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## **Literature List**

### **Skin-Visiometer®**

*K.-P. Wilhelm, Evaluation of a new opticoprofilometric technique for the Assessment of the Skin Surface Topography*, The 10th International Symposium on Bioengineering & the Skin, Cincinnati, Ohio, June 13-15, 1994

Quantitative measurement of the roughness or smoothness of the skin surface topography is a valuable tool for the objective efficacy control of external formulations.

*M. Ghyczy, J. Greiss T. Kovats, Liposomes from Vegetable Phosphatidylcholine*, Cosmetics & Toiletries, July 1994

The structure of the skin, especially the stratum corneum with its important function as a barrier to minimize transepidermal water loss (TEWL), has been extensively studied and reviewed. During the proliferation of epidermal cells and their migration from the basal layer to the upper layer of the stratum corneum, cell differentiation is accompanied by a tremendous change in metabolic activities.

*A. Teglia, G.F. Secchi, Evaluation of the Protective Efficacy of Proteins and Mild Tensides against the adverse Cutaneous Effects of Anionic Detergents by means of TEWL and Profilometric Measurements*, 18th International IFSCC-Congress, Venice, October 1994

The repeated use of anionic-based detergents is reported to induce adverse events on the human skin, such as alteration of the stratum corneum barrier function and increase of roughness. Our investigation focused on quantification and comparison of the protective effects of mild surfactants and protein derivatives in simple and complex tenside systems based on sodium lauryl sulfate, sodium laureth sulfate and sodium C14-16 olefin sulfonate. Cocamidopropyl betaine, cocamidopropylamine oxide and alkyl polyglucoside were used as mild surfactant additives; wheat proteins with different average molecular size were tested. The variations in skin permeability were assessed by TEWL measurements. The changes in skin surface morphology were analysed by three- and two-dimensional roughness parameters of the skin relief. Exposure models were based on the soap chamber test and on standardised washing procedures. Proteins and mild surfactants show comparable efficacy in the one-day occlusion tests, but better results were observed for proteins in the occluded and open repeated exposures.

*H.P. Nissen, Comparative Studies of Skin Roughness Measurements by Profilometry and a New Image Analysis System*, Cosmetic and Toiletries Manufacture Worldwide, Jan. 95

The characterisation of the effects of skin care products on the topography of the horny layer is a valuable component in the substantiation of treatment products' efficacy. Skin roughness is a very important parameter in the characterization of cosmetic skin properties. Smooth, supple skin is a perceptible effect that can be achieved by means of cosmetic skin care products. Up to now, however, it has been difficult to record the roughness of the skin and to define it satisfactorily by measuring technique. In this study a new method for computer assisted structural analysis of the skin surface is

presented, which uses a special image analysis technique. This new method is compared with the profilometry and the conventional image analyser technique.

*J.W. Fluhr, W. Gehring, M. Gloor, **Analyse der Hautrauigkeit bei Personen unterschiedlicher Altersgruppen mit dem Visiometer**, Akt.Dermatol. 21, 151-156 - 1995*

An 40 hautgesunden Probanden wurde mittels eines neuartigen Verfahrens (Visiometer) in vier distinkten Altersgruppen an Ober- und Unterarmen, Ober- und Unterschenkel sowie am Nacken und Rücken das Hautrelief untersucht. Die Untersuchung mit dem Visiometer beruht auf der Analyse eines Silikonabdruckes mittels EDV-gestützter CCD-Videokamera. Altersunterschiede konnten nur am Rücken nachgewiesen werden. Hingegen fanden sich im direkten Vergleich der Lokalisationen übereinstimmende Hautrauigkeitswerte am Oberarms, Unterarm, Oberschenkel sowie am Rücken, die sich signifikant unterschieden. Ein Geschlechtseffekt konnte nicht nachgewiesen werden.

*L. Jourdan, "**Visiomètre SV 400**": l'alternative pour mesurer le relief cutané, Cosmétologie No. 2, 28, Janvier 1995*

Pour évaluer l'état de la peau et les effets des cosmétiques il faut pouvoir mesurer de façon optimale la rugosité de la surface cutanée.

*J.-I. Kim, H.-K. Lee, **Technologies of Skin Bioengineering**, The Society for Investigative Dermatology, Sheraton Chicago Hotel, Chicago, May 24-28, 1995*

Clinical improvement of amino propane sulfonic acid and its quantitative measurement with a new opticoprofilometry.

*K. Articus, K.P. Wilhelm, **Das Skinvisiometer-ein neues Gerät zur Bestimmung der Hautrauheit**, Parfümerie und Kosmetik, Nr. 9/95.*

Die Rauheit der Hautoberfläche kann nicht direkt gemessen werden, da willkürliche Bewegungen des Probanden die Messung stören. Daher wird ein Silikonabdruck der Haut angefertigt. Eine Diamantnadel, deren Spitze auf der Oberfläche des Abdruckes aufliegt, wird über den Abdruck bewegt. Dabei hebt und senkt sie sich entsprechend der Oberflächenstruktur des Abdruckes. Die Bewegung der Nadel wird - elektronisch verstärkt - auf Papier aufgezeichnet. Die resultierende Linie stellt ein Profil der Oberfläche dar. Gemäß den Definitionen der DIN Normen (2) werden dann an Hand der Profillinie die verschiedenen Rauheitsparameter bestimmt (Tab.1). Da die Nadel mit konstanter Geschwindigkeit gleichmäßig über die Oberfläche bewegt werden muß, stellt dieses Verfahren hohe Anforderungen an die Mechanik des Gerätes und die Aufzeichnung des Profils dauert mehrere Minuten. Das Skinvisiometer benutzt eine andere Methode, um den Silikonabdruck der Oberfläche auszuwerten. Es ist dadurch in der Lage, die gesamte Oberfläche eines 6,5 mal 5mm<sup>2</sup> großen Silikonabdruckes in Sekunden einzulesen.

*A. Teglia, G.F. Secchi, **Minimizing the Cutaneous Effects of Anionic Detergents** Cosmetics and Toiletries Magazine Vol. 111, August 1996*

Evaluating the protective efficacy of proteins and mild surfactants via transepidermal water loss and profilometric measurements.

*A. Teglia, **Un Nuovo Sistema Per lo Studio Della Superficie Cutanea: Skin Visiometer SV 400®**, Cosmetics & Toiletries (Italiano) 1996*

Il giudizio sensoriale dello stato di salute e bellezza della pelle...

*D. Khazaka, **Claim Support & Efficacy Testing. A New System to Analyze Skin Roughness and Wrinkles**, Active Ingredients, International Conference Paris, November 1996*

From the 1 January 1997 all cosmetic products and raw materials have to fulfill the 6th Amendment regarding product information package, ingredient labeling and claim support. Meanwhile

there are a range of objective skin analyzing instruments on the market helping to satisfy the new needs of efficacy testing and claim support arising from this Amendment. The parameters of the skin which can be determined objectively are sebum, moisture, pH-value of the skin (hydrolipidic film), viscoelasticity and micro circulation of the skin, skin color (melanin and erythema index), transcutaneous oxygen pressure, temperature and thickness of the skin. A brand new system to evaluate skin roughness and wrinkles is now commercially available: the SKIN-VISIOMETER SV 400<sup>®</sup>. It differs from other roughness measuring systems by its economical, accurate and quick measuring principle. A specially blue dyed silicon skin replica is analyzed by light transmission in a slide projector according to their heights and depths. By means of a digitalization unit the replica is visible on a monitor in 256 gray levels or false colors. Standard roughness parameters (e. g. Ra, Rt, Rz, etc.) are calculated for the profile of a single line. Also the average parameters of up to 180 lines in a circle or a square can be determined within a second. The software of the SKIN-VISIOMETER SV 400<sup>®</sup> offers many possibilities to the user as calculation of 3-dimensional parameters like surface or volume, or the display of a perspective image for marketing use. All data can be stored, printed out and exported to statistical programs.

*De Vroey, Vrije Universiteit Brussel, Studie van het Microreliëf van de Hiud aan de Hand van een Lichttransmissie-methode.*

*K. Articus, G. Khazaka, K.-P. Wilhelm, The Skin Visiometer - A Photometric Device for the Measurement of Skin Roughness, Bioengineering of the Skin: Skin Surface Imaging and Analysis. 1997 CRC Press*

Since 1959, When Tronnier presented a stylus profilometer as a tool to quantify the surface of the human skin, several author have used this device to quantify the effect if cosmetic and pharmaceutical products on the skin. A profilometer works like a phonograph. A diamond stylus is placed on the surface of a plastic replica of the skin, and the stylus is moved linearly across the surface. By transducing the horizontal and vertical movement to a recording unit, a two-dimensional (2D) profile line is drawn. The profile line is used to calculate roughness parameters. Profilometers have been used for many years, so that the machines have reached a high stage of development and the calculation of various roughness parameters has been standardised in many countries. In 1979, Hoppe showed that the anisotropic surface of the human skin cannot be reliably quantified by profilometric measurements in one direction, but that several direction have to be measured to obtain a more correct roughness value of the human skin. Later Hoppe et al. applied the fast fourier analysis as a three-dimensional (3D) parameter on 3D skin surface recordings that were achieved by combining several parallel 2D profile scans of the surface to overcome the disadvantages of 2D parameters. In the meantime, other investigators have also applied 3D parameters on skin surface data. Unfortunately, the movement of the stylus is very time-consuming, and though faster systems have been invented, where the diamond stylus is replaced by optical measurement systems that use laser beams and thus avoid contacting the surface, the 3D recording of a replica of a skin area still takes several minutes up to hours. Also, the precise movement of the stylus makes heavy demands on the mechanics of the movement mechanism. The photometric device that we present in this article overcomes these problems by applying a photometric measurement principle that needs no horizontal or vertical displacement of a stylus and records the 3D surface of a skin area in a split second.

*M. Kläsger Radez, Wirkungskontrolle bei der Kosmetikherstellung - Kein Problem mit einem neuen System zur Hautprofilvermessung, Euro Cosmetics 3/97*

Eine glatte, geschmeidige Haut ein Leben lang zu erhalten, ist gleichermaßen der Traum der kosmetischen Forschung, der Marketingstrategen und natürlich der Verbraucher von kosmetischen Produkten.

*A. Teglia, A. Mondelli, Influence of cosmetic treatments on the intercorrelations of skin elasticity, hydration and microrelief*, 19th IFSCC Congress Sydney, October 1996 and Experimental Dermatology Vol 6 No 5, ISICD and ISBS Meeting Rome 2-4 October 1997

Skin Hydration, elasticity and surface microtopography are important cutaneous parameters reflecting sensory/aesthetic qualities of the skin and have been largely adopted as indicators of the effectiveness of cosmetic treatments. Several studies have been made about the influence of environmental and biological factors on them, while little is known about their correlation. Aim of our study was to investigate their intercorrelation and possible influence of cosmetic applications on their relationship. 30 healthy volunteers were subject to the study over a period of one year. 7 skin sites for each longitudinal half of the body were taken as test areas: volar aspect of the forearm (3sites), upperarm, breast cheek, forehead. The subjects divided into two groups were properly instructed to apply twice a day a W/O emulsion (1st group) and an O/W emulsion (2nd group) on the test sites of a half of the body; contralateral untreated sites were used as controls. Biophysical measurements of skin hydration, mechanical properties and surface geometry were made at regular intervals over the test period for each volunteer. The data collected were submitted to statistical analyses for cross-correlation and differences of the means. The following variables were considered: electric capacitance EC as measure of the hydration of the horny layer; the viscoelastic to elastic ratio  $U_v/U_e$  and the biological elasticity  $U_r/U_f$  as mechanical properties of the skin; mean roughness depth  $R_z$  and coefficient of skin extensibility LD as parameters of the skin surface microtopography. Age of the subjects was considered as biological variable. On untreated skin were observed: significant correlation of topographical and mechanical parameters with age; correlation of  $R_z$  with  $U_v/U_e$  (direct) and with  $U_r/U_f$  (inverse); correlation of LD with EC (inverse) and with  $U_r/U_f$  (direct). Correlation of mechanical properties with hydration was not significant. Treatment with W/O emulsion increases significantly hydration, elasticity and skin smoothness; intercorrelation of biophysical variables does not show important variations. The baseline correlation of microrelief parameters with age was reduced. Treatment with O/W emulsion increases moderately hydration and smoothness but does not effect the elastic properties of the skin; correlation of  $R_z$  with biological elasticity and viscoelastic component loses significance. Exposure of the skin to different type of emulsions can effect selectively the cutaneous biophysical parameters and vary their intercorrelation.

*J.W. Fluhr, W. Gehring, J. Bettinger, M. Gloor, Skin Visiometer SV 400 zur Hautrauhigkeitsmessung: EDV-gestützte Transmissions-Profilometrie*, Kosmetische Medizin 18/1997

The Skin Visiometer SV400 is a high speed device with good reliability to measure the skin roughness. The measurement principal of the Skin Visiometer is based on light transmission of a silicone replica and the light-measurement with a CCD-camera. The great disadvantage of the Skin Visiometer is, in comparison to conventional profilometers, the missing validity. This new device could help to analyse skin roughness in studies with dermatologic and cosmetic products, light protection and skin aging effects.

*M. Kläsger-Radez, Putting Claims to the Test*, SPC Oktober 1997

The pressure is on to substantiate your product claims or drop them altogether. Michael Kläsger-Radez of Courage + Khazaka explains how high-tech equipment is making this possible in skin care.

*D. Khazaka, Claim Support and Efficacy Testing – A New System to Analyse Skin Roughness*, SÖFW-Journal 5/98

The new 6<sup>th</sup> Amendment which is now effective since January 1<sup>st</sup> 1997, is the successor of the directive "on the approximation of the law of Member States relating to cosmetic products" from 1976.

**Beweiskraft der Tests.** Beauty Forum 1/98

Für jedes Hautproblem bietet die Kosmetikindustrie die wirksame Patentlösung - zumindest laut werbekräftiger Aussagen.

*E.J. Thumm, C. Bayerl, E.G. Jung, Evaluation Of The Efficacy Of Cosmetic Products By Using Profilometry*, 3rd Int.Symposium on Cosmetic Efficacy, May 1998

Efficacy of three cosmetic products was studied by using laser profilometry for skin roughness, by corneometry for the hydration of stratum corneum and by assessment of transepidermal water loss (TEWL).

*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

*K. Articus, C.A. Brown, K.P. Wilhelm, Scale Sensitive Fractal Analysis Using the Patchwork Method for the Assessment of Skin Roughness*, 12th ISBS, Boston, 06/98

A new method for three dimensional assessment of skin topology is presented.

*R.R. Warner, Y.L. Boissy, S.A. Lang, Microscopy of Lipid Structure in the Outer Stratum Corneum: The Effects of Age, Skin Grade and Frequent Soap Use*, 12th ISBS, Boston, 06/98

The effect of age, skin condition and extended soap use on the lipid structure of the outer stratum corneum (Sc) in humans was investigated using transmission electron microscopy of ruthenium-tetroxide-stained tape strips,

*H. Tronnier, Neuere Wirkstoffe in der Kosmetik – Teil 2*, Kosmetische Medizin Nr. 2, 1998

Eine Reihe neu oder wieder entdeckter Wirkstoffe für die Kosmetik wird vorgestellt und kritisch beleuchtet. Manches ist an Wirkungen an der Haut nachgewiesen, anderes bisher nur in Modellen und dann einfach auf die Haut übertragen worden. Für den Wirkungsnachweis bedeutet das aber speziell in der Kosmetik, daß dieser zur Bewertung prophylaktischer Maßnahmen, die ja erst nach Jahrzehnten zum Tragen kommen, natürlich kaum geführt werden kann, und hier ein Rückgriff auf eine Beeinflussung von Mechanismen, die zu einer Alterung, vor allem einer vorzeitigen führen, erfolgen muß.

*E. Thumm, E.G. Jung, Ch. Bayerl, Überprüfung der Auswirkung von Kosmetika auf Hautrauigkeit, Feuchtigkeitsgehalt und Barrierefunktion der Haut*. Kosmetische Medizin 3 Juni 1999

In einer seitenkontrollierten Studie wurde drei Kosmetikpräparate auf liposomaler Basis hinsichtlich ihrer Auswirkung auf a)Hautrauigkeit (Skin Visiometer SV 500), b) den Feuchtigkeitsgehalt des Stratum corneum (Corneometer CM825) und c) die Hautbarrierefunktion bzw. den transepidermalen Wasserverlust/TEWL (Tewameter TM 210) untersucht.

*M. Puschmann, A. Melzer, H.P. Nissen, Hautgättende, hautelastische und hautschützende Wirkung einer Urea-Ceramid-Kombination*. Kosmetische Medizin Nr.4, 1999

*V. Rogiers, K. de Paepe, I. Van Hecke, D. Roseeuw, A Light Transmission Method for the Study of Microrelief and Ageing*, ISBS and EEMCO Meeting, Liege, 09/1999

The Skin Visiometer SV 500® (Courage-Khazaka electronic GmbH, D) based on light transmission through coloured replica of the skin, has been used to measure skin microrelief as a function of ageing and the effects of a so-called anti-wrinkle preparation.

*C. Houghton, New natural oils*, Cosmetic Science & Business 2000

Here we look at a selection of vegetable oils from different sources which have recently come under R&D spotlight.

*M. Gotsche, R. Dieing, A. Jentzsch, P. Hoessel, W. Schrof, Investigations of Polymers for Skin Care, XX1st IFSCC Congress 2000, Berlin*

There is a need for improved skin care products due to a demographic shift in the population. A major challenge for the cosmetic chemist in this area is the improvement of skin smoothness and moisturization.

*K. de Paepe, J.M. Lagarde, Y. Gall, D. Roseeuw, V. Rogiers, Study of the Human Skin Microrelief by a Standardised Light Transmission Method, 13<sup>th</sup> ISBS Jerusalem, March 2000 and Skin Research and Technology, Vol. 6, No. 3, August 2000*

Human skin topography can be studied *in vivo* using non-invasive bioengineering techniques.

*K. de Paepe, J.M. Lagarde, Y. Gall, D. Roseeuw, V. Rogiers, Microrelief of the Skin Using a Light Transmission Method, Arch. Dermatol. Res (2000)*

The recently developed Skin Visiometer, based on light transmission through blue-coloured silicone replicas, was used to study skin microrelief. Calibrated metal plates displaying lines with depths between 6 and 361  $\mu\text{m}$ , were used to determine the accuracy, sensitivity and reproducibility of the technique as well as the parameters of importance during measurement.

*D. Schmid, A. Lang, T. Allgäuer, C. 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.

*K. Articus, Validierung und Anwendung eines photometrischen Verfahrens zur Rauigkeitsmessung von Hautoberflächen, Dissertation der Universität zu Lübbeck, 2000*

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

Measuring 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.

*K. Articus, C.A. Brown, K.-P. Wilhelm, Scale-sensitive fractal analysis using the patchwork method for the assessment of skin roughness, Skin Research and Technology, Vol. 7, No. 2, August 2001*

As skin roughness and wrinkles are easily perceived by the consumer, quantifying skin surface structures is a vital parameter for cosmetic product development. As more tools are available for measuring three-dimensional (3-D) surface data, instead of two-dimensional (2-D) profile lines, new algorithms are desirable, to take advantage of the information gathered.

*S. Sustmann, Body care for dry skin, Scientific Study Eubos Med, 2001*

Dry skin is a widespread phenomenon of our time and is characterized by a deficiency of fat and moisture.

*S. Sustmann, Face care for sensitive and particularly dry skin, Scientific Study Eubos Med, 2001*

Daily influences, such as stress and the effects of weather, attack our skin and cause damage that is initially slow and scarcely detectable.

*H.-P. Nissen, S. Sustmann*, **Body care for normal to oily and sensitive skins**, Scientific Study Eubos Med, 2001

Body cleansing is particularly important in modern civilization, with its emphasis on hygiene, and it makes an important contribution to individual well-being.

*H. Lambers, H. Pronk*, **Biophysical Methods for Stratum Corneum Characterization**, in T. Förster (Editor): *Cosmetic Lipids and the Skin Barrier*, 2001 by Marcel Dekker

There is no doubt that the application of 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.

*J. Sook Koh, H. Kang, S.W. Choi, H.O. Kim*, **Cigarette smoking associated with premature facial wrinkling: image analysis of facial skin replicas**, *International Journal of Dermatology* 2002

Current smokers have a higher degree of facial wrinkling than nonsmokers and past smokers. Past smokers who smoked heavily at a younger age show less facial wrinkling than current smokers. In the analysis, which was adjusted for age group, the relative risk of moderate to severe wrinkling for current smokers compared with nonsmokers was 2.72 (confidence interval, CI: 1.32-3.21,  $P < 0.05$ ).

*K. de Paepe, J.-P. Hachem, J.-M. Lagarde, E. Houben, Y. Galle, D. Roseeuw, V. Rogiers*, **Skin micro-relief topography measurements of ageing skin using a light transmission method**, *Skin Research and Technology*, Vol. 9, No. 2, May 2003, Abstract No. P69

Anti-wrinkle creams, anti-ageing products and all kinds of skin care products, developed to affect skin relief and reduce lines and wrinkles, are very popular and good sellers. Also for these products, it is necessary to comply with the actual cosmetic EU legislation and to substantiate the claims made.

*M. Fröschle, R. Plüss, A. Peter, F. Etzweiler*, **Phytosteroids for skin care**, *Personal Care*, Vol. Sept. 2004

Healthy skin is a largely self-regulating system. In order to keep metabolic processes functioning efficiently, the relevant biological precursors and activators must be available to the skin cells for metabolism. If, due to age-related changes, the body no longer provides a sufficient amount of certain substances, an additional external supplement can proactively support the biological processes and thus counteract the advance of the ageing process.

*S. Grippon, S. Leclère, J.-F. Molina, J.-L. Philbé*, **Interactive Polysaccharide “Second Skin” Film Protector to Combat Cutaneous Aggression**, *Personal Care Ingredients Asia*, Guangzhou, March 2004

Sugars do not cease to amaze us with their numerous, varied properties. They have mainly displayed their contribution to skin protection and beauty in the form of polysaccharides and oligosaccharides. They are involved at all levels in the body and their efficacy depends on their composition and structure. Whether involved in the complex process of cell communication, stimulating neuromediator synthesis, as sensorial moisturising agents or even protectors of the microbial ecosystem of the skin, they can also fulfil their role as a genuine defence against external aggression.

*S. Kim, B. Young Kang, S. Yong Cho, D. Suk Sung*, **20-O- $\beta$ -D-Glucopyranosyl-20 (S)-Protopanaxadiol (Compound K) Induces Expression of Hyaluronan Synthase 2 Gene in Transformed Human Keratinocytes and Fibroblasts and Increases Hyaluronan in Hairless Mouse Skin**, *IFSCC Magazine*, Vol. 7, No. 3, 2004

Ginsenosides, the major active ingredients of ginseng, show a variety of biomedical efficacies such as anti-ageing, anti-oxidation and anti-inflammatory activities. To understand the effects of 20-O- $\beta$ -

D-glucopyranosyl-20 (S)-protopanaxadiol (compound K) – one of the major metabolites of ginsenosides – on the skin, we assessed the expression level of approximately 100 transcripts in compound K-treated HaCaT cells using cDNA microarray analysis.

*A. Barel, M. Calomme, A. Timchenko, K. de Paepe, N. Demeester, V. Rogiers, P. Clarys, D. Vanden Berghe, **Effect of Oral Intake of Choline-Stabilized Orthosilicic Acid On Skin, Nails And Hair In Women With Photodamaged Facial Skin**, Poster Presentation, AAD 2005, New Orleans and Presentation on the IFSCC in Florence 2005*

Chronic exposure of the skin to sunlight or ultraviolet causes severe damage to the underlying connective tissue, with a loss of elasticity and a reduction in its protective function. Silicon (Si) was suggested to have an important function in the formation and maintenance of connective tissue.

*G. Böhm, J. Nutzmann, M. Jansen, N. Heussen, W. Gehring, V. Schumpelick, **Neue Hautemulsionen zur Behandlung der postoperativen Hautquellung der Chirurgenhand – eine klinisch prospektive Studie**, Kosmetische Medizin 07/05*

Chirurgen und OP-Personal erfahren durch das Tragen protektiver Handschuhe eine Erhöhung der natürlichen Respiration der Haut mit Bildung einer feuchten Kammer. Daraus resultiert ein stark hydratisiertes, gequollenes und mazeriertes Stratum corneum mit Erniedrigung der normalen Barrierefunktion.

*K. de Paepe, V. Rogiers, **Corneofix F20®**, a new technology to define skin desquamation*, Presentation on the ISBS Meeting 2005 in Philadelphia and Skin Research and Technology 2005, 11 (abstracts)

The aim of the present study was the evaluation of a newly marketed methodology for the characterization of the skin desquamation index (DI) being an important parameter for the evaluation of overall skin condition

*S. Cho, D.H. Lee, C.H. Won, S. Lee, M.J. Lee, J.H. Chung, **A Randomized, Double-Blind Clinical Trial on the Clinical Efficacy of Oral Supplementation with Chlorophyll Extracts on Skin Aging**, 21<sup>st</sup> World Congress of Dermatology, Buenos Aires, Argentina, 2007*

Chlorophyll, a polyene photoreceptor of plants, is known to have anti-inflammatory effects. Though its beneficial roles on aged skin were reported, there have been few systematic studies. The aim of this study is to evaluate the efficacy and tolerability of dietary chlorophyll extract supplementation on aging skin. Thirty healthy females (aged more than 45) were randomised to take low-dose or high-dose dietary supplementation containing chlorophyll extracts for 12 weeks

*H.K. Lee, Y.K. Seo, J.H. Baek, J.S. Koh, **Comparison between ultrasonography (Dermascan C version 3) and transparency profilometry (Skin Visiometer SV600)**, Skin Research and Technology 2008; 14, p. 8-12*

A recently developed method to estimate skin smoothness is the replica method, which may have the limitation of the roughness difference of actual skin due to the skin-replicating process. Therefore, observation of dermal layer change is very important. For this purpose, ultrasonic display equipment is generally used.

*E.-S. Hong, G.-W. Ahn, B.-K. Jo, **The Potential Anti-aging Properties of Prunella vulgaris Extract In Vitro and In Vivo**, IFSCC Barcelona 2008*

The dried *Prunella vulgaris* (self-heal) is one of the popular traditional herbal medicines in some Asian countries, and has been used extensively for the treatment of robustness, hyperpiesis, uteritis, goiter and so on[1-5]. The aim of this study was to examine various anti-wrinkle activities of *Prunella vulgaris* extract such as the activation of collagen synthesis, inhibition of collagenase synthesis,



inhibition of elastase activity and anti-oxidative activities in vitro. And we were also interested in investigating the effect of this *Prunella vulgaris* on the skin's surface in a double-blind clinical study.

*H. Tronnier, M. Wiebusch, U. Heinrich, Change in Skin Physiological Parameters in Space - Report on and Results of the First Study on Man*, *Skin Pharmacol Physiol* 2008;21: p. 283-292

Astronauts often show skin reactions in space. Systematic tests, e.g. with noninvasive skin physiological test methods, have not yet been done. In an interdisciplinary cooperation, a test series with skin physiological measurements was carried out before, during and after a long-term mission in the International Space Station. The hydration of the stratum corneum (Corneometer), transepidermal water loss (Tewameter), and the surface structure of the skin (SkinVisiometer) were measured. In order to record cutaneous states, the suction elasticity was measured (Cutometer), and an ultrasound measurement with 20 MHz (DermaScan) was also made. In addition, one measuring field of the two inner forearms was treated with a skin care emulsion. There were indications of a delayed epidermal proliferation of the cells, which would correspond to the clinical symptoms. Hydration and TEWL values are improved by respective skin care. On the cutaneous level, the elasticity measurements and the ultrasound picture showed results which correspond to a significant loss of elasticity of the skin. Further examinations are necessary to validate these preliminary results.

*H. Tronnier, M. Wiebusch, U. Heinrich, First Skin-Physiological Tests in Weightlessness in the ISS Space Station*, *IFSCC Magazin*, Vol. 11, No. 3/2008

A prolonged stay in weightlessness induces several medical alterations of the human body and also results in impairment of the skin. The stratum corneum, epidermal barrier as well as other skin compartments are affected in terms of their susceptibility to dryness, desquamation and pruritus. This can lead, for example, to wound healing disorders. Skin physiological tests were performed on the skin of an astronaut during the ASTROLAB-Mission within the Skin Care program initiated by the ESA. The skin was analysed before, partly during and after the mission. In addition, the tests were repeated after one year.

*A. del Pozo, M. Solans, C. Fernandez, M. Dolz, P. Corrias, M. Herráez, O. Díez-Sales, Efficacy evaluation and characterization of chitosan nanoemulsions with Spirulina hydro-glycolic extract*; *IFSCC Barcelona* 2008

Poster) Nanoemulsions represent an interesting prospect for use as vehicles in the development of formulations to deliver active ingredients to the human body. Particularly, nanoemulsion formulations have been shown to be superior for transdermal and dermal delivery of hydrophilic and lipophilic compounds, compared to conventional vehicles, such as hydrogels and emulsions [1]. Lecithins (phosphatidylcholines) have been used in several studies as surfactants for topical nanoemulsion vehicles. These surfactants are able to form nanoemulsions without co-surfactants.

*J.-M. Sainthillier, S. Mac, P. Humbert; La photographie numérique: un outil scientifique dans l'évaluation des traitements esthétiques et correcteurs*, *J. Méd. Esth. et Chir. Derm.* Vol. XXXVI, 144, décembre 2009

La photographie numérique et l'analyse d'image ont fait des progrès énormes ces 20 dernières années. Le développement de l'informatique et de la puissance de calcul ont permis les avancées technologiques clefs (migration des boîtiers argentiques, amélioration des CCDs, Matrice de Bayer). Il est désormais possible de réaliser des images dans des résolutions > 16 millions de pixels et d'y appliquer des algorithmes d'analyse réservés initialement à des stations de calcul (détections neuronales, filtrages non linéaire).

*J.-M. Sainthillier, S. Mac, P. Humbert; La photographie numérique: un outil scientifique dans l'évaluation des traitements esthétiques et correcteurs*, J. Méd. Esth. et Chir. Derm. Vol. XXXVI, 144, décembre 2009

La photographie numérique et l'analyse d'image ont fait des progrès énormes ces 20 dernières années. Le développement de l'informatique et de la puissance de calcul ont permis les avancées technologiques clefs (migration des boîtiers argentiques, amélioration des CCDs, Matrice de Bayer). Il est désormais possible de réaliser des images dans des résolutions > 16 millions de pixels et d'y appliquer des algorithmes d'analyse réservés initialement à des stations de calcul (détections neuronales, filtrages non linéaire).

*M. Udompataikul, P. Sripiroj, P. Palungwachira, An oral nutraceutical containing antioxidants, minerals and glycosaminoglycans improves skin roughness and fine wrinkles*, IFSCC Magazine, Vol. 12, No. 4 / 2009, p. 422

Various nutraceuticals (dietary supplements) are claimed to have cutaneous antiageing properties, however, there are limited number of research studies supporting these claims. The objective of this research was to study the effectiveness of an oral nutraceutical containing antioxidants, minerals and glycosaminoclycans on cutaneous ageing. In this double-blind, placebo-controlled trial, 60 women aged 35-60 years were randomized to receive oral dietary supplement (n=30) or placebo (n=30), once daily for 12 weeks.

*H. Kim, N. Kim, S. Jung, J. Mun, J. Kim, B. Kim, J. Lee, H. Ryoo, H. Jung, Improvement in skin wrinkles from the use of photostable retinyl retinoate: a randomized controlled trial*, Br J Dermatol. 2010 Mar;162(3): p. 497-502

Background: Photoaged skin can be treated with retinoids, which are natural and synthetic vitamin A derivatives. However, these are photounstable and can cause skin irritation, which is a major limitation in their use in general cosmetics. Retinyl retinoate, which is an ester of all-trans retinoic acid (RA) and all-trans retinol, has reduced toxicity due to blocking of the carboxyl end group of RA and higher skin regeneration activity than retinol. Objectives: To assess the efficacy of a photostable retinyl retinoate in treating women over 30 years old with periorbital wrinkles. Methods: We conducted two clinical studies with a total of 46 Korean women with periorbital wrinkles, who were not pregnant, nursing or undergoing any concurrent therapy. In the first clinical study, the efficacy of retinyl retinoate was compared with placebo. Twenty-four patients completed a 12-week trial of 0.06% retinyl retinoate applied twice daily to one side of the face and a placebo applied to the other side. In the second clinical study, the efficacy of retinyl retinoate was compared with retinol. Twenty-two patients completed an 8-week trial of 0.06% retinyl retinoate applied twice daily to one side of the face and 0.075% retinol applied to the other side. Efficacy was based on a global photodamage score, photographs, and image analysis using replicas and visiometer analysis (Skin-Visiometer SV 600; Courage & Khazaka, Cologne, Germany) every 4 weeks. The standard wrinkle and roughness parameters used in assessing skin by visiometer were calculated and statistically analysed. Results: The retinyl retinoate-treated wrinkles improved compared with wrinkles treated with placebo or retinol, as assessed by both the investigators and the subjects. Also, skin replica analysis indicated significant improvements in retinyl retinoate-treated skin in both studies, especially in average roughness. Conclusions: Retinyl retinoate applied twice daily was significantly more effective than a placebo or retinol in treating periorbital wrinkles. Importantly, no severe side-effects were observed.

*J.W. Shin, D.H. Lee, S.Y. Choi, J.I. Na, K.C. Park, S.W. Youn, C.H. Huh, Objective and non-invasive evaluation of photorejuvenation effect with intense pulsed light treatment in Asian skin*, J Eur Acad Dermatol Venereol. 2011 May;25(5): p. 516-22

Background: Intense pulsed light (IPL) has been widely used for photorejuvenation. Although previous literature has shown clinical effectiveness of IPL treatments on cutaneous photoaging, the associated changes in the biophysical properties of the skin following IPL treatments have not been fully

elucidated. Objective: The aim of this study was to evaluate changes in skin biophysical properties in patients with photoaging after IPL treatments, using non-invasive, objective skin measuring devices. Patients and Methods: A total of 26 Korean women with facial dyschromias underwent three sessions of IPL treatment at 4-week intervals. Outcome assessments included standardized photography, global evaluation by blinded investigators, patients' self-assessment and objective measurements of colour (Mexameter MX18, Chromatometer), elasticity (Cutometer), roughness (Visiometer), sebum (Sebumeter) and skin hydration (Corneometer). Results Intense pulsed light treatments produced a 15% decrease in the size of representative pigmented lesions ( $P < 0.05$ ). Conclusions: Patients' self-assessment revealed that 84% and 58% of subjects considered their pigmented lesions and wrinkles were improved respectively. Objective colorimetric measurement demonstrated significant improvements following IPL treatments that were most remarkable after one session of IPL. Moreover, skin elasticity showed significant improvements at the end of the study. Skin wrinkles as measured using Visiometer showed a mild improvement without statistical significance. Sebum secretion and water content of skin remained unchanged. Intense pulsed light provided significant improvement in the appearance of facial pigmented lesions in Korean patients. These effects appeared to be more remarkable in improving pigmentation, skin tone and elasticity.

*P. Perugini, M. Vettor, M. Bleve, G. Bruni, A. Mondelli, G.F. Secchi, F. Pavanetto, Preliminary evaluation of particle systems visualization on the skin surface by scanning electron microscopy and transparency profilometry, Skin Research and Technology 2012; 18: p. 45-54*

Humans have been exposed to nanoparticles throughout their evolutionary phase; however, this exposure has increased to a huge extent in the past century because of the industrial revolution. Nanoparticles constitute a part of particulate matter. Epidemiological studies have shown that urban pollution with airborne particulate matter deriving from combustion sources such as motor vehicle and industrial emission contributes to respiratory and cardiovascular morbidity and mortality.

*H. Kim, M. Kim, Y. Quan, T. Moom, J. Mun, H. Cho, N. Park, W. Moon, K. Lee, H. Kim, J. Lee, H. Ryoo, H. Jung, Novel anti-wrinkle effect of cosmeceutical product with new retinyl retinoate microsphere using biodegradable polymer, Skin Research and Technology 2012; 18: p.70-76*

Like all organs, skin undergoes characteristic changes with age. In addition, photoaging due to UV radiation causes undesirable changes in skin appearance. Photoaged skin is characterized by an increase of wrinkles, thickening, inelasticity, dryness, roughness, shallowness, and pigmentary mottling. Although retinoids, such as retinol and retinoic acid, have been considered a highly efficient anti-wrinkle agent through the booming of high-performance cosmetics, the side effects of retinoic acid and the instability of retinol in light and oxygen were the main hurdle for their application in the cosmetics industry.

*G. de Maria, F. Weighardt, A few hints to contrast aging. A multi-voice interview with leading companies showcasing their latest advancements, Household and Personal Care Today N 1/2012, p. 10-15*

The aging process is a challenging human experience common to everyone, and the desire to look and feel younger prevails in the majority of us. To this regard, science has found and validated with clinical studies several molecules and solutions addressing at the basis of most ageing processes. As a consequence several studies concentrate on those compounds which, through nutritional supply and/or topic application, can slow down or prevent oxidative processes. The most visible aspect of ageing resides in particular in the slow loss of turgidity and firmness of the skin. Wrinkle formation and loss of thickness of the skin are the consequences of a low change of the compositions of the extracellular matrix in dermis and epidermis. Another series of researches have addressed directly these phenomena by seeking for molecules being able to restore the composition and the chemical and physical properties of younger skin.

A. Manosroi, R. Chutoprapat, M. Abe, W. Manosroi, J. Manosroi, **Anti-aging efficacy of topical formulations containing niosomes entrapped with rice bran bioactive compounds**, Pharm Biol. 2012 Feb;50(2): p. 208-224

Context: Rice [*Oryza sativa* L. (Gramineae)] bran is a rich source of phytochemicals. Its oil also contains several bioactive components that exhibit antioxidative properties such as ferulic acid (F),  $\gamma$ -oryzanol (O), and phytic acid (P) which can be a new source of cosmetic raw materials. Objective: To evaluate the anti-aging effects of the gel and cream containing niosomes entrapped with the rice bran bioactive compounds. Materials and Methods: The semi-purified rice bran extracts containing F, O, and P which indicated the growth stimulation of human fibroblasts and the inhibition of MMP-2 by sulforhodamine B and gelatin zymography, respectively, were entrapped in niosomes by supercritical carbon dioxide fluid (scCO<sub>2</sub>) and incorporated in gel and cream formulations. The skin hydration, elasticity, thickness and roughness, and pigmentation in human volunteers after treated with these gel and creams were investigated by corneometer, cutometer, visiometer, and mexameter, respectively. Results: Gel and cream containing the semi-purified rice bran extracts entrapped in niosomes gave no sign of erythema and edema detected within 72 h on the shaved rabbit skin by the closed patch test investigated by mexameter and visual observation, respectively. These formulations also demonstrated higher hydration enhancement and improvement of skin lightening, thickness, roughness, and elasticity on the skin of 30 human volunteers within the 28-day treatment not more than 9, 27, 7, 3, and 3 times, respectively. Discussion and Conclusions: The formulations containing niosomes entrapped with the rice bran bioactive compounds gave superior clinical anti-aging activity which can be applied as a novel skin product.

C. Uhl, D. Khazaka, **Techniques for globally approved skin testing**, Personal Care April 2013

In efficacy testing and claim support for cosmetic products, objective measurement systems became indispensable long ago, especially since subjective clinical assessments are often prone to bias and inter-observer variation. Without suitable instrumentation it is close to impossible to determine what a product is really doing for the skin. Those objective measurement methods and subjective evaluations are mutually dependent. No measurement can be performed without the subjective evaluation of the results by the user of such instrumentation. However, a pure subjective evaluation of the skin without appropriate measurement techniques is not able to achieve accurate results either. This relationship becomes clearer when looking for example at skin colour measurements. Subjectively, the human brain cannot process slight changes in colour, especially when the colours are not viewed side by side, but at different points in time. Instrumental measurement however will clearly detect such slight changes. The achieved result must then be interpreted in context with the expected outcome or the hypothesis. For this, you will always need a knowledgeable and experienced person because 'a fool with a tool is still a fool', as the late Albert Kligman used to say. This relationship between objective measurement and subjective evaluation is not only true for the determination of differences in skin colour, but also for all other skin measurement parameters important for the cosmetic industry.

Y.H. Hong, E.Y. Jung, K.S. Shin, K.W. Yu, U.J. Chang, H.J. Suh, **Tannase-converted green tea catechins and their anti-wrinkle activity in humans**, J Cosmet Dermatol, 2013 Jun;12(2): p. 137-143

Background: This study was performed to investigate the anti-wrinkle effects of topical applications of green tea extract with high antioxidant activity by tannase treatment. Increases in gallic acid (GA), (-)-epigallocatechin (EGC), and (-)-epicatechin (EC) were observed in the green tea extract after tannase treatment. Objectives: This study was performed to investigate the anti-wrinkle effects of topical applications of green tea extract exhibiting high antioxidant activity after tannase treatment. Methods: Subjects, randomly divided into two groups, received the application of either tannase-converted green tea extract (TGE) or normal green tea extract (NGE) on their crow's feet for 8 weeks. The anti-wrinkle effects were evaluated with two methods: (i) self-assessment; and (ii) average roughness of skin surface (R(a), R(z), and R(t) value) using skin replica and Skin-Visiometer SV 600. Results: The scavenging abilities of TGE against radicals were significantly higher compared to NGE. The evaluation of skin wrinkle index values after 8 weeks of treatment showed that reductions of R(a),

R(z), and R(t) values in the TGE group were significantly greater than in the NGE group, which indicated that tannase treatment improved the anti-wrinkle effects of green tea extract. According to the overall ratings for wrinkle treatment by applying the formulations, most of the TGE group (63.60%) reported marked or moderate improvement in wrinkles compared with only 36.30% of the NGE group. Conclusions: Tannase treatment can improve the antioxidant activity of green tea extract, conferring anti-wrinkle activities. These results suggest that TGE may have beneficial properties as an anti-wrinkle agent.

*M. Kim, H. Yang, H. Kim, H. Jung, H. Jung, Novel cosmetic patches for wrinkle improvement: retinyl retinoate- and ascorbic acid-loaded dissolving microneedles*, Int J Cosmet Sci, 2014 Jun;36(3): p. 207-212

Objective: To evaluate wrinkle improvement and safety of a novel cosmetic dissolving microneedle patches loaded with two active compounds with different hydrophilicities, namely ascorbic acid and retinyl retinoate. Methods: Clinical studies were performed on 24 Korean women for 12 weeks. Patients in group A were treated with retinyl retinoate-loaded dissolving microneedle patches on the left eye crow's feet area, and patients in group B were treated with ascorbic acid-loaded patches on the right eye crow's feet area twice daily. Wrinkle improvement was evaluated by skin Visiometer SV 600. Results: Both the retinyl retinoate- and ascorbic acid-loaded dissolving microneedle patches demonstrated statistically significant differences in all Visiometer R-values ( $P < 0.05$ ). In particular, highly significant differences were shown at R1 (skin roughness) and R5 (arithmetic average roughness) ( $P < 0.001$ ). Also, there were no side effects such as allergies or irritant contact dermatitis. Conclusion: Retinyl retinoate and ascorbic acid were successfully loaded into dissolving microneedles and used to produce novel cosmetic patches. These novel patches can be used efficiently in cosmetics given their patient usability, safety and effectiveness in wrinkle improvement.

*E.S. Hong, E.J. Seo, K.S. Kim, S.J. Lee, The Potential Anti-Aging Properties of Camellia Sasanqua Extract in vitro and in vivo*, SÖFW-Journal 140, 3-2014

Introduction: The skin aging process can be divided into intrinsic aging and extrinsic aging (1). Intrinsic aging, also known as the natural aging process, is characterized by smooth, dry, pale and finely wrinkled skin. In contrast to intrinsic aging, extrinsic aging is due to environmental factors such as sun exposure, air pollution, smoking, alcohol abuse, and poor nutrition. Since ultraviolet (UV) exposure is the principal cause of extrinsic aging, it is often referred to as photoaging. Extrinsic aging is characterized by loss of elasticity, increased roughness, dryness, hypopigmentation and deep wrinkling (2). Matrix metalloproteinases (MMPs) are key regulators in the photoaging process of skin due to the reactive oxygen species generated by exposure to ultraviolet (UV) irradiation.

*T. Baldecchi, L. Heider, M. Lefort, C. Carola, C. Cartigliani, A. Bonfigli, F. Pflücker, The skin firming "Red-revolution": anti-cellulite efficacy of a Papaver rhoeas extract*, IFSCC 2014 Paris

Abstract: The intention of this paper is to report about the in vivo efficacy of a natural active ingredient based on the seeds of a special poppy species. This Papaver rhoeas extract can significantly increase skin blood micro-flow and flatten the dermo-hypodermal junction, leading to a visual improvement of cellulite conditions. The study confirms the outcome of several in vitro and ex vivo investigations in which the extract displays both a prevention of lipogenesis and an activation of lipolysis. This set of results demonstrates that this natural ingredient may offer an attractive option to design skin firming, skin shaping, face contouring or anti-cellulite cosmetic products.

*H.-S. Yoon, S.-R. Lee, J. H. Chung, Long-term Topical Oestrogen Treatment of Sun-exposed Facial Skin in Post-menopausal Women Does Not Improve Facial Wrinkles or Skin Elasticity, But Induces Matrix Metalloproteinase-1 Expression*, Acta Derm Venereol 2014; 94: p. 4–8

It is controversial whether treatment with oestrogen stimulates collagen production or accumulation in sunexposed skin. The aim of this study was to determine the effect of long-term

treatment with topical oestrogen on photoaged facial skin, with regard to wrinkle severity, and expression of procollagen and matrix metalloproteinase-1 enzyme. Two groups of 40 post-menopausal women applied either 1 g of 1% oestrone or vehicle cream once daily to the face for 24 weeks. Visiometer R1–R5 values (skin wrinkles) and Cutometer values (skin elasticity) were not significantly improved in the oestrone group after 24 weeks of treatment. Type I procollagen immunostaining did not increase in the oestrone group compared with the control group. However, levels of matrix metalloproteinase-1 mRNA increased robustly (10.3 times) in oestrone-treated skin compared with vehicle-treated skin. Thus, treatment with topical oestrogen may be deleterious in ultraviolet-induced skin ageing, at least in part, through induction of matrix metalloproteinase-1 (MMP-1) expression in human skin.

*H.J. Lee, E.G. Lee, S. Kang, J.-H. Sung, H.-M. Chung, D.H. Kim, **Efficacy of Microneedling Plus Human Stem Cell Conditioned Medium for Skin Rejuvenation: A Randomized, Controlled, Blinded Split-Face Study**, Ann Dermatol Vol. 26, No. 5, 2014, p. 584-591*

Background: The use of growth factors in skin rejuvenation is emerging as a novel anti-aging treatment. While the role of growth factors in wound healing is well established, their use in skin rejuvenation has only recently been to be studied and no controlled trials have been performed. Objective: We evaluated the anti-aging effects of secretory factors of endothelial precursor cells differentiated from human embryonic stem cells (hESC-EPC) in Asian skin. Methods: A total of 25 women were included in this randomized, controlled split-face study. The right and left sides of each participant's face were randomly allocated to hESC-EPC conditioned medium (CM) or saline. To enhance epidermal penetration, a 0.25-mm microneedle roller was used. Five treatment sessions were repeated at 2-week intervals. Results: Physician's global assessment of pigmentation and wrinkles after treatment revealed statistically significant effects of microneedling plus hESC-EPC CM compared to microneedling alone ( $p < 0.05$ ). Skin measurements by Mexameter and Visiometer also revealed statistically significant effects of microneedling plus hESC-EPC CM on both pigmentation and wrinkles ( $p < 0.05$ ). The only minimal adverse event was mild desquamation in one participant. Conclusion: Secretory factors of hESC-EPC improve the signs of skin aging and could be a potential option for skin rejuvenation.

*J.C. Bernengo, H. Adhoute, D. Mougin, **Measurement of the time off light of photons into the skin: influence of site, age and gender, correlation with other skin parameters**, Skin Research and Technology 2015; 21: 25-34*

Background/purpose: The speed of light (time of flight) into the skin is obviously related to its structure, and might appear as a tool for non-invasive investigation of skin physico-chemical properties, among them aging is of primary importance. Though already published, such time of flight measurements have never been extensively correlated with other well-documented skin parameters such as localization, the influence of gender and age, the elasticity and roughness, and the water trans-epidermal diffusion (TEWL).

*A. Mohamed, **Cococin rejuvenating coconut water for Skin and Hair Care**, Euro Cosmetics; 1/2-2015*

Cococin CG is obtained from coconut (*Cocos nucifera*) and is standardized to contain at least 30% total carbohydrates and free amino acids. It is used in hair care formulations and in rejuvenative topical preparations. It is available in liquid form. Also available is Cococin, the freeze-dried tender coconut water available in a free flowing powder form. Cococin is rich in proteins, amino acids, sugars, vitamins, minerals and growth hormones essential to promote tissue and hair growth.

*D.H. Lee, I.Y. Oh, K.T. Koo, J.M. Suk, S.W. Jung, J.O. Park, B.J. Kim, Y.M. Choi, Improvement in skin wrinkles using a preparation containing human growth factors and hyaluronic acid serum, J Cosmet Laser Ther, 2015 Feb;17(1): p. 20-23*

Background: Skin aging is accompanied by wrinkle formation. At some sites, such as the periorbital skin, this is a relatively early phenomenon. Objective: We evaluated the anti-wrinkle effect of a preparation containing human growth factor and hyaluronic acid serum on periorbital wrinkles (crow's feet). Material and Methods: In total, 23 Korean women (age range: 39-59 years), who were not pregnant, nursing, or undergoing any concurrent therapy, were enrolled in this study. All the patients completed an 8-week trial of twice-daily application of human growth factor and hyaluronic acid serum on the entire face. Efficacy was based on a global photodamage score, photographs, and image analysis using replicas and visiometer analysis every 4 weeks. The standard wrinkle and roughness parameters used in assessing skin by visiometer were calculated and statistically analyzed. Results: Periorbital wrinkles were significantly improved after treatment, with improvements noted both by physician's assessment and visiometer analysis. Conclusion: Topical application of human growth factor and hyaluronic acid was beneficial in reducing periorbital wrinkles.

*P. Leelapornpisid, R.R. Wickett, S. Chansakaow, N. Wongwattananukul, Potential of native Thai aromatic plant extracts in antiwrinkle body creams, J Cosmet Sci, 2015 Jul-Aug;66(4): p. 219-231*

Antioxidant activities of 10 essential oils and 10 absolutes extracted from Thai aromatic plants were evaluated and compared to thyme oil, trolox, quercetin, and kaempferol by two independent assays: the 2, 2-diphenyl-1-picrylhydrazyl (DPPH\*) radical scavenging assay and the thiobarbituric acid reactive species (TBARS) assay for lipid peroxidation. We found that four essential oils including ginger oil (*Zingiber officinale* Roscoe), Wan-sao-long leaf oil (*Amomum uliginosum* Koen), lemongrass oil (*Cymbopogon citratus*), holy basil oil (*Ocimum sanctum* L.), and the absolute of dwarf ylang-ylang [*Cananga odorata* Hook. f. & Thomson var. *fruticosa* (Craib) J. Sinclair] exhibited high antioxidant activity in both DPPH and TBARS assays and possessed satisfactory fragrance properties. These were then combined into an essential oil blend (EOB) and retested for antioxidant activity. The EOB also exhibited high antioxidant activity in the above assays. It was then incorporated into a stable cream base as EOB body cream. The EOB body cream was found to be best able under storage in stress conditions and presented significantly higher antioxidant activity than its' cream base both before and after stability testing. The effect of EOB body cream on skin surface topography was evaluated in 29 healthy volunteers using the Skin Visiometer (SV 600 FW, CK Electronic GmbH, Germany). Three parameters, Ra, Rz (roughness), and surface, were analyzed. After 4 weeks of application, the EOB body cream showed significant reductions in surface and Rz compared with before treatment ( $p < 0.05$ , paired t-test), and with untreated and placebo treatment ( $p < 0.05$ , Duncan test). These results indicate that the essential oils and absolutes from Thai plants may serve as potential sources of natural antioxidants for spa and cosmetic products designed to prevent or treat signs of skin aging.

*Y.H. Hong, U.J. Chang, Y.S. Kim, E.Y. Jung, H.J. Suh, Dietary galacto-oligosaccharides improve skin health: a randomized double blind clinical trial, Asia Pac J Clin Nutr 2017;26(4): p. 613-618*

Background and Objectives: To study the effects of galacto-oligosaccharides (GOS) on the skin, we investigated skin-related parameters in healthy adults who received GOS for 12 weeks. Methods and Study Design: This double-blind, randomized, placebo-controlled study included subjects divided into two groups (control and GOS) by stratified block randomization. The GOS group received 1.0 g of GOS twice a day, whereas the control group received only vehicle. Results: The results showed that the increase in corneometer values from baseline to week 12 was significantly greater in the GOS group than in the control group (6.91 vs 2.88 arbitrary units,  $p < 0.05$ ). The transepidermal water loss (TEWL) in the GOS group was reduced significantly after 12 weeks of GOS treatment (20.1 g/h/m<sup>2</sup> at baseline vs 17.5 g/h/m<sup>2</sup> at week 12,  $p < 0.05$ ). The differences in total and percentage of wrinkle areas between the two groups were statistically significant after 12 weeks of GOS treatment ( $p < 0.05$ ). Conclusion: Our findings support that oral treatment with GOS is beneficial to the skin and present the possibility of new

nutritional strategies for skin care.