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Abstracts

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Supplementation with Nutritional Cartilage Extract Positively Influences Skin Hydration, Skin Barrier and Skin Structure: A Double Blind, Randomized, Placebo-Controlled Study

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The aim of the study was to evaluate the efficacy of polysaccharides from fish cartilage with regard to their skin aging properties. An application test was carried out during the intake of cartilage tablets as a nutritional supplement. The study was designed as a monocentric, double-blind, randomized, placebo-controlled application test. 28 healthy female volunteers (35-60 years) with dry skin were included in the study. They were divided into two groups. Group 1 received tablets containing placebo and group 2 the verum treatment (cartilage hydrolysate combined with vitamin C). The duration of the study was 12 weeks. The focus of interest was to find out about the hydration properties, and to see whether the skin barrier and structure were influenced by the test formulation compared with placebo. Hydration measurements were made before and during the study, and the transepidermal water loss (barrierer function of the skin) was measured. The thickness and density of the skin of all volunteers were determined by means of ultrasound measurements during of the study. Statistical analysis was based on the Wilcoxon signed rank test. The following results were obtained in this study: There was a significant improvement in the hydration properties, a significant decrease in transepidermal water loss and a significant increase in the skin density in the verum group (cartilage extract). No or minor improvements could be detected in the placebo group.

A Novel Water-Repellent O/W Emulsion Using a New Water-Soluble Amphiphilic Polymer

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A novel O/W (oil-in-water) emulsion cosmetic that has strong water repellency and a »water-splash feel« was prepared using the amphiphilic polymer hydrophilic-hydrophobic modified polysaccharide (INCI/Sodium Stearoxy PG-Hydroxyethylcellulose Sulfonate). This emulsion is composed of a hydrophobic-hydrophilic modified polysaccharide/water/oil system with a small amount of lipophilic non-ionic surfactant (hydrophilic-lipophilic balance<5) added to obtain finely emulsified oil particles. Hydrophilic-hydrophobic modified polysaccharide was used as a thickener and polymer surfactant, and it produced a stable O/W emulsion without the addition of a hydrophilic surfactant. Several types of oil droplets decrease in size upon addition of various kinds of lipophilic surfactant due to the lowering of tension at the water/oil interface. Rheological measurements revealed that the strong network structure of hydrophilic-hydrophobic modified polysaccharide retained oil droplets without occurrence of phase inversion. Such an emulsion is very different from those made using conventional hydrophilic surfactants, and it is water repellent.

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This system was characterized by the presence of hydrophilic-hydrophobic modified polysaccharide, and the state of the emulsion could be controlled by the ratio of hydrophobic/hydrophilic moieties introduced into the polysaccharide.

Compatibility Testing *In Vitro*: A Comparison with *In Vivo* Patch Test Data

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For safety reasons cosmetic formulations have to be assessed for putative side effects like skin irritation. The human patch test is an appropriate method for this type of assessment, but it cannot be used for the higher throughput needed for screening innovative formulations and a distinct assessment is often difficult. The aim of this study was therefore to investigate the feasibility of using an in vitro approach for compatibility testing to determine the irritancy of surfactants. Test samples were provided by the German Society of Cosmetic Chemists (DGK), which conducted a human patch test study with the same set of samples in parallel. This gave us the unique opportunity to correlate in vitro with in vivo data. To assess irritant effects in vitro, reconstructed human epidermis was exposed to seven coded test samples consisting of individual anionic surfactants, blends of surfactants, and controls. A multiple endpoint analysis was established comprising the viability, cytotoxicity, histology, cytokine release and differential gene expression. Using this test strategy, a very good correlation was determined for our in vitro assessment of compatibility with a theoretical ranking and the human patch test data.

Photodegradation of Hair of Different Ethnicity after 1 Year of Exposure to Natural Weathering in Arizona

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Natural weathering of hair in a relatively dry hot climate was carried out by exposing hair of different ethnicity to natural environmental conditions at a Q-Lab weathering station in Arizona. The appearance of hair fibers changed dramatically due to thinning and fusion of scales as well as fusion of individual hair fibers with each other (inter-fiber fusion) to form rod-like structures stuck together by solubilized, oozed out, gelled and finally hardened proteins. The hair became extremely rigid and brittle with radial cracks forming mostly smooth radial fractures and occasionally step fractures. There was also internal fusion of the cellular structure of the fiber. Hair fibers were characterized by scanning electron microscopy (SEM) and UV-visible microspectrophotometry. UV-visible spectra showed that natural hair color (melanin) plays an important role in protecting hair proteins, mostly by a sacrificial mechanism. Indian and Chinese black hair, which are rich in melanin, resist photochemical degradation much better than hair of European origin with moderate, low or no melanin content.

How Cosmetic Science Can Contribute to the Improvement of Society

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The only constant in life is change and living in South Africa I certainly have witnessed major change during my life, particularly as our country was transformed from being governed by the Apartheid regime to a democratically elected government. In order to share my ideas of how cosmetic science can contribute to the improvement of society, I would like to address three issues. The first part of my essay will discuss some of the recent changes in the society we live in and how these changes have affected our need for cosmetics. Secondly I will discuss the developments in cosmetic science that will be necessary to cope with these changes and finally, the kind of developments in cosmetic science will be necessary in order for them to improve our society. Of course, not all people in our world share the same norms and values and I will therefore consider a global acceptance of and adherence to the Declaration of Human Rights as the ultimate improvement. On such a level, it should be realized from the beginning that the influence cosmetic science can have on society is very limited compared to that of, for instance, political leaders of our world. Cosmetic science, however, does make a contribution, although it is only a small step in the process of improving the world we live in, but according to Confucius the longest journey begins with the first step. Therefore, let the journey begin…

Influencing the Equilibrium of the Cutaneous Ecosystem to Improve the Properties of Skin Prone to Acne

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The skin is colonized by a variety of microorganisms such as Propionibacterium acnes, Staphylococcus epidermidis, and Malassezia furfur that are in a stable balance and form the resident skin flora. The homeostasis of this ecosystem is of fundamental importance since it plays a barrier role by limiting the invasion and growth of pathogenic bacteria on the skin surface. An internal or external change in the skin environment, a transitory lack of hygiene, a change in hormone status or hyperseborrhea can upset this balance at any time and enable the proliferation of saprophytic skin microorganisms or contamination by pathogens. Hyperseborrhea causes retention lesions such as open comedos and closed microcysts that can be transformed into papulae, pustules or nodules in the case of an inflammatory reaction caused by abnormal bacterial proliferation. These skin disorders are particularly pronounced between the ages of 12 and 25 but nonetheless affect all ages and cause oily skin accompanied by unsightly imperfections that are difficult to camouflage and live with. The skin combats microbial infections with its natural defense system. Keratinocytes produce and secrete a large number of peptides with direct and indirect antimicrobial activity (cathelicidins, □-defensins). These natural antimicrobial peptides limit the proliferation of pathogenic bacteria and fungi such as Staphylococcus aureus or Candida albicans and can also induce an indirect immune response. They are indispensable for the homeostasis of the cutaneous ecosystem and are over-expressed by keratinocytes in response to an inflammatory stimulus or an infection. When these natural defenses are disturbed or overwhelmed, they must be stimulated to limit the inflammatory reactions that result in the appearance of skin imperfections such as acne. To this end, we have developed an extract purified from Filipendula ulmaria (meadowsweet) that is rich in phenolic acids. Tested at 1% on human keratinocytes, the F. ulmaria extract stimulated the natural defense functions of the skin by boosting the synthesis of cathelicidins by 130%. In addition, when tested in vivo at 4%, the F. ulmaria extract significantly reduced the lipid index by 12% in 71% of volunteers after 28 days of twice-daily treatment. The F. ulmaria extract stimulates the natural defense functions of the skin, preventing the proliferation of bacteria on the skin surface and thereby limiting complications from acne: The number of spots and their total occupied surface were significantly reduced by -10% and -12%, respectively. Finally, dermatological evaluation after 28 days of twice-daily use showed the capacity of the F. ulmaria extract to significantly improve the quality of skin prone to acne: The homogeneity of skin grain was improved (+21%), the number of inflammatory lesions reduced (-20%) and the infiltration of lesions decreased (-22%).