Introduction

Detergents have a broad spectrum of applications in daily life and are found in many domestic products. Their basic function is to clean, and they are categorised into different classes of products depending on the surface they are intended to act upon (skin, hair, hard surfaces, fabrics, etc.). However, whatever their original target, all of them eventually come into contact with the skin surface.

Over the past decades, public health issues have become a subject of major public concern, and they have risen to the tops of the priority lists of companies involved in the cosmetic and toiletries business. At the core of the problem with surfactants are the changes induced in the physical properties of the stratum corneum and the risk of initiating an irritant contact dermatitis [27]. In addition, skin compromised by low-level exposure to surfactants is more susceptible to other chemical irritants. The irritancy potential of a surfactant may therefore be due to synergism between different factors [15]. Hence, dermatological effects should be taken into account during the development of new surfactant-based products [2, 16, 32]. Unfortunately, the proclivity to surfactant-induced irritation is unequal among individuals and difficult to assess.

Development and refinement of bioengineering techniques in recent years have provided access to new methods implementing the objective evaluation of skin changes induced by surfactants. It may be possible to use measurements of biological characteristics, such as corneocyte alterations [43, 45] and loosening [15, 24], transepidermal water loss [15], skin-surface electrical properties [4, 60], roughness [31] and pH, colour [46], laser-Doppler blood flow and a few others, as indices of damage predicting cutaneous irritancy. Screening for mildness has become a reachable goal for technologically advanced societies. The use of instrumentation does, however, bring its own problems, notably high costs, poor standardisation of some methodologies, lack of validation and, more importantly, unsatisfactory correlation between some experimental data and actual experience. Nevertheless, according to reliable forecasts, this trend will continue during the coming years despite the implementation of cost-containment policies. The objective of this review is to survey surfactant-containing products with regard to their composition, physico-chemical properties, labelling rules and skin testing programs performed to ensure good skin compatibility.
Roles of Detergent Products

The primary function of detergents is to clean. However, the cleaning power to be provided by the product is greatly influenced by the surface to be cleaned and the type of soils that will be removed. The frequency and duration of the contact between the product and the skin also determines the choice of the formulation. Detergents used at home belong to four main categories: personal cleansing products, laundry, dishwashing and household cleaning products. Within each of these categories, many different product types also exist that have specialised functions.

Personal Cleansing Products

The primary function of body-cleansing products is to remove biological products, such as sebum, sweat components and superficial corneocytes, from the skin surface. In addition to such a complex cell-enriched hydrolipidic film, the accumulated microorganisms, extraneous particulate matter, grease, cosmetic and other soils also need to be washed away. In the case of shampoos, a similar kind of greasy soil has to be removed from hair in addition to some products that have accumulated from specific hair treatments like conditioners, balsams and sprays. The most obvious microscopic feature of skin-surface washings are corneocytes, both singly and in clumps, and microorganisms. The amount of proteins solubilised does not correlate with the number of corneocytes released nor with the irritancy potential of the surfactant [15]. As a rule, hydrophilic lipids such as triglycerides and free fatty acids are released in preference to more hydrophobic lipids such as ceramides. However, proclivity to surfactant-induced irritation is correlated to low levels of ceramide release [12].

Personal cleansing also has another dimension; people no longer wash themselves for hygiene alone, but also for pleasure, relaxation and skin care. In Western societies, there is also a cultural trend to increase the frequency of showering, bathing and shampooing. As a consequence, it is important that personal cleansing products are compatible with the skin, a consideration which has greatly influenced improvement of formulations over recent years. Furthermore, the current tendency is to provide additional benefits to cleansing products, like skin moisturisation, protection and antibacterial or antifungal efficacy, as well as sensory benefits directly perceived by the consumer. The pace of change is nowhere quicker than in this field of toiletries.

Laundry Detergents

The goal of laundry detergents is to clean fabrics from which a variety of different soils have to be removed. Additionally, those products have to condition and soften the fabrics, but must not damage them. More and more fabric cleaners also claim to be non-irritating, mild and hypoallergenic.