Thomas Schreier, Profiling of Serine Protease Activities in Human Stratum Corneum*, Oral Presentation on the 24<sup>th</sup> IFSCC Congress, Osaka, Oct. 2006. \*

Epidermal serine proteases are involved in numerous physiological and pathological reactions in cells and tissues such as proliferation, differentiation, lipid barrier homeostasis and tissue remodeling. Most importantly proteolysis of corneodesmosomes is a crucial event prior to desquamation. Reduced expression of kallikrein 7 (stratum corneum chymotryptic enzyme or SCCE) and kallikrein 5 (stratum corneum tryptic enzymes or SCTE) has been observed in the outer layers of the stratum corneum (SC) in dry skin whereas increased total SC activities are reported following a challenge to the skin with ultraviolet radiation or surfactants.

*A. Firooz, F. Gorouhi, P. Davari, M. Atarod, S. Hekmat, M. Rashighi-Firoozabadi, A. Solhpour Comparison of hydration, sebum and pH values in clinically normal skin of patients with atopic dermatitis and healthy controls*, 2007 The Author(s), Journal compilation, Blackwell Publishing Ltd. The water content of the stratum corneum and skin surface lipids forms a balance that is important for the appearance and function of the skin. An impaired balance may lead to the clinical manifestations known as “dry skin”, which is particularly seen in patients with atopic dermatitis (AD).

*Walaiorn Pratchyapruit, Katsuki Kikuchi, Pimonpun Gritiyaranganan, Setsuya Aiba, Hachiro Tagami, Functional analyses of the eyelid skin constituting the most soft and smooth area on the face: contribution of ist remarkably large superficial corneocytes to effective water-holding capacity of the stratum corneum*, Skin Research and Technology 2007, 13, pp. 169 – 175

The eyelid constitutes a unique area on the face because of its soft, smooth and thin skin distinct from that of other facial portions. Its softness facilitates their easy compliance to blinking movement, which is indispensable to protect the wet surface of the eyeball. Moreover, the skin of the eyelid does not show any prominent follicular orifices of an oily appearance even in adults.

*H. Lambers, S. Piessens, A. Bloem, H. Pronk, P. Finkel, Natural skin surface pH is on average below 5, which is beneficial for its resident flora*, IFSCC Magazine-vol. 10, no 1/2007, p. 84

Variable skin pH values are being reported in literature, all in the acidic range but with a broad range from pH 4,0 to 7,0. In a multicentre study (N=330), we have assessed the skin surface pH of the volar forearm before and after refraining from showering and cosmetic product application for 24h.

*Lawrence Ambroisine, Khaled Ezzedine, Anissa Elfakir, Sophie Gardinier, Julie Latreille, Emmanuelle Mauger, Michel Tenenhaus, Christiane Guinot, Relationships between visual and tactile features and biophysical parameters in human facial skin*, Skin Research Technology 2007; 13: pp. 176-183

Skin properties, such as colour, hydration and texture, can be studied on a qualitative basis by a clinical assessment or on a quantitative basis using techniques that measure biophysical properties of the skin. The aim of this study was to explore the links between facial skin features and a range of skin biophysical parameters using multivariate method.

*Walaiorn Pratchyapruit, Katsuko Kikuchi, Pimonpun Gritiyaranganan, Setsuya Aiba, Hachiro Tagami, Functional analyses of the eyelid skin constituting the most soft and smooth area on the face: contribution of ist remarkably large superficial corneocytes to effective water-holding capacity of the stratum corneum*, Skin Research and Technology 2007; 13; pp. 169-175

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*D. Segger, U. Aßmus, M. Brock, J. Erasmy, P. Finkel, A. Fitzner, H. Heuss, U. Kortemeier, S. Munke, T. Rheinländer, H. Schmidt-Lewerkühne, **Multicenter Study on Measurement of the Natural pH of the Skin Surface***, IFSCC Magazine – vol. 10, no 2/2007, pp. 107-110

Characterization of the skin's natural state is very important for understanding skin functions and describing disturbances of skin function. In the field of cosmetics and dermatologicals the natural pH of the skin surface plays an important role in the development of products with a skin neutral pH.

*R. Voegeli, J. Heiland, S. Doppler, A.V. Rawlings, T. Schreier, **Efficient and simple quantification of stratum corneum proteins on tape strippings by infrared densitometry***, Skin Research and Technology 2007, 13; pp. 242-251

The analysis of stratum (SC) components is a widely accepted method to determine "skin health" status or to follow the effects of topical treatments. These analytes are normally corrected to the amount of SC removed which can be determined gravimetrically or by extraction of SC proteins and their subsequent analysis.

*M. Kerscher, T. Reuther, G. Schramm, **Chlormadinonacetat enthaltende Mikropille verbessert unreine Haut***, Frauenarzt 48 (2007), Nr. 4, pp. 373-378

Moderne Mikropillen zeichnen sich besonders durch eine Reihe von Zusatznutzen aus. Den wichtigsten stellt die Verbesserung des Hautbildes dar. Für die Chlormadinonacetat-haltige Mikropille Belara wurde in klinischen, kontrollierten Studien bei leichter bis mittelschwerer Akne die Überlegenheit im Vergleich zu einer Levonorgestrel-haltigen Mikropille und zu Placebo nachgewiesen

*Slaheddine Marrakchi, Howard I. Maibach, **Biophysical parameters of skin: map of human face, regional, and age-related differences***, Contact Dermatitis 2007; 57, pp. 28-34

The face showed anatomical variation on reaction to chemicals, which could be related to differences in biophysical parameters. 10 young human volunteers (24-34 years) and 10 old volunteers (66-83 years) were studied to prepare a map of the human face based on regional variations and age-related differences by measuring various biophysical parameters.

*Susun An, Eunyoung Lee, Seunghun Kim et al. **Comparison and correlation between stinging responses to lactic acid and bioengineering parameters***, Contact Dermatitis 2007; 57; pp. 158-162

Sensitive skin has been described as a skin type showing higher reactivity than normal skin. By our consumer surveys, approximately 30% of the subjects believe that they have sensitive skin. However, consumer-perceived cutaneous reactions are usually scientifically unconfirmed.

*Gabriele Feller-Heppt, Christina Wagner, Selma Ugurel, **Wirksamkeit und Patientenzufriedenheit verschiedener Pflegecremes bei Atopikern und Neurodermitispatienten im erscheinungsfreien Intervall***, Kosmetische Medizin 5/2007, pp. 28-34

Bei Neurodermitispatienten stehen vor allem die Symptome trockene Haut und ausgeprägter Juckreiz im Vordergrund. Hierdurch kommt es zu vermehrtem Kratzen und nachfolgend möglicherweise zum Eintritt infektiöser Erreger bei gestörter Hautbarrierefunktion und gestörter zellulärer Immunität. Ein neuer Ekzemschub kann entstehen und den Juckreiz noch verstärken.

*Bayler, T. Walker, M. Arens-Corell, **Dermatologically controlled in-use test of sebamed soap-free washing bar in a daily care unit***, 21<sup>st</sup> World Congress of Dermatology, Buenos Aires, Argentina

Suitability and tolerability of a soap-free washing bar for cleansing was evaluated in patients with skin diseases. Recruitment of volunteers included consecutive patients of an outpatient, daily care unit of a dermatological hospital.

*N. Garcia Bartels, A. Mieczko, H. Proquitté, R. Wauer, T. Schink, Ul Blume-Peytavi, **Influence of Bathing in Newborns: A Prospective, Randomized Clinical Study on Skin Barrier During the First Four Weeks of Life**, 21<sup>st</sup> World Congress of Dermatology, Buenos Aires, Argentina*

Background: The adapting process of skin barrier to extra-uterine life and the influence of bathing on term neonates's skin is not completely understood. Thus, we investigated the effect of bathing on skin barrier during the first four weeks of life. Methods: Monocenter, prospective, randomised study with 57 healthy full-term newborns (32 boys and 25 girls).

*Naveed Akhtar, Gulfishan Ahmed, Mahmood Ahmed, Nazar Ranjha, Ahmad Mahmood, **Grapefruit Extract Cream: Effects on Melanin and Skin**, Cosmetics and Toiletries magazine, Vol. 123, No. 1/January 2008, pp. 55-68*

Emulsions are thermodynamically unstable systems defined as microscopic dispersions of liquid droplets contained within another liquid, with a diameter ranging from 0.5 to 100 µm. Emulsions usually consist of mixtures of an aqueous phase with various oils or waxes.

*G. Maaß, **Anwendungsstudie der sebamed TROCKENE HAUT Produkte bei Kindern mit atopischem Ekzem**, Kosmetische Medizin 6/2007, pp. 288-290*

Es erfolgte in einer vierwöchigen Anwendungsuntersuchung eine klinische Überprüfung der sebamed TROCKENE HAUT Pflegeprodukte – Waschlotion, Pflegelotion, Tagescreme und Nachtcreme – bei Kindern mit atopischem Ekzem anhand von quantitativen Meßgrößen, von klinischen Befundurteilen sowie von qualitativen Beurteilungen der Pflegewirkungen.

#### **Hautanalysegeräte**

#### **Neue Wege in der Hautdiagnostik**

Der Einstieg in die professionelle Hautberatung ist stets das persönliche Gespräch mit dem Kunden. Dabei ist es entscheidend, neben der Beurteilung des optischen Eindrucks

der Haut herauszufinden, welche individuellen Lebensgewohnheiten vorliegen. Genetische Disposition, Ernährung, Risikofaktoren wie Rauchen, Stress oder hoher Alkoholkonsum, sportliche Aktivitäten, Schlafverhalten und Alter beeinflussen entscheidend den Hautzustand und müssen daher in die Beratung mit einbezogen werden. Basis einer qualitativen und auf die Bedürfnisse des Kunden zugeschnittenen Körperkosmetik ist die Bestimmung des individuellen Hautzustands. Diese Information ist unentbehrlich, um eine fundierte Hautberatung durchzuführen. Auf dieser Diagnose soll der gesamte Pflegeplan aufgebaut werden, der essentiell für den Erfolg der Behandlung und damit für die Zufriedenheit der Kunden ist. Lesen Sie, welche Methoden es gibt und wie man vorgeht.

#### **Electronically av.**

#### **Vergleichende Untersuchung zur Belastung und Beanspruchung am Arbeitsplatz durch Reinigungsmittel auf Mineralöl- und auf Pflanzenölbasis unter besonderer Berücksichtigung akuter und Chronischer Hauterkrankung**

#### **Abschlussbericht**

#### **Assessment of Age-Related Differences in Skin Surface, Hydration, Sebum and pH;**

*Marta O. Ferreira, M. Helena Amaral, Paulo C. Costa, M. Fernanda Bahia; Ifssc Barcelona 2008*

Skin is the body's largest organ and constitutes a formidable physical barrier that protects us from the environment [1]. It is composed of two main layers: the epidermis and the dermis. The stratum corneum is the outermost layer of the epidermis and is the most important in terms of protection against damage and aesthetic appearance of the skin. The hydrolipidic film of the stratum corneum, which consists mainly of

sebum excreted by the sebaceous glands and moisture components excreted with sweat, protects the skin from drying out, keeps it supple and due to the natural acid protection barrier it prevents the penetration of harmful external substances.

### **Study of the Inter-Relations between Skin Surface Parameters, Hydration, Sebum and pH**

*Marta O. Ferreira, M. Helena Amaral, Paulo C. Costa, M. Fernanda Bahia; Ifsc Barcelona 2008*

Skin is the body's largest organ and constitutes a formidable physical barrier that protects us from the environment [1]. Several biophysical techniques are commonly used to study the skin properties and to measure the in vivo skin effects of cosmetics, topical medicaments and chemical irritants [2,3]. The Corneometer® (a capacitance method) measures skin hydration, the Sebumeter® (a photometric method) measures the sebum of the skin and the Skin-pHMeter® (a potentiometric method) measures the pH of the skin [4]. The Visioscan® VC98 connected to the software SELS (Surface Evaluation of the Living Skin) can measure several skin surface parameters [5]. This apparatus consists of a special b/w video sensor chip with very high resolution, an objective and an UVA-light source.

### **Serine Proteases, Skin Function and Homeostasis; Rainer Voegeli<sup>1</sup>, Anthony V Rawlings<sup>2</sup>, Joachim W Fluhr<sup>3</sup>, Stephan Doppler<sup>1</sup>, Thomas Schreier; Ifsc Barcelona 2008**

Several proteases were shown to be present in the epidermis and especially in the stratum corneum (SC). Among these enzymes the serine proteases have a wide spectrum of specificities and functions and play important roles in numerous physiological and pathological processes [1]. In skin they are involved in epidermal proliferation, differentiation, lipid barrier homeostasis and tissue remodeling. Most importantly, kallikreins, together with other enzymes, are involved in the proteolysis of corneodesmosomal proteins, a crucial event prior to desquamation [2].

### **The alkaline pH-adapted skin barrier is disrupted severely by SLS-induced irritation; Eunjoo Kim, Seunghun Kim, Haekwang Lee, Seongjoon Moon, Ihseop Chang; Ifsc Barcelona 2008**

Human stratum corneum is a multilayer barrier composed of corneocytes and specialized intercellular lipids rendering the skin poorly permeable to water and other polar compounds. The horny layer assists in maintain a constant internal milieu with a pH of 7.4 in viable epidermis that contrasts with the pH of 4-6 found on most parts of human skin[1].

The 'acid mantle' of the stratum corneum first described by Schade & Marchionini in 1928[2], was originally thought of as a thin film composed of fatty acids, amino acids, and other organic acids deposited on the skin surface.

### **Bi-Functional Study of Ion Calcium in the Skin**

*Silvia H. Pérez Damonte<sup>1</sup>, Claudia Liliana Selem, Claudia Groisman; Ifsc Barcelona 2008*

The Calcium ion has an important function in the skin. Its gradient plays a role in regulating epidermal growth and differentiation *in-vivo*. In the intact epidermis, the extra cellular calcium content is low in both, malpighi and spinosum strata, but increases from the inner to the outer layer of the stratum granulosum [1]. Also, the calcium ion participates in the formation of the epidermal desmosomes, fibroblasts and keratinocytes, which provide the integrity and firmness of the skin [2]. All of these factors are important for the correct function of the epidermal barrier.

### **Safety Assessment for Nickel in Cosmetics; Silvia H Pérez Damonte; Ana Maria Martín; Marta Edit Daraio ; Ifsc Barcelona 2008**

Many environmental chemicals produce contact hypersensitivity or local inflammatory responses in the skin. Nickel released from metal objects is well known as a sensitizing agent in humans. Since the initial damage caused by nickel remains to be the leading cause of skin disorders such as allergic contact dermatitis worldwide, the aim of this study is to investigate if the content of nickel in cosmetics could produce such reactions.

*Parastoo Davari, MD, Farzam Gorouhi, MD, Sirous Jafarian, MD, Yahya Dowlati, MD, PhD, and Alireza Firooz, MD; A randomized investigator-blind trial of different passes of microdermabrasion therapy and their effects on skin biophysical characteristics; International Journal of Dermatology 2008, 47, S. 508-513*

Microdermabrasion (MDA) was developed in 1980s, and rapidly became a popular modality in superficial skin resurfacing. Its safety, simplicity, no need for anesthesia, prompt recovery and modest equipment costs hold a wide appeal for both physicians and patients. This non-invasive mechanical technique is used in management of fine rhytides, mottled pigmentation, clogged pores, acne, acne scars, and stretch marks.

*T. Reuther, S. Schröder, M. Kersche; FP0363 ANALYSIS OF SITE-DEPENDENT DIFFERENCES OF TRANSEPIDERMAL WATER LOSS, SKIN CAPACITANCE AND SKIN SURFACE-PH USING BOTH T-TEST AND CORRELATION ANALYSIS; Abstract; EADV Paris 09/2008;*

Transepidermal water loss (TEWL), skin capacitance (SC) and skin surface-pH (pH) are today standard parameters for assessing skin barrier function. While there are many studies analysing the relationship between absolute values from different sites using t-test investigations providing information from the analysis of such data using correlation analysis are very rare. Therefore the aim of the present study was to analyze TEWL, SC and pH of the forearm (FA) and the forehead (FH) using and comparing t-test and correlation analysis.

*Firooz A., Gorouhi F., Davari P., Hekmat S., Atarod M., Rashighi Firoozabadi M., Solhpour A.; Comparison of hydration, sebum and pH values in clinically normal skin of patients with atopic dermatitis and healthy controls; Clinical and Experimental Dermatology 2007; 32, S.321-322;*

The water content of the stratum corneum and skin surface lipids forms a balance that is important for the appearance and function of the skin. An impaired balance may lead to the clinical manifestations known as “dry skin”, which is particularly seen in patients with atopic dermatitis (AD).

*Davari, Parastoo; Gorouhi, Farzam; Jafarian, Sirous; Dowlati, Yahya; Firooz, Alireza;*

**A randomized investigator-blind trial of different passes of microdermabrasion therapy and their effects on skin biophysical characteristics;** International Journal of Dermatology, Volume 47, Number 5, May 2008 , pp. 508-513(6)

Background: Microdermabrasion (MDA) is a safe, simple, and beneficial technique for superficial skin resurfacing. Despite its popular usage, few studies have assessed the efficacy of different MDA protocols applied at the present time.

Objectives: To assess the effects of MDA generally, as well as to compare the effects of two vs. three passes of MDA in each session for a total number of six therapeutic sessions on skin biophysical characteristics.

*J. Dissemond; pH-Wert und chronische Wunden; dermatology (14) 2008, S. 486-490*

Der pH-Wert beschreibt logarithmisch die reziproke Konzentration von freien Wasserstoffionen und ist somit ein Maß für die Stärke der sauren bez. basischen Wirkung einer wässrigen Lösung. Der Begriff pH-Wert leitet sich von den lateinischen Wörtern potentia (Kraft) und hydrogenium (Wasserstoff) ab. Die Skala der pH-Werte reicht von 0 bis 14, wobei der Mittelwert von 7 als neutral bezeichnet wird.

*Johann W. Wiechers, PhD; Formulating at pH 4-5: How Lower pH Benefits the Skin and Formulations; Cosmetics and Toiletries magazine; Vol. 123, No. 12/December 2008;*

Most skin products are formulated around pH 6 but the latest research in skin biology suggests the skin is significantly more acidic – around 4,7. Here, the author shows how formulating for this natural pH can enhance the skin penetration of actives, reduce the amount of preservatives required, and increase chemical stability.

*S. Gong, C. Lv., KR Feingold, X. Zhang, S. Xin, C. Tu, L. Dui, PM Elias, M. Man; Variation of skin surface pH, sebum content and stratum corneum hydration with age and gender in Chinese population; Journal of Investigative Dermatology (2009), Volume 129*

Evidence suggests the importance of skin biophysical properties in predicting diseases and in developing appropriate skin care. The results to date of studies on skin surface pH, stratum corneum (SC) hydration, and sebum content in various gender and ages have been inconclusive in part due to small sample size. Additionally, little is known about skin physical properties of Asian, especially Chinese, subjects.

*Diana Khazaka, Christiane Uhl; More than 2 decades of bioengineering for efficacy testing and product recommendation; Household and Personal Care TODAY, n1/2009,*

Due to high competition in the cosmetic and growing customer expectations, in the past two decades there has been a continuous development of new cosmetic products with more efficient ingredients covering new effects on the skin. Simultaneously to this, there was an increasing demand for new measuring techniques to substantiate the new product claims. The field of skin bioengineering has consequently been immensely enriched in the last years by inventing new physical and optical measurement methods for all kind of skin parameters.

*Masaki Yamaguchi, Yusuke Tahare, Teruhiko Makino, Tadamichi Shimizu, Akira Date; Comparison of Cathepsin L activity in cheek and forearm stratum corneum in young female adults; Skin Research and Technology 2009K; 15; 370-375*

Noninvasive determination of skin surface proteolytic activity may be useful for the diagnosis of human disease and the potential of skin. The cathepsin family is one of the metabolizing enzymes of the skin cell and it includes aspartic protease cathepsin D and cysteine proteases cathepsin B, H, and L. Cathepsin L is a lysosomal cysteine protease with a major role in intercellular protein catabolism.

*D. De Paepe, E. Houben, R. Adam, J.-P. Hachem, D. Roseeuw, V. Rogiers ; Seasonal Effects on the Nasolabial Skin Condition ; Skin Pharmacol Physiol 2009; 22: 8-14*

In the present work, nasolabial skin condition and the influence of seasonal changes during autumn and winter were studied in 16 healthy female volunteers. Apart from visual scoring of erythema and skin scaliness, transepidermal water loss (TEWL), skin hydration, apparent skin pH, skin colour and skin desquamation were biophysically measured. The study results showed that nasolabial TEWL was significantly higher during wintertime than in autumn.

*Evi Houben, Ralf Adam, Jean-Pierre Hachem, Diane Roseeuw, Vera Rogiers, Kristien De Paepe; Clinical scoring and biophysical evaluation of nasolabial skin barrier damage caused by rhinorrhea; Contact Dermatitis 2008, 59; 296-300*

Suffering from an acute viral cold – caused by rhinoviruses or coronaviruses – probably is the most common illness known. A common cold usually is mild and self-limiting. Apart from an overall discomfort, cold symptoms are sneezing, serous nasal secretion, and obstruction of nasal breathing caused by the swelling and inflammation of the sinus membranes. These symptoms occur 2-3 days after the infection and usually last for 7-10 days. In acute viral rhinitis, only the symptoms can be treated and common over-the-counter medication for a cold may already be effective.

*Ralf Adam, Baerbel Schnetz, Petra Mathey, Marc Pericoi, Y. de Prost; **Clinical Demonstration of Skin Mildness and Suitability for Sensitive Infant Skin of a New Baby Wipe**; Pediatric Dermatology 1-8; 2009;*

Over the past decade, baby wipes have become established as leading cleansing devices for the diaper area. Despite this fact, few publications have reported clinical data on the dermatologic effects of baby wipes. Although basic performance requirements of a moist tissue, such as cleaning and removal of fecal matter from the skin, are largely met by current products, modern baby wipes can address further aspects of skin care in the diaper area via usage of effective cosmetic product application.

*N. Krueger, S. Luebberding, M. Oltmer, M. Streker, M. Kerscher; **Age-related changes in skin mechanical properties. Quantitative evaluation of 120 female subjects in a trial with a strict design**. ISBS Barcelona, 2009*

The most commonly used method to determine the mechanical ability of skin is the creep test using suction chamber devices. Until now there is no scientific consensus upon which skin deformation parameters are particularly suitable to describe age related changes in human skin mechanics. The aim of this study was to examine common mechanical skin parameters to find those best representing the influence of aging.

*A. Elkhyat, Y. Afifi, B. Hassam, P. Humbert; **Human skin wettability cartography**; ISBS Besancon, 2009*

For decades the surface hydrophobicity has been reported to play an important role in many biological processes, such as cellular adhesion, contact inhibition, elasticity, functionality of tissue membranes, functioning of intracellular structures, and adhesion of infectious microorganisms. The skin affinity with water is estimated by measuring of its water contact angle. To establish a cartography of skin's wettability by Ow measuring at nine sites. The hydration and lipidic index (HI, LI) and the skin pH are measured

*W. Siyu, L. Li; **Effect of sweating by exercise on stratum corneum hydration, skin surface sebum content and pH value**; ISBS Besancon, 2009*

The physiological indexes of skin include stratum corneum hydration, skin surface sebum content and pH value, which could reflect physiological state of the local and systematic organism, and also could be affected by many factors from internal or external changes. Many studies have been put on these physiological indexes, but there is no report of studying on effect of sweating by exercise on sebum, hydration and pH value of face skin. To observe the effect of sweating by exercise on stratum corneum hydration, skin surface sebum content and pH value of forehead and pars zygomatica of healthy individuals of different ages in order to collect the numerical data as the reference for exterior use drugs and before / after sports' cosmetics.

*G. Stamatas, J. Nikolovski; Non-invasive optical methods for the study of infant skin; ISBS Besancon, 2009*

Until recently, the study of infant skin in vivo has been limited to simple non-invasive techniques focusing on skin surface properties such as stratum corneum (SC) hydration, trans-epidermal water loss, and SC pH. With this work we demonstrate the development of non-invasive optical methods adapted for measurements on infant skin and the use of such methods to document skin maturation changes during the first years of life. Optical methods can be classified into methods relating to spectroscopy, microscopy, macroimaging, or a combination of the above. Skin spectroscopy can be achieved in vivo with the use of fiber optic probes that can come in contact with the skin site of interest.