

# Abstracts

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### Review Article

Formulation effects of topical emulsions on transdermal and dermal delivery

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It has been recognized that the vehicle in which a permeant is applied to the skin has a distinctive effect on the dermal and transdermal delivery of active ingredients. The cutaneous and percutaneous absorptions can be enhanced, e.g. by an increase in thermodynamic activity, supersaturation and penetration modifiers. Furthermore, dermal and transdermal delivery can be influenced by the interactions that may occur between the vehicle and the skin on the one hand, and interactions between the active ingredient and the skin on the other hand. Emulsions are widely used as cosmetic and pharmaceutical formulations because of their excellent solubilizing capacities for lipophilic and hydrophilic active ingredients and application acceptability. This review focuses, in particular, on the effect of emulsions on the dermal and transdermal delivery of active ingredients. It is shown that the type of emulsion (w/o vs. o/w emulsion), the droplet size, the emollient, the emulsifier as well as the surfactant organization (micelles, lyotropic liquid crystals) in the emulsion may affect the cutaneous and percutaneous absorption. Examples substantiate the fact that emulsion constituents such as emollients and emulsifiers should be selected carefully for optimal efficiency of the formulation. Moreover, to understand the influence of emulsion on

dermal and transdermal delivery, the physicochemical properties of the formulation after application are considered.

Human synthetic sebum formulation and stability under conditions of use and storage

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The human skin surface and hair are generally coated with a thin film of liquid phase sebaceous lipids. This surface lipid film contributes to the cosmetic properties of the skin. Synthetic sebum has been used for studies on properties of skin and hair. However, there has been no standardized formulation of synthetic sebum and many of the synthetic sebum formulations that have been used do not closely resemble actual sebum. In this study, a formulation for a standardized and inexpensive synthetic sebum is proposed, and the chemical stability of this lipid mixture is demonstrated under conditions of use and storage. The proposed synthetic sebum consists of 17% fatty acid, 44.7% triglyceride, 25% wax monoester (jojoba oil) and 12.4% squalene. This lipid mixture takes up approximately 6% of its weight in water when equilibrated in an atmosphere saturated with water vapour. It is stable on exposure to the atmosphere at 32°C for at least 48 h, and it is also stable on storage at 4 or –20°C, either dry or in chloroform : methanol solution for at least 6 months. This synthetic sebum could be useful in studies on cosmetic properties of the skin surface or hair, on penetration of chemicals into the skin or in development of standardized tests of laundry detergent performance.

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Development of a minimally invasive epidermal abrasion device for clinical skin sampling and its applications in molecular biology

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A new abrasion tool (US patent US7087063 B2) has been developed for collecting skin epidermal samples. This device includes a central shaft that holds the probe in a split chuck. Of the variety of probe designs tested, the laser-cut hollow tube (HT) probe abraded the basal layer of the epidermis most consistently, resulting in representative epidermal skin samples. Compared with traditional clinical methods, the abrasion method allows for high-throughput epidermal skin collection with minimal invasiveness to the volunteer subjects. A large number of abrasion samples have been collected in various clinical studies with no adverse effects observed. Epidermal abrasion, when used appropriately and with the optimized probes, can yield high quality tissue samples that are representative of the epidermis. A sufficient quantity of RNA and protein can be obtained for many subsequent molecular and biochemical applications. Because of its minimal invasiveness and high-throughput nature, the abrasion method can be a valuable tool used to investigate the efficacy of topical applications of skin care products.

Comparison of clinical efficacies of sodium ascorbyl phosphate, retinol and their combination in acne treatment

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Acne vulgaris impairs the appearance of an individual and causes psychological irritation. Inflammatory acne lesion is caused by multifactor incorporates in each step of acne pathogenesis. In an attempt to archive inflammatory lesion treatment with the promise of prevention of acne vulgaris, randomized and double-blind studies on the comparison of the efficacies of topical formulations containing 5% sodium ascorbyl phosphate (SAP) and 0.2% retinol, separately as well as in combination application, were conducted. The resulting data showed that SAP reduced the inflammatory lesion by 20.14% and 48.82% within 4 and 8 weeks

respectively. Application of the formulation containing retinol slightly improved the treatment efficacy as the lesion reduced by 21.79% and 49.50% after 4 and 8 weeks respectively. The combination treatment significantly reduced the inflammatory lesion by 29.28% after 4 weeks and 63.10% after 8 weeks of application. The most effective treatment was by using the combination of 5% SAP and 0.2% retinol, which incorporated the synergistic effects on lipid peroxidation and sebaceous gland function in addition to the enhancement of SAP permeability by the desquamation of stratum corneum influenced by retinol, keratin plug removal and anti-inflammatory effect of retinol. This study promises for the development of cosmetic products to overcome aesthetic and psychological problems caused by acne vulgaris.

Manipulation of body odour alters men's self-confidence and judgements of their visual attractiveness by women

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Human body odour is important in modulating self-perception and interactions between individuals. Artificial fragrances have been used for thousands of years to manipulate personal odour, but the nature and extent of influences on person perception are relatively unexplored. Here we test the effects of a double-blind manipulation of personal odour on self-confidence and behaviour. We gave to male participants either an aerosol spray containing a formulation of fragrance and antimicrobial agents or an otherwise identical spray that lacked these active ingredients. Over several days, we found effects between treatment groups on psychometric self-confidence and self-perceived attractiveness. Furthermore, although there was no difference between groups in mean attractiveness ratings of men's photographs by a female panel, the same women judged men using the active spray as more attractive in video-clips, suggesting a behavioural difference between the groups. Attractiveness of an individual male's non-verbal behaviour, independent of structural facial features, was predicted by the men's self-reported proclivity towards the provided deodorant. Our results demonstrate the pervasive influence of personal odour on self-perception, and how this can extend to impressions on others even when these impressions are formed in the absence of odour cues.

Salvia somalensis essential oil as a potential cosmetic ingredient: solvent-free microwave extraction, hydrodistillation, GC-MS analysis, odour evaluation and in vitro cytotoxicity assays

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Salvia somalensis Vatke, a wild sage native of Somalia, has been studied with the aim of assessing the potential cosmetic application of its essential oil, recovered from fresh aerial parts by solvent-free microwave extraction – SFME. To evaluate the efficiency and reliability of this ecofriendly procedure, the recovery of the essential oil was also processed by conventional hydrodistillation (HD) and the results compared. The essential oils obtained by both SFME and HD were analysed by gas chromatography–mass spectrometry using apolar and polar capillary columns. The essential oil recovered by SFME was submitted to an odour evaluation that revealed peculiar olfactive characteristics interesting in alcoholic male perfumery and body detergents. In vitro cytotoxicity assays were carried out using NCTC 2544 human keratinocytes as

target cells. The oil displayed slight cytotoxic effects, which were three orders of magnitude lower than those found for sodium dodecyl sulphate positive control. The promising results in terms of chemical composition, scent and safety seem to indicate this essential oil as an interesting potential functional ingredient useful in a cosmetic context.

Spectral uniformity: a new index of broad spectrum (UVA) protection

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Despite the wide acceptance of in vitro assay for the determination of the spectral absorbance of a sunscreen product, we find that different authorities are recommending different summary metrics of this spectral profile to express the UVA or broad spectrum, protection offered by topical sunscreens. Regrettably, the situation that now prevails is not ideal and the option for rationalizing the situation in the interests of consumer-focused international harmonization is either the adoption of one of the existing metrics or universal acceptance of a new metric for expressing broad spectrum (UVA) protection. There may be greater harmony in adopting the second proposal and so I introduce here a new metric, which I term the spectral uniformity index, for consideration by the international sunscreen community. It is shown that this new index is aligned to the fundamental requirement of a topical sunscreen to provide a flat spectral profile, is simple to calculate and conceptually easy to understand, and correlates strongly with existing indices.