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NARRATIVE REVIEW

Origin, evolution, and multifunctional properties of BB Creams

Origem, evolução e propriedades multifuncionais dos BB Creams

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ABSTRACT

BB Creams (Blemish Balm/Beauty Balm creams) are among the most popular multifunctional cosmetic products, offering a combination of subtle coverage, imperfection correction, skin tone evening, hydration, and sun protection in a single formulation. These products efficiently combine physical and chemical UV filters with vitamins and antioxidants, providing broad-spectrum protection and minimizing UV-induced skin damage. By incorporating moisturizing agents that retain water and strengthen the skin barrier, BB creams help prevent transepidermal water loss and protect against harmful substances. Emollients such as natural oils and butters further enhance softness and hydration. With anti-aging benefits, BB creams include peptides, antioxidants, and sunscreens that combat visible signs of aging while regulating sebum production and maintaining hydration balance. Advancements in drug delivery technologies, such as nano- and microencapsulation, have enhanced the efficacy of these products by improving skin penetration and absorption. Understanding BB Cream formulations is essential for developing innovative and effective cosmetics.

PALAVRAS-CHAVE
Antienvelhecimento
Cosméticos Coloridos
Estabilidade de Formulação
Barreira Cutânea
Saúde da Pele
Proteção Solar

RESUMO

Os BB Creams (*Blemish Balm/Beauty Balm creams*) estão entre os produtos cosméticos multifuncionais mais populares, oferecendo em uma única formulação cobertura sutil, correção de imperfeições, uniformização do tom da pele, hidratação e proteção solar. Esses produtos combinam de forma eficiente filtros UV físicos e químicos com vitaminas e antioxidantes, proporcionando proteção de amplo espectro e minimizando danos causados pelos raios UV. Com agentes hidratantes que retêm água e fortalecem a barreira cutânea, os BB Creams ajudam a prevenir a perda de água transepidérmica e protegem contra substâncias nocivas. Emolientes como óleos e manteigas naturais intensificam a maciez e a hidratação da pele. Oferecendo benefícios antienvelhecimento, incluem peptídeos, antioxidantes e filtros solares que combatem os sinais visíveis da idade, regulam a produção de sebo e mantêm o equilíbrio da hidratação. Avanços em tecnologias de liberação, como nano e microencapsulação, aumentam sua eficácia, melhorando a penetração e absorção cutânea.

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INTRODUCTION

Multifunctional cosmetics provide several skin benefits within a singular product, garnering the interest of consumers who seek efficacy and practicality within their skin care regimen. These products can combine moisturizing, protective, rejuvenating, depigmenting, and anti-acne properties. Cosmetic multifunctionality can manifest through various mechanisms. Some products can perform two or more functions in combination, such as a foundation that not only conceals blemishes but also offers sun protection. Other formulations include ingredients capable of multiple roles within the product, such as a body cream that both hydrates and brightens the skin. Lastly, there are products strategically designed for multifunctional versatility in diverse contexts, such as a moisturizing cream suitable for application on both facial and body surfaces. Multifunctional cosmetics distinctly emerge as versatile and complete resolutions to meet the requisites and exigencies of consumers with regards to their skin care[1]. The cosmetics market is full of multifunctional products in different forms such as creams, lotions, serums, tonics, and masks that provide multiple benefits to the skin. These cosmetics can be used day and night according to the specific needs of the skin[2].

"Blemish Balm" or "Beauty Balm" creams, commonly known as "BB Creams", is recognized as one of the most popular multifunctional cosmetic categories current available in the cosmetic market. Such products have gained higher recognition in the field of personal beauty care for their ability to provide subtle coverage, minimizing imperfections even out the skin tone, skin moisturizing, sun protection and additional skin benefits in a sole product. Thus, BB creams represent a viable and relevant alternative for obtaining sun protection. Their application is advised when seeking a practical and sophisticated option that prioritizes the preservation of skin health and aesthetics[3,4].

The inception of BB cream dates back to Germany in the late 1860s, initially conceived to aid in the care of patients undergoing dermatological interventions like peelings and laser treatments, by providing skin hydration and smooth coverage. The growing popularity of BB creams began in Asia, partly due to associations with Asian celebrities who believed the product could provide the desired skin tone. BB creams emerged in Korea in 2011 when it was positioned as a multifunctional skin care product that combines foundation, moisturizing and sun protection. Subsequently, the "Korean wave" and the success of Franco-Korean brands further fueled its launch in Europe and the US[5].

As consumers become more conscious of their image and concerned about the health of their skin, they are likely to turn to dermatologists for advice on the safety and efficacy of cosmetic products. In this case, BB cream proves to be an important alternative as it combines skin care and makeup benefits in a single product. Its versatility and usefulness have attracted the attention of consumers, and it is important to understand its potential role in dermatological treatment regimens[6].

COVERAGE AND FINISHING ASPECTS

In the pursuit of optimal skin appearance, a multitude of product choices, including BB creams and foundations, are commonly encountered. Although both are employed to conceal imperfections and create an even skin tone, substantial distinctions set them apart. BB creams are multifunctional products that offer light to medium coverage, in addition to providing hydration, sun protection, and, in certain instances, notable skincare benefits, by including constituents such as antioxidants, vitamins, and moisturizing agents. Moreover, these preparations consistently present an SPF (Sun Protection Factor) ranging from 20 to 40[7].

On the other hand, makeup foundation products were formulated to deliver more intense and uniform coverage to the skin surface. These products offer diverse finishing options, including matte, luminous, or natural effects, customized according to individual preferences. Additionally, specific foundations incorporate moisturizing, mattifying, or oil-controlling properties, contingent upon the formulation and skin type[8].

Various types of foundations are readily available in the current market, with notable options including liquid, cream, and powder foundations. Liquid foundations enjoy popularity due to their fluid texture, ease of application, and capacity to offer light to full coverage, culminating in a natural finish. Powder foundations are more suitable for oily skin, effectively managing shine and delivering an opaque coverage that can be layered. Finally, creamy foundations, characterized by their consistent texture, are recommended for concealing imperfections extensively, and are more compatible with dry skin due to their moisturizing and emollient attributes[8]. Both liquid and creamy foundations are aqueous products, and water is their primary component. In contrast, powder bases are categorized as anhydrous products, distinct in their composition by the absence of water[9].

The BB Cream offers a diverse array of formulations in the market, allowing for the consideration of various active ingredients aiming to achieve desired effects. The increase in the trade of these products has driven the creation of diverse formulations searching to enhance their properties, introduce lighter compositions, and offer pleasing textures, all while providing novel benefits for the skin. Despite being a contemporary trend, attaining complete assurance of these advantages remains elusive. Nevertheless, it is crucial to underscore the potential for exploring distinct physicochemical attributes of emulsions to address the specific requirements of various skin types, including oily, dry, or combination skin[10].

SUN PROTECTION

Ultraviolet radiation (UV) constitutes a category of electromagnetic radiation emitted by the sun, encompassing UVA, UVB, and UVC rays. UVA rays, characterized by longer wavelengths, deeply penetrate the skin. This type constitutes the predominant portion of UV radiation reaching the Earth and maintains a constant presence throughout the day and year. Despite not causing immediate sunburn, UVA radiation damages collagen

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and elastin, resulting in skin photoaging that includes wrinkles, sagging, age spots, and skin cancer. On the other hand, UVB rays, with higher energy compared to UVA, primarily cause sunburn and cellular DNA damage. Prolonged exposure to UVB rays elevates the risk of skin cancer, including melanoma and other variants. Intense UVB exposure can result in sunburn, with symptoms such as redness, inflammation, scaling, and potentially blistering[11]. UVC rays have higher energy and short wavelengths, capable of inflicting substantial harm on the skin and the environment. Nevertheless, the ozone layer selectively absorbs UVC rays preventing them from reaching the Earth's surface[12].

Thus, exposure to UV radiation can result in skin cancer due to the harm inflicted on the DNA of skin cells. This damage can trigger genetic mutations in tumor suppressor genes, resulting in abnormal cell growth and the formation of malignant tumors[13] (Fig. 1). In order to mitigate this risk, the utilization of products containing sunscreens with higher Sun Protection Factor (SPF) values has been advised.

The SPF is an adopted measure of the capacity of a sunscreen to protect against UVB rays and sunburn. SPF is established by comparing the minimal radiation dosage required to induce sunburn with and without the application of the product. A higher SPF offers more protection against UVB radiation, thereby decreasing the risk of sunburns and potential skin damage. However, SPF does not provide an indication of defense against UVA rays, which are also harmful to skin health[14,15].

Ensuring sun protection is essential for maintaining skin health. Therefore, when choosing a sunscreen product, it is crucial to consider factors like the duration and intensity of sun exposure, the skin type, as well as the provided protection levels and SPF of the product[16]. Opting for products that offer broad-spectrum protection is vital, as they can effectively offer defense against both UVB and UVA rays[17].

Sunscreens typically contain a combination of ingredients that provide both chemical and physical protection against UV radiation. Chemical sunscreens absorb UV rays and convert their energy into low-intensity forms, such as heat, without damaging the skin. Although these sunscreens are more aesthetically pleasing, some of their compounds may be toxic and have the potential to cause irritation or allergic reactions in sensitive individuals. In contrast, physical sunscreens reflect and scatter incident UV radiation on the skin. These filters offer broad-spectrum protection against both UVA and UVB rays and are considered photostable. They are also regarded as safer because they do not cause allergic reactions or skin irritation. However, due to their high particle size, physical sunscreens may leave a white residue on the skin[18,19]. The most prevalent sunscreens included in BB cream formulations are listed in Table 1.

The formulation of multifunctional products, such as BB Cream, can incorporate various types of sunscreens, including physical filters, chemical filters, or a combination of both. The inclusion of these sunscreens, along with antioxidants such as vitamins, offers significant advantages in skin protection. This combination works synergistically to effectively counteract the free radicals generated by exposure to UV radiation[20,21]. Furthermore, these components play a critical role in the photostabilization of UV filters, resulting in an increased sun protection factor and contributing to the prevention of photoaging induced by solar exposure[22].

ADDITIONAL BENEFITS TO THE SKIN

Maintaining optimal skin hydration is essential for upholding the skin integrity and efficacy. The skin barrier (Fig. 2) primarily consists of the intercellular lipid layer and the filaggrin protein, which collectively regulate transepidermal water loss (TEWL) and serve as a defense mechanism against the penetration of harmful substances[23]. BB Cream formulations contain hydrating and moisturizing components capable of retaining moisture and enhancing the functionality of the skin barrier. Furthermore, certain BB creams incorporate emollient agents, such as natural oils and natural butters, to foster skin softness and nourishment[24]. Illustrative examples of moisturizing and emollient agents include almond, jojoba, and macadamia oils, enriched with fatty acids and vitamins. Glycerin, hyaluronic acid, and aloe extract (*Aloe vera*) can also contribute to preserving the skin moisture content.

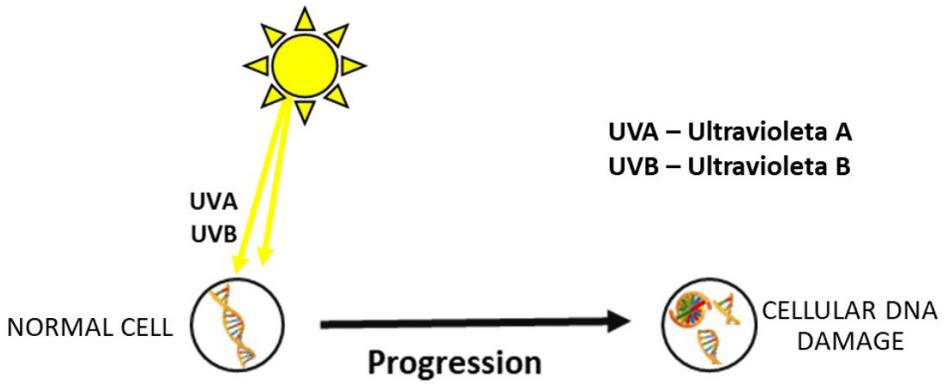
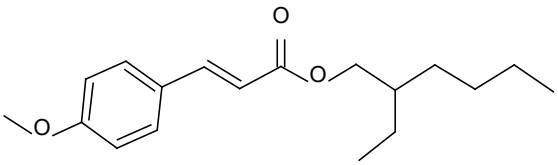
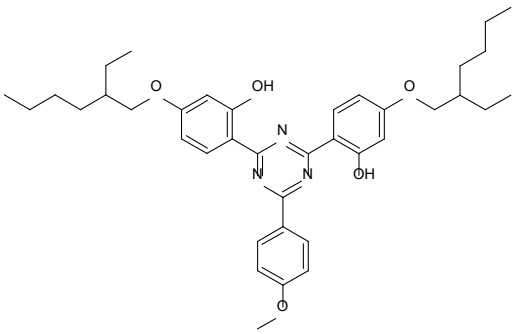
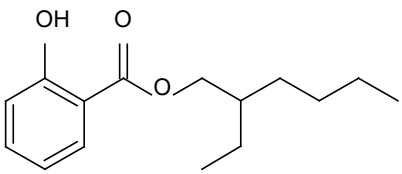
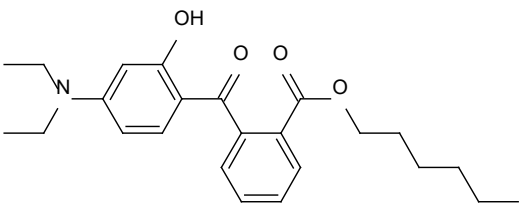


Figure 1 – DNA damage after prolonged sun exposure.

Table 1 – Most commonly used sunscreen ingredients in BB creams.

Ingredient	Chemical structure	Function
Titanium Dioxide	TiO_2	Physical sunscreen (UVA/ UVB protection).
Zinc Oxide	ZnO	Physical sunscreen (UVA/ UVB protection)
2- Ethylhexyl Methoxycinnamate		Chemical sunscreen (UVB protection)
Bis- Ethylhexyloxyphenol Methoxyphenyl Triazine		Chemical sunscreen (UVA/ UVB protection)
Ethylhexyl Salicylate		Chemical sunscreen (UVB protection)
Diethylamino Hydroxybenzoyl Hexyl Benzoate		Chemical sunscreen (UVA protection)

Anti-aging benefits are prominently featured within these products, owing to constituents like peptides, antioxidants, and sunscreens. These elements collectively work to reduce the formation of wrinkles, fine lines, and dark spots, while concurrently furnishing protection against UV-induced damage[25]. Antioxidants, such as vitamins E and C, in addition to α-bisabolol, effectively counteract oxidative harm attributed to UV radiation by impeding or reducing oxidation reactions induced by free radicals[20,26].

Finally, the formulation of BB Creams can influence the control of the natural sebum production by the skin. Facial oiliness results from an excess of sebum produced by the sebaceous glands, leading to a shiny appearance and frequently contributing to acne development. Consequently, ingredients with oil-absorbing properties, like clay and silica, can be incorporated into the composition of BB creams[27].

PHYSICAL AND REOLOGICAL PROPERTIES

Physical and rheological characteristics hold a primordial significance in the formulation of cosmetic products due to their direct impact on stability and sensory attributes.

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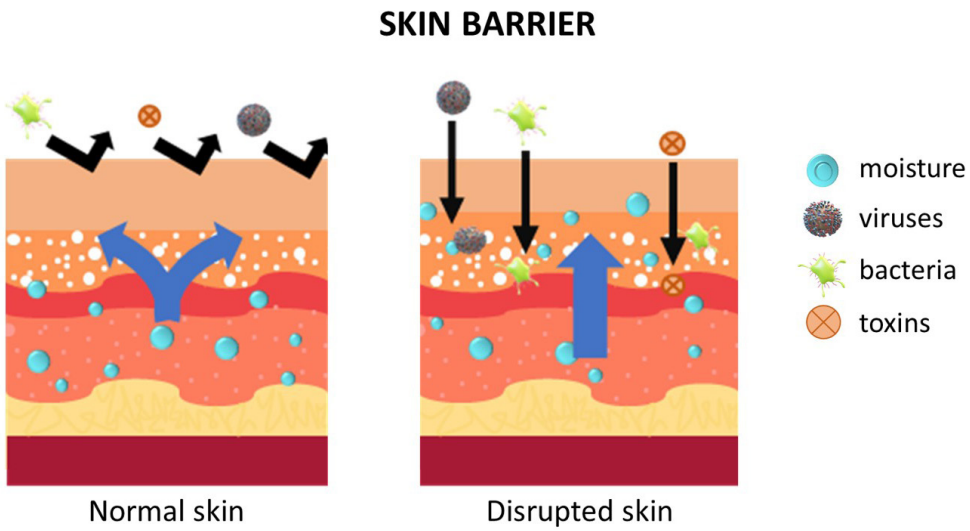

Figure 2 – Skin permeability in (a) normal and (b) disrupted conditions.

These aspects are of utmost importance as they significantly shape product performance and influence consumer acceptance. A thorough comprehension and management of these attributes are imperative to guarantee the quality, effectiveness, and safety of cosmetic products, aligning them with consumer expectations and requirements[28].

Differences in rheological and sensory attributes among various BB Creams can be attributed to several factors, including the type of emollients utilized, the incorporation of thickeners, and the composition of surfactants. Emollients can enhance product smoothness and ease of application, resulting in a reduction of product viscosity. In contrast, thickeners are responsible for elevating viscosity, necessitating the selection of a thickening agent that offsets the viscosity decrease introduced by emollients. Surfactants, on the other hand, impact viscosity by facilitating the mixture of oil- and water-based constituents. A precise mixture of these components demands meticulous adjustment to achieve the intended viscosity, given that texture profoundly influences the user's experience during product application[27].

Viscosity is an important aspect in the formulation of BB Creams, exerting influence over the product spreadability, coverage, adherence to the skin, and stability. To comprehensively assess viscosity, the application of both shear flow analysis and oscillatory strain sweep analysis, as complementary rheological techniques, is commonly employed. These techniques provide insights into the behavior of cosmetic products concerning their viscosity. Specifically, they aid in understanding how viscosity changes under distinct mechanical stress conditions, such as during the application of the cosmetic onto the skin or when pressure is exerted during product usage[29].

It must be demonstrated that the preservation system is effective, that the product is physically stable and does not negatively interact with the packaging. Stability can be assessed by various parameters such as color change, phase separation, sedimentation, and viscosity change over time, and is affected by manufacturing processes, excipients, and storage conditions[30]. Components such as emulsifiers and stabilizers can affect product stability and prevent phase separation or sedimentation[31].

The cosmetic formulation of BB Creams holds substantial influence over consumer reception of the product. Aspects such as color, luminosity, finish, and tactile sensation on the skin carry great importance in the formulation of a BB Cream. Typically, formulations with a matte finish obtain higher preference in comparison to those with a glossy finish or a luminous[3,5].

DISCUSSION

The incorporation of BB Creams into the daily skincare regimen has become increasingly commonplace, attributable to their versatility and multifunctional advantages. Regarding the sequential application, certain guidelines can be followed. Initiating with proper facial cleansing is crucial, as it remove the impurities from the skin and primes it to receive subsequent products. Applying a facial tonic is the second step, intended to enhance blood circulation and rejuvenate the skin tissues[32]. The subsequent phase entails skin hydration, intended for nourishing and balancing the skin. Utilizing a moisturizer tailored to the skin type contributes to enhancing the skin barrier and serves as a foundation for the subsequent application of the BB Cream, facilitating adherence and uniform application of the product[33].

After properly preparing the skin following the previous steps, BB creams can be applied with fingers, sponge or makeup brush according to personal preference[34]. BB creams can also be used as an alternative or complementary to conventional sunscreens if they have an SPF suitable for daytime sun exposure. For complementary use, applying the conventional sunscreen before the BB cream is recommended[34].

Skin care routines can be individually adjusted as needed. In specific conditions such as acne, dark spots or wrinkles, additional products for special treatments may

be added to the routine, usually following the guidance of a dermatologist[35].

Therefore, despite the popularity of BB creams within the cosmetic market, there are obstacles to overcome in order to enhance their efficacy and safety. The pursuit of more sophisticated formulations, capable of providing broader and extended sun protection while enhancing compatibility with various skin types, represents challenges for the ongoing scientific exploration. Moreover, a full comprehension of the mechanisms of action of the ingredients included in BB creams, along with their enduring impacts on skin health, is essential for advancing the creation of even more effective products.

Finally, associating active ingredients like antioxidants, peptides, and brightening agents introduces complementary skin advantages alongside sun protection. The growing encapsulation of ingredients in novel drug delivery technologies, such as nano- and microencapsulation, facilitates higher skin penetration and absorption, thereby optimizing the results obtained with BB creams. These technological advances position BB creams as a promising avenue for skincare, harmoniously merging sun protection and aesthetic benefits to meet the expectations of modern consumers.

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