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Literature List

Visiopor® PP 34

A. Gianetti, The European aesthetic guide, Autumn 2008, S. 43-50

As in previous years, the congress will be accompanied by a highly impressive industrial exhibition featuring app. 300 companies and a large poster display. Global laser and light technology manufacturers, as well as companies from diagnostic, dermal filler, implant, pharmaceutical and neutraceutical industries will use this opportunity to display product innovations and introduce new clinical results.

H. Dobrev, Use of Visiopor to Study Skin Fluorescence in Acne, 6th Regional Conference of Dermatology and Venerology, 30.04.-02.05.2010, Hisarva, Bulgaria

Acne vulgaris – Definition: Acne vulgaris is a chronic inflammatory disease of the pilosebaceous units that affects 80% of people between the age of 11 and 30 years. Acne – Multifactorial pathogenesis: Retentional hyperkeratosis; Increased sebum production; Propionibacterium acnes; Inflammation Acne and skin microflora: Acne is not infectious. Cutaneous microflora is an element of acne pathogenesis which contributes to the inflammation. Cutaneous microflora is of secondary importance compared with: sebaceous gland activity; hyperproliferation of follicular keratinocytes (significant microbial involvement occurring only after sebum production has increased and comedone formation has become established)

E. Xhaufaire-Uhoda, G. Szepetiuk, A. Schreder, F. Henry, G. Piérard, Tracabilité de la fluorescence folliculaire due à Propionibacterium acnes. Effet d'extinction par certains anti-acnéiques et des crèmes solaires, Skin, Vol. 13 No. 3, 2010

Diverses structures cutanées peuvent émettre une fluorescence en réponse à la stimulation lumineuse spécifique d'un fluorophore particulier. En particulier, la fluorescence de porphyrines peut être détectée sous différentes illuminations dans le spectre allant de la lumière bleue aux rayons ultraviolets dont la longueur d'onde est comprise entre 300 et 450nm. La source lumineuse d'excitation peut être la lumière de Wood, celle d'une lampe à arc, d'une lampe au krypton, d'une lampe à mercure avec un filtre adéquat, d'une source lumineuse bleue incohérente ou violette dont la longueur d'onde se situe au pic d'excitation de la fluorescence, ainsi que de lampes diodes particulières et de quelques autres systèmes encore. Sous ces stimulations, la fluorescence des porphyrines apparaît rougeâtre.

H. Dobrev, Fluorescence diagnostic imaging in patients with acne, 2010 John Wiley & Sons A/S, Photodermatology, Photoimmunology & Photomedicine

Acne is a chronic inflammatory disorder of the pilosebaceous follicles with a multifactorial etiology and pathogenesis. It typically begins in adolescence when androgen hormones stimulate the production of sebum and proliferation of follicular epidermis. In consequence, the openings of hair follicles become plugged with oil secretion and corneocytes. The follicular impactions develop into initially invisible lesions (microcomedones) and then into clinically evident comedones.

G. Szepetiuk, G.E. Piérard, Scrutinizing the antibacterial effect of acne treatments using the novel Visiopor PP34 camera, Household and Personal Care TODAY – n 3/2010

Acne is a common disorder in adolescents and young adults. It results from alterations taking place in pilosebaceous follicles. These structures are most abundant on the face, chest and upper back. Several sequential biological steps are involved in the initiation, maturation and regression of each acne lesion. At first, during the preadolescent age, hormonal changes progressively lead to increased circulating androgens, both in boys and girls. Androgen receptors are present in the sebaceous gland apparatus. Their stimulation leads to increasing the size of the sebaceous gland, the sebum flow (skin greasiness) and the size of opening of the excretion duct at the skin surface (skin pore, acroinfundibulum).

G. Szepetiuk, S. Piérard, C. Piérard-Franchimont, M. Caucanas, P. Quatresooz, G.E. Piérard, Recent trends in specular light reflectance beyond clinical fluorescence diagnosis, Eur J Dermatol 2011; p. 157-161

Under specific light illumination, particularly ultraviolet (UV) and near-UV light stimulation, the skin produces both specular light reflectance and, possibly, specific fluorescent emission. These properties offer diagnostic clues and disclose some peculiar functions of the skin. A series of superficial infections (erythrasma, some tinea capitis types, tinea/pityriasis versicolor, dermatophytoses, etc.) and pilosebaceous follicles enriched in *Propionibacterium spp* show fluorescence. This latter characteristic is downgraded or lost while on some anti-acne treatments. A quenching effect of fluorescence is observed following the application of sunscreens.

C. Piérard-Franchimont, P. Quatresooz, G.E. Piérard, Specular light reflectance of flakes in seborrhoeic dermatitis of the scalp: a pilot study; Experimental dermatology 2011, p. 1-4

Seborrhoeic dermatitis and dandruff are common scalp conditions. In this study, we set out to explore a new method for rating both the severity of the scalp condition and the efficacy of scalp-care compounds. Scalp flakiness was sampled for 40 volunteers using adhesive-coated clear discs, with image analysis used to quantify the specular light reflectance (SLR) of the flakes. Two ultraviolet (UV)-emitting charge-coupled device cameras (Visioscan VC98 and Visiopor PP34) were used. SLR clearly highlighted the flakiness with high contrast against a black background, and the recorded appearance could be conveniently submitted to the image-analysis system for quantification. In conclusion, SLR under UV illumination highlights scalp flakiness, allowing objective measurements.

G.E. Piérard, S. Seité, A. Rougier, P. Quatresooz, Analytic assessment under ultraviolet light of actinic lentigines under bleaching treatment

Actinic (solar) lentigines are melanitic tumors frequently developed during photoaging on the dorsum of the hands. Bleaching (whitening) agents are commonly offered to fade their darker aspect. In general, regular colorimetric methods show poor sensitivity to disclose any bleaching effect. The present randomized controlled study on 24 women was designed to objectively assess the clinical efficacy of a combination of bleaching agents on actinic lentigines. In the endeavour of improving sensitivity. The ultraviolet light-enhanced visualization (ULEV) method was used to derive analytical measurements of lentigo areas and darkness

G.E. Piérard, C. Piérard-Franchimont, P. Humbert, Bioimpact of EGFR antagonists on the pilosebaceous follicles, Eur J Dermatol 2011, p. 1-4

Cancer patients under targeted chemotherapy to the epidermal growth factor receptor (EGFR) frequently suffer from unusual skin adverse events. In the past, these changes were globally qualified as a rash. Our aim was to assess objectively by non invasive bioinstrumentation some early structural and functional skin changes associated with EGFR inhibitor treatment. A series of 27 cancer patients aged 58-66 years were assessed using two ultraviolet light emitting CCD cameras, Visioscan and Visiopor. Assessments were performed on the foreheads at inclusion and therefore at weekly intervals for 2 months at most. No topical treatment was applied during the assessment period.

G. Szepetiuk, S. Pierard, C.M. Caucanas, Recent trends in specular light reflectance beyond clinical fluorescence diagnosis, Eur J Dermatol 2011; 21(2):157-61

For centuries the human eye was the only imaging device. Since the introduction of microscopy, technical advances have been progressively brought through instruments. In fact, a considerable research effort has been launched and rapidly improved new imaging technologies over the past two decades. They have been successfully applied to skin observation, each of them affording new insight into and specific information on cutaneous morphology and physiology. In this field, we are looking at what the eye has never seen before.

G. Mayeux, E. Xhaufnaire-Uhoda, G.E. Piérard, Patterns of aluminium hydroxychloride deposition onto the skin, Skin Research and Technology, 2011

The normal stratum corneum (SC) is nearly impermeable except for some small size xenobiotics and a minute amount of water evaporating from its surface. This property supports the concept of a diffusional barrier function that may be weakened in some conditions. The remarkable barrier effect results from the highly organized structure of the SC. The predominant route for water passage is thought to reside in the intercorneocyte path composed of a complex mixture of lipids structured in rigid bilayer arrays. In practice, the measurement of transepidermal water loss (TEWL) is performed at rest in a cool environment in order to assess this physiological process. Under physical or emotional stress, TEWL is severely altered by sweating.

T. Hermanns-Lê, K. Al Rustom, C. Piérard-Franchimont, G.E. Piérard, S. Piérard, Le “cheetah-look” Le phenotype guépard, face cache de la pigmentation mélanique innée du visage, DERM ACTU No° 131 Mai-Juin 2012

Au niveau du visage, trois types principaux de pigmentation physiologique peuvent être distingués. On identifie d'une part des mélanoses zonales ethniques comme la pigmentation orbitaire. D'autre part, le territoire facial peut comporter des zones mélaniques discrètes limitées par des lignes de démarcation coedifiées qui donnent un effet de “tigre-look” sous éclairage en lumière ultraviolette. Enfin, des mouche-tures relativement régulières, peuvent parsemer le visage, contribuant à un “cheetah-look” très particulier sous lumière ultraviolette. La lampe de Wood est un outil ancestral permettant des observations dans un spectre relativement étroit de lumière ultraviolette. Cet équipement centenaire a fait l'objet de transformations techniques nombreuses pour aboutir à des cameras de type Visioscan et Visiopor (C+K electronic, Cologne).

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.

R.S. Teixeira, L.A. Araújo, D.G. Mercúrio, P.M.B.G. Maia Campos, Application of biophysical techniques to evaluate the efficacy of a gel with zinc pca, University of Sao Paulo, 2013

The biophysical and skin imaging techniques are effective tools to help characterize the skin type and to evaluate the clinical efficacy of products cosmetics because they are non-invasive methods and enable to evaluate the products directly in human skin.

G. Piérard, D. Khazaka, G. Khazaka, Sunscreen remanence on the skin: a noninvasive real time in vivo spectral analysis assessing the quenching of specular ultraviolet A light reflectance, Journal of Cosmetic Dermatology, 15,p. 3-9

Abstract - Background: Under specific light illumination, particularly ultraviolet radiation (UVR), the skin produces both specular light reflectance and, possibly, specific fluorescent emission. A quenching effect of fluorescence is observed following the application of sunscreens active against UVA radiations. Aims: To assess noninvasively in a real-time process, the potential sunscreen remanence/substantivity after application on the skin. Methods: The Visiopor[®] device was used in a real-time procedure after application of sunscreens to the skin. A quenching effect of follicular fluorescence due to bacterial porphyrins was evaluated at 30-min intervals. The Visioscan[®] device was used as a distinct UVA emitter in a control procedure of spectral analysis of specular UVR emission and reflectance by dermal fibers. Results: Under UVA-1 irradiations, facial skin produced different patterns of specular UVR reflectance and fluorescent emission as well. The porphyrin-related follicular fluorescence was instantly abated by UVA blockers present in sun care products. The potential sunscreen remanence/substantivity was assessed by the follicular and interfollicular fluorescence recurrence all along the next hours.

S. Eisenberg, H. Hanau, D. Kleefeld, V. Bicard-Benhamou, H. Driller, 3R regulation of oily skin and microflora balance, Personal Care April 2016

There is something many of us remember from our teenage years but only a few associate with adulthood: oily skin. Oily skin is a major issue, because it affects those areas that are the most exposed, like the chin, forehead and nose. Oily and impure skin causes a real aesthetic problem and may lead to higher acne susceptibility. Even in adults, a healthy facial skin and complexion play an important role. Consumers around the world have become very self-conscious of their appearance.

C. Richter, C. Trojahn, G. Dobos, U. Blume-Peytavi, J. Kottner, Follicular fluorescence quantity to characterize acne severity: a validation study, Skin Research and Technology 2016; 0: 1-9

Background: Porphyrins are native fluorophores in the follicle openings, visible under ultraviolet-A light. Acne severity might be associated with increased Propionibacterium acnes colonization and porphyrin production. Aim of this study was to investigate whether the parameter fluorescence quantity can be used to measure acne severity. Methods: A validation study was conducted in 24 patients with acne using split-face design. Acne severity was measured using Investigator Static Global Assessment scores and lesion counts. Reliability, construct validity and sensitivity to change in fluorescence quantity were investigated. Results: Mean baseline Investigator Static Global Assessment score was 2.7 (SD 0.1). Mean baseline fluorescence quantities were 24.8 (SD 4.0) on the cheek and 20.3 (SD 4.6) on the chin. On day 25, values ranged from 6.0 (SD 6.0) to 18.1 (SD 18.4) on the cheek and from 2.6 (SD 4.4) to 14.7 (SD 16.2) on the chin. The intraclass correlation coefficients of fluorescence quantity ranged from 0.513 to 0.987. Effect sizes for fluorescence measurements were highest on the chin and cheek ranging from 0.24 to 0.77 and 0.32 to 0.75, respectively. Conclusion: Fluorescence quantity indicates acne severity, especially on the inner cheek and chin areas. Fluorescence quantity is reliable but is not as sensitive as manual lesion counting.

C. Oliveira, A. Silva, L. Fagundes, N. Raposo, A. Ferreira, M.A.F Brandão, Polonini, Development and Preliminary Cosmetic Potential Evaluation of Melaleuca alternifolia cheel (Myrtaceae) Oil and Resveratrol for Oily Skin, J Dermatol Res Ther 2016, 2:032, Volume 2 | Issue 4

Background: Oily skin presents shine in excess, as well as increased pores and acne. For this reason, people with oily skin have more difficulty using cosmetics in general. This is the first

report in literature to evaluate a multi-purpose dermatological emulsion containing *Melaleuca alternifolia* Cheel (Myrtaceae) (tea tree) oil and resveratrol for oily skin.

C. Uhl, D. Khazaka, **Test equipment supports anti-pollution claims**, PERSONAL CARE ASIA PACIFIC, May 2017, p. 27-29 and PERSONAL CARE EUROPE, September 2017, p. 74-76

Pollution and its impact on the skin have recently become the main topic at all important cosmetic events, and products claiming to protect the skin from pollution effects are a major trend in the cosmetic and personal care industry.

V. Bicard-Benhamou, J. zur Lage, L. Heider, D. Kleefeld, S. Eisenberg, F. Pfluecker, **Evaluation of the potential of a cyclohexyloxy derivative targeting impure skins**, 42th SICC National Congress & 1st IPCE Conference June 2017, Stresa, Italy

Butyl hydroxycyclohexane carboxylate (BHCC, structure shown on Figure 1, a cyclohexyloxy derivative is an adequate innovative solution to an issue well-known from our teenage years and yet more rarely associated with adulthood: oily skin and its impact on the appearance of acne formation. At all ages impure skin issues may lead to a real aesthetic problem considering that in nowadays life, image resulting from own appearance matters more and more and because it appears on body parts most exposed to view like for instance forehead, nose and chin. Oily skin may result in skin especially prone to open pores, blackheads, spots and pimples, skin appearing greasy and coarse and skin looking uneven. Most people associate oily skin with teenage years, but oily skin can persist long beyond adolescence and for some people it might last a lifetime. Nevertheless, acne most often begins in puberty when androgens level increases causing sebaceous glands to become more active resulting in increased sebum production. *Propionibacterium acnes* (*P. acnes*), mainly colonized in the pilosebaceous unit, plays a crucial role in the development of acne. Acne patients demonstrate marked increases of this microorganism (1), *P. acnes* and its metabolites, the porphyrins, are also associated with inflammation processes in the skin. The perception of the skin as an ecosystem can advance our understanding of the delicate balance between host and microorganism. Disruptions in the balance on either side of the equation can result in skin disorders or infections (2) and non-beneficial bacteria are associated with them. On the other way beneficial bacteria helps preventing pathogenic microorganisms from colonizing the surface of the skin and preserving them is essential. A healthy and balanced microflora is therefore crucial. BHCC helps relieving skin from susceptibility to acne development and supporting skin health. BHCC provides a triple effect: it Regulates Sebum, it Reduces inflammation, and finally it rebalances skin's microflora and all the results shown here provide a scientific demonstration of these claims.

M.L. Vazquez-Gonzalez, M. Cocerra, J. Nestor, G. Rodriguez, R. Saldana, L. Barbosa-Barros, O. Lopez, **Innovative approach to control acne-prone skin**, PERSONAL CARE ASIA PACIFIC, March 2018

Excessive sebum production can give rise to oily skin, shiny appearance, enlarged pores and favour the development of acne lesions. The care of acne-prone skin involves the use of harsh molecules, wash out and multi-step products that irritate the skin and limit user compliance. This study describes the development of a bicosome system that targets the epidermis and follicles to effectively deliver a sebostatic active compound and potentiate its effects on sebum production and acne lesion prevention. This is an alternative approach to that offered by current products, which can be included in the daily care of acne-prone skin.

M. Gabarra Almeida Leite, P.M. Berardo Gonçalves Maia Campos, **Evaluation of Oily Hair and Skin: Comparison between Self Perception and Clinical Analysis Using Biophysical and Imaging Techniques**, Poster Presentation at ISBS Conference San Diego, May 2018

Introduction: Excess of oiliness can cause skin changes such as acne and compromise the cutaneous physiology, affecting of both skin and hair. Thus, the aim of this study was to evaluate skin and hair alterations due to excessive amount of sebum using biophysical and imaging techniques. Methodology: 100 participants (18 - 49 years), with oily skin and hair, were recruited. Skin was evaluated in terms of stratum corneum water content, TEWL, activity of the sebaceous glands,

amount of porphyrins and pores. Scalp was evaluated in terms of sebum content. Results and Conclusions: Participants were divided 4 groups: 1- Oily skin and hair (45,23%), 2- Oily skin and normal hair (10,71%), 3- Normal skin and oily hair (34,52%) and 4- Normal skin and hair (9,52%). The participants with oily skin presented activity of the sebaceous glands of 9.1 ± 1.1 surface (%), high amount of pores and presence of porphyrins, and scalp amount of sebum of $330,6 \pm 9,8$ $\mu\text{g}/\text{cm}^2$. Although all the panelists considered their hair and skin oily, they were classified differently, showing that the tropical weather can influence the self-perception and lead to a wrong treatment without the correct evaluation.

M.L. Vazquez-Gonzalez, M. Cocerra, J. Nestor, G. Rodriguez, R. Saldana, L. Barbosa-Barros, Innovative approach to control acne-prone skin, PERSONAL CARE EUROPE, April 2018, p. 153-156

Excessive sebum production can give rise to oily skin, shiny appearance, enlarged pores and favour the development of acne lesions. The care of acne-prone skin involves the use of harsh molecules, wash out and multi-step products that irritate the skin and limit user compliance. This study describes the development of a bicosome system that targets the epidermis and follicles to effectively deliver a sebostatic active compound and potentiate its effects on sebum production and acne lesion prevention. This is an alternative approach to that offered by current products, which can be included in the daily care of acne-prone skin.

C. Uhl, G. Lanzendörfer-Yu, How effective is your anti-acne product?, SPC December 2018

For assessing, treatment analysis and documentation, acne has to be either graded or lesion scoring has to be done. Both methods strongly depend on the skills of the examiner and bear high inter-individual deviations. Biophysical measurements using sebometry, porphyrin fluorescence, and standardized photographic images of the face can overcome these disadvantages. Additionally, they can be used for comprehensive evaluation of the treatment protocol.

C. Uhl, Efficacy testing of microbiome skin care, PERSONAL CARE EUROPE, April 2019, p. 41-45, PERSONAL CARE ASIA, May 2019, p. 51-55, косметолог 2 [94] 2019 (in Ukrainian), Cosmetics & Toiletries Brasil, Vol. 31, Mai-June, 2019, p. 22-27 (in Portuguese)

For years now, we have accepted the idea that we can nourish our intestinal tract with dedicated bacterial ingredients from food supplements and thereby improve our general health. Books written on this subject have become bestsellers. But why should we focus only on our intestinal tract? There are so many different microbial communities that can be found on and inside our body. Especially the colonization of the skin being our largest organ, tangible to the hands, visible to the eye, and in constant contact with the outside environment has moved to the front of cosmetic research. The idea of being a complex ecosystem is adding to the existing trend of personalised cosmetics, and will confirm the customer in their feeling of uniqueness.

В течение многих лет мы принимали идею о том, что можем обогащать наш кишечный тракт специальными бактериальными ингредиентами из пищевых добавок и тем самым улучшать общее состояние здоровья. Книги, написанные на эту тему, стали бестселлерами. Но можем ли мы сосредотачиваться только на нашем кишечном тракте?

O microbioma cutâneo é a população de microrganismos que habita a pele. Neste trabalho, o autor apresenta uma breve descrição da importância da atividade do microbioma e dos meios analíticos instrumentais para medir a eficácia de produtos cosméticos de interesse do microbioma cutâneo.

C. Uhl, Claim support for Microbiome Skin Care, happi, July 2019

Since the dawn of mankind, humans have struggled to understand why they were struck by disease. Many theories have been established, most of them discarded now. In the first century BC, Roman medical author Cornelius Aulus Celsus mentioned the term "virus," the Latin term for "poison." He used it to describe the phlegm that transmits rabies. Until the 17th Century, this term was used for all infectious diseases.

D. Khazaka, C. Uhl, In-house tests complement CRO final product testing, PERSONAL CARE EUROPE. September 2019

Before a cosmetic product is offered on the market, final tests are obligatory for the manufacturer to prove its safety and to substantiate the various claims on the products, e.g. reduces wrinkles up to 20%, increases skin hydration for 24 h. There are no limits to modern claims. All over the world, contract research organisations (CROs) varying from small laboratories to vast multinational institutes offer their services to the cosmetic manufacturers to perform all kind of tests and compile the final necessary product documentation.

H. Dobrev, Value of non-invasive bioengineering investigations of the human skin in vivo, Dissertation in Dermatology and Venerology at the University of Plodiv, 2019, Bulgaria

The skin is the largest organ of the human body. It has a surface area of about 2 m² and a weight of about 16% of the body weight. Skin is a great visual field. Most of the changes that occur in it are visible and accessible to dermatologists. For centuries, the dermatologist's eyes and fingers have been his main diagnostic tools. Old physicians are known to describe the rash elements with great love, diligence and methodicality, especially with regard to morphological details. Today, this descriptive phase in the evolution of dermatology has lost its dominance. According to Prof. J. Serup, "*The dermatologist's eyes and hands are already becoming archaic diagnostic tools.*" With the introduction of modern skin bioengineering methods, there has been a transition from the "visible" to the "invisible". From the "visual" field, dermatology is increasingly becoming an "instrumental" field. The advantage of the new research methods created is that they enable the detection of invisible changes in skin functions, as well as their objective and quantitative measurement. This dissertation is devoted to the new methods of skin functional diagnostics. It illustrates the practical application of some of them in the field of dermatology and cosmetic science based on the experience of the sector of "Functional diagnostics of the skin" at the Department of Dermatology and Venerology, University Hospital "St. George", Plovdiv, Bulgaria. The literature review part provides an overview of current bioengineering methods for functional skin diagnostics. The apparatus used to carry out the present work is described in detail. Additionally, two little-known aspects of skin bioengineering research are presented - protocol and research ethics. Data on Bulgarian experience in the field of skin functional diagnostics have also been reported.