The Science behind the Cosmetic Industry

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When purchasing makeup, personal care products and other over-the-counter (OTC) goods, the science behind them is not usually the first thing that comes to mind. Nonetheless, the chemical and biological properties of the raw materials that constitute these products are crucial in understanding the formulation stages. A research and development chemist in the cosmetics industry, will focus on the physical properties of many of the substances that are used on a regular basis. Some of these substances are solubilizers, emulsifiers, surfactants, and preservative agents. In addition, experimental work on the bench is performed in order to create a system that is stable but most importantly will be effective in its intended use when applied to the skin and/or hair. Regulations on the usage of these ingredients is also an important factor that determines how a product is developed. Nowadays, many companies adhere to the clean ingredient guidelines and would rather use natural or organic based chemicals in the development of their brand goods. However, this raises new challenges in the formulation as well as the performance of the product. For instance, a sunscreen presents its own set of challenges, as the chemical composition of its active material must work favorably in the system and on the application to the skin. The aim is to achieve a designated Sun Protection Factor (SPF), while complying to the FDA regulations and in several cases, the clean ingredient guidelines. Furthermore, analyses using the UV-light spectrophotometer, the HPLC apparatus, total-solids test, and the Karl-Fischer titration are useful techniques that aid in formulating oil-in-water or water-in-oil emulsion systems.