

**Influence of Technology on the Beauty Industry**

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4/3/2023

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The beauty and cosmetics industry has undergone significant transformation over the years which is driven by scientific advancements and technological innovations. From the development of synthetic colorants and preservatives to the creation of sunscreen products that protect the skin from the sun's harmful rays, these advancements have revolutionized the industry and enabled the creation of new and innovative products. Some of the major scientific advancements that have shaped the beauty and cosmetics industry are driven by cutting-edge developments in the industry.

### Advancements in the Beauty industry

There have been several scientific advancements that have revolutionized the beauty and cosmetics industry. The beauty and cosmetics industry has been shaped by numerous scientific advancements over the years, which have led to new product developments and improved formulations. Examples include synthetic colorants, preservatives, and sunscreen. Synthetic colorants allowed for a wider range of colors and shades in makeup products. Before the development of synthetic colorants, cosmetics, and personal care products were often limited to the natural colors of their ingredients, such as plant extracts and minerals (Hussain et al., 2022). The use of synthetic dyes allowed for a wider range of colors and shades to be used in makeup and other cosmetic products, which gave consumers more options and greater flexibility in their beauty routines. The first synthetic colorants used in cosmetics were coal-tar dyes, which were developed in the late 19th and early 20th centuries. These dyes were derived from coal and were often used in hair dyes and other cosmetic products. However, concerns about their safety eventually led to their replacement with other synthetic colorants, such as dyes, which are still

commonly used today. Today, synthetic colorants are used in a wide range of cosmetic and personal care products, including lipstick, eyeshadow, nail polish, and hair dye.

Preservatives allowed for beauty products to last longer. Preservatives are added to cosmetics and personal care products to prevent the growth of bacteria, fungi, and other microorganisms that can cause spoilage or contamination. Without preservatives, these products would have a very short shelf life and could pose a risk to consumers if they become contaminated. There are several types of preservatives used in cosmetics, including parabens, formaldehyde releasers, and organic acids (Torfs and Brackman, 2021). Each type of preservative has its advantages and disadvantages, and the choice of preservative will depend on factors such as the type of product, its intended use, and the desired shelf life.

The development of sunscreen products was based on the discovery that certain chemicals could absorb or reflect the harmful ultraviolet (UV) radiation from the sun that causes damage to the skin. The first sunscreen products were developed in the 1940s and 1950s and were designed to block UVB radiation, which causes sunburn (Powers and Murphy, 2019). These products typically contained chemicals such as para-aminobenzoic acid (PABA) and its derivatives, which absorbed UVB radiation and prevented it from reaching the skin. Today, there are many different types of sunscreen products available, including lotions, sprays, and powders, which often contain a combination of different active ingredients to provide broad-spectrum protection.

### New Developments in the Beauty Industry

Some of the cutting-edge developments in beauty today include Personalized Skincare and Clean Beauty. Personalized skincare has become a major trend in the beauty industry, with many brands now offering customized skincare solutions. Advances in technology, such as

genetic testing and artificial intelligence, have made it possible to analyze a person's skin at a molecular level and create a skincare regimen that is designed for their specific needs. Some brands, for example, GenoPalate and MyHeritage, offer DNA testing to analyze a person's genetic makeup and determine their skin's unknown conditions to certain conditions, such as dryness or acne (Angers et al., 2021). This information is then used to create a personalized skincare routine that targets these specific issues.

Some beauty brands use artificial intelligence (AI) to analyze a person's skin and create a customized skincare regimen based on their individual needs. This can include recommendations for products that address concerns such as fine lines, wrinkles, and hyperpigmentation. AI algorithms can take into account a variety of factors, such as a person's age, skin type, concerns, and even their environment and lifestyle, to create a customized skincare plan. One example of an AI-powered skincare brand is Proven Skincare. Proven uses a machine learning algorithm that analyzes a person's skin concerns and goals, as well as their lifestyle and environment, to create a personalized skincare regimen. The algorithm takes into account factors such as humidity levels, pollution, and even a person's exercise habits to create a personalized routine. Another example is Neutrogena's Skin360 app, which uses AI-powered technology to analyze a person's skin and make product recommendations (Martorell et al., 2022). The app takes a close-up photo of a person's face and analyzes factors such as fine lines, wrinkles, and dark spots to determine their skin's overall health. Based on this analysis, the app provides customized product recommendations to address specific skin concerns. AI-powered skincare facilitates a more personalized and targeted approach to skincare. By taking into account a person's unique needs and environment, these algorithms can create a skincare routine that is truly tailored to the individual.

The beauty and cosmetics industry has been shaped by numerous scientific advancements over the years. From the development of synthetic colorants and preservatives to the discovery of chemicals that can block the harmful effects of the sun's rays, these advancements have enabled the industry to create innovative and effective products that meet the evolving needs of consumers. Today, cutting-edge developments in beauty include personalized skincare, natural and organic ingredients, and advanced formulations that incorporate the latest scientific research. These developments reflect a continued commitment to innovation and a focus on creating products that are safe, effective, and responsive to the diverse needs and preferences of consumers.

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