Abstract:
Many chemicals used for fragrance purposes have been identified to have high allergen potential. The objective of this study was to perform an evaluation of dermal sensitization induction resulting from daily exposure to select fragrance chemicals via application of various personal care products. For the purposes of this study, we chose to evaluate several chemicals ranging from weak to strong sensitizing agents for which restricted use limits have been established by international agencies. We estimated the dermal exposure to individual chemicals following daily application of rinse-off (e.g. shampoo) and leave-on (e.g. body lotion) personal care products. We calculated an estimated daily dermal exposure using the following parameters: amount of product applied, retention factor, the concentration of fragrance chemical in the product, and the surface area of the body where the product was applied. We assumed that the products contained the maximum recommended/permitted concentration of fragrance chemicals according to product category. We used the 50th and 95th percentile amount of product applied per day among adult women from consumer use practice data, and based on dermal modeling data, we conservatively assumed a maximum skin adherence of 10 mg/cm². We used a retention factor of 0.01 in rinse-off products and 1.0 in leave-in products. We compared estimated daily dermal exposures (µg/cm²) to reported no expected sensitization induction levels (NESILs) for the individual fragrance chemicals. The NESILs ranged from 24 µg/cm² (methyl-2-nonynoate) to 29,500µg/cm² (citronellol). The MOSs for rinse-off products were all greater than one for all evaluated fragrances. Meanwhile, the MOSs for 9 of 11 fragrances were below one for selected leave-on products. Overall, these results provide evidence that some leave-on products containing fragrance chemicals at the maximum recommended or permitted limit may increase the risk of sensitization induction. In contrast, rinse-off products were not associated with a potential risk of skin sensitization induction.