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Bio-ingredients in Cosmetic Formulations: Their Market Prospects, Regulatory Status, and Future Trends: A Review

Bioingredients In Cosmetic Formulations, Their Market Outlook, Regulatory Status And Future Trends: A Review

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Summary

Numerous new materials have been studied regarding their composition and functionality, focusing on their safety aspects for the production and development of new products and materials for the industry. This review article will investigate the cosmetics market, its trends, and regulatory status. This review article aims to present the application of bio-ingredients in the cosmetics industry, their market prospects, and regulatory status, based on publicly available information and regulatory databases. The study was conducted at the Department of Chemical Engineering of SUNY College of Environmental Science and Forestry between June 2025 and January 2026. Many opportunities can arise from studying new raw materials. It is possible to combine the opportunities that utilize the compounds present in the chemical composition of new raw materials with the production process, allowing for the customization and development of the composition and functionality of manufactured products. Natural cosmetic products are defined as products containing natural ingredients of animal, plant, or mineral origin, that is, derived from natural raw materials rather than synthetic ones, while an organic cosmetic product is defined as one that contains ingredients derived from organic agriculture and/or livestock farming. Nanocelluloses and other extractable natural substances are considered bio-ingredients that can be safely used in various areas, such as cosmetics, special coatings, and biomedicine. Thus, cosmetics encompass a wide range of products, and this class of products is defined considering the categories regulated by each regulatory agency, such as the FDA, ANVISA, and the European Union. Finally, it is evident that many categories of cosmetics and ingredient functions are specifically regulated according to local laws established by the agencies. Even with all the differences between regulatory agencies, new bio-ingredients derived from sustainable sources worldwide, such as cellulose, have attracted special attention in the cosmetic industry.

Keywords: Cosmetics, Natural Index, Bioingredient, Nanocellulose

Abstract

Numerous new materials have been studied regarding their compositions and functionality, exerting their safe aspects into the production and design of new products and materials for the industry. This review paper will investigate the cosmetic market, its trends and regulatory status. This is a review article designed to show the bioingredients application in the cosmetic industry, their market outlook and regulatory status focused on available public information and regulatory databases. The study was carried out in the Department of Chemical Engineering from SUNY College of Environmental Science and Forestry, between June 2025 and January 2026. Many opportunities could be achieved when we start studying new raw materials. Joint the opportunities that use the compounds in the chemical composition in the new raw materials to the process to make their achievable tailoring and design the composition and functionality of industrialized products. Natural cosmetic products are identified as products containing natural ingredients of animal, vegetable or mineral derivation, meaning that they derive from raw materials rather than synthetic ones, whereas an organic cosmetic product is identified as containing ingredients that derive from organic agriculture and/or farms.

Nanocelluloses and other extractable natural substances are considered bioingredient that can potentially be safely used in many areas, such as cosmetics, special coatings and biomedicine. Thus, cosmetics encompass a vast range of products, this class of products are defined considering the range of regulated categories for each regulatory agency as FDA, ANVISA and EU. Finally, it is clear

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Please note that many cosmetic categories and ingredient functions are unique regulated in accordance with the local laws established by the agencies. Even with all existing differences throughout each regulatory agencies, new bioingredients derived from worldwide sustainable sources, as cellulose, have attracted a unique attention considering the cosmetic industry.
Keywords: Cosmetic, Natural indexes, Bioingredient, Nanocellulose

1. INTRODUCTION

Numerous new materials have been studied regarding their compositions and functionality, exerting their safe aspects into the production and design of new products and materials for the industry.

Considering the popularization of many new ingredients linked to the industries trends the use of natural cosmetics is growing among the population. Beauty products considered as natural bring an approach of association between the environment preservation and health protection. Thus, consumers of that kind of cosmetic search for products with the guarantee that they are natural [36].

The cosmetic industry has been able to respond to changing consumers' preferences for chemical-free cosmetics formulas and to switch to natural and organic cosmetic compounds, which are replacing harmful synthetic substances throughout the entire supply chain. The beauty industry is going green and moving progressively toward an eco-friendly and ethical dimension. The importance of sustainability is essential to understand how the cosmetic industry has evolved and changed throughout the years. Sustainability has become the basis of a new era of capitalism, where all stakeholders and business forces have been affected in different ways and along all the entire products' life cycle. This change, for cosmetic companies, means moving towards innovative formulations, eco-friendly packaging, waste and carbon emissions reduction, research of alternatives materials, but also investments on the social and ethical dimension of the beauty world. In fact, sustainability means also working on social and ethical causes, such as human rights protection and animal welfare [37].

From many years of signals and cumulative learning and changes, this industry has been reinvented and presented strong trends building the next steps of the market focused on their ecosystems, consumer wellness and lifestyle throughout the regulatory status safe of the commercial products [38].

2. COSMETIC MARKET OUTLOOK AND PATH

The global beauty market is divided into three main product segments: skincare, haircare, and makeup. However, as highlighted by McKinsey & Company (2024), each category demonstrates distinct growth dynamics and market weight. Figure 1 shows the global beauty market forecast from

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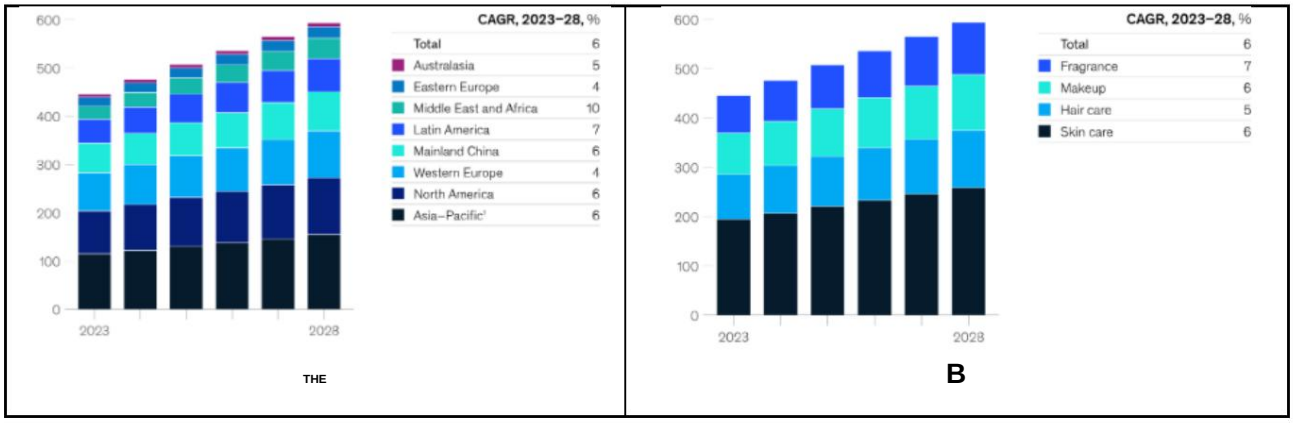
2023 to 2028 accordingly world region (A) and cosmetic category (B). Skin care dominates the global beauty landscape, accounting for over 44% of total market value, while makeup represents approximately 17%, also is classified as second growing market (Figure 1B) [24, 25].

Figure 1. The global beauty market forecast from 2023 to 2028 according world region (A) and cosmetic category (B) [24,25].



The main markets spread all over the world could be divided into 8 regions as, Australasia, Eastern Europe, Middle East and Africa, Latin America, Mainland China, Western Europe, North America and Asia-Pacific. The most significant growing regions forecast since 2023 to 2028 are Middle East and Africa, and Latin America, 10 % and 7 % respectively [24,25]. Although Europe remains the most mature and established cosmetics market holding the leading position in global beauty exports by value. However, recent McKinsey research shows that over the past decade, the Middle East & Africa and Latin America have recorded the fastest growth rates in both value and volume [25]. Linked to the major trends and updated cosmetic terms: (1) Skin care presented the fastest growing and largest segment, driven by demand for active ingredients [25]; (2) Haircare showed the second largest category, supported by innovations in scalp health, natural ingredients, and functional formulations [25] and finally (3) Makeup announced a dynamic segment shaped by inclusivity, hybrid textures, and the rise of skincare infused beauty products [25].

Figure 2 shows the cosmetic major trends map generated by VOSviewer [1] inputting Clarivate-Web of Science database for general current cosmetic search [3]. It is relevant to mention the relational map in this case presents 4 major groups of input related information generated from the most recent cosmetic databases available on the internet. This major groups exemplifies the most significant trends for this area as the formulation, their components, ingredients and available concentration to become a product to interact with the consumer sphere where sustainability, impact and product attitude was the major trends founded.

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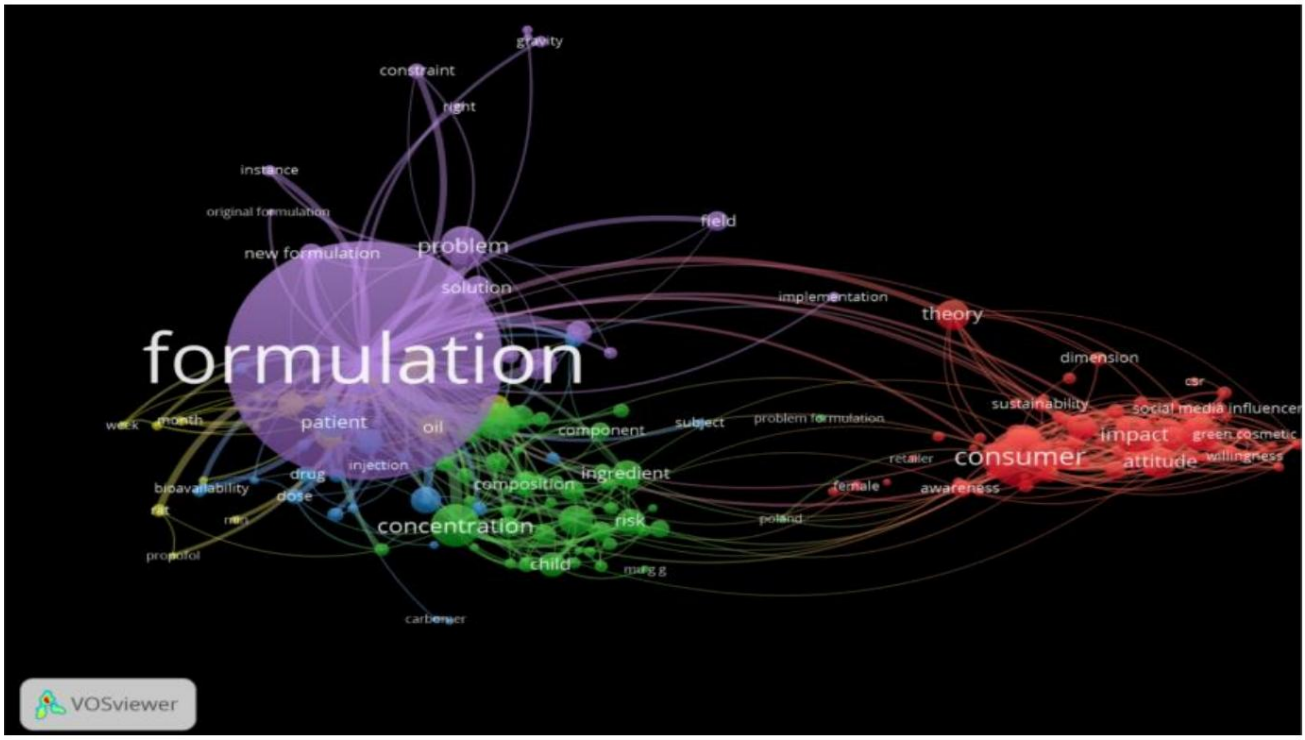
Figure 2. Cosmetics major trends map generated by VOSviewer [1] inputting Clarivate-Web of Science database for general current cosmetic search [3].



3. Cosmetic Ingredients

Many opportunities could be reached when we start studying new raw materials. Joint the opportunities that use the compounds in the chemical composition in the new raw materials to the process to make their achievable tailoring and design the composition and functionality of industrialized products.

Nanocelluloses and other extractable natural substances are considered bioingredient that can potentially be safely used in many areas, such as cosmetics, special coatings and biomedicine. According to Cosmetics Regulation (EC) No 2009/1223 of the European Parliament and of the Council since 2013, to regulate some chemical materials with different, classes and functions the following definitions shall apply: “(a) 'cosmetic product' means any substance or mixture intended to be placed in contact with the external parts of the human body (epidermis, hair system, nails, lips and external genital organs) or with the teeth and the mucous membranes of the oral cavity with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance, protecting them, keeping them in good condition or correcting body odors”; “(b) 'substance' means a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used but excluding any solvent which may be separated without affecting the stability of the substance or

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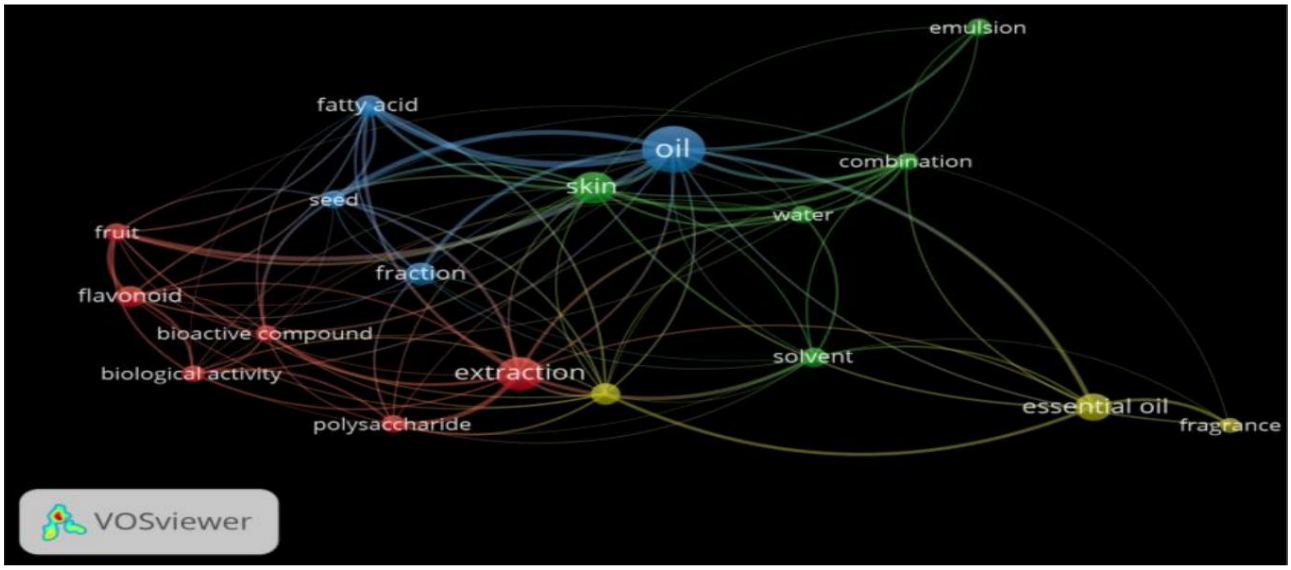
changing its composition"; "(c) 'mixture' means a mixture or solution composed of two or more substances" [29,30].

For the FDA-US Department of Health and Human Services Food and Drug Administration, cosmetic product means a finished cosmetic the manufacture of which has been completed. Any cosmetic product which is also a drug or device, or component thereof is also subject to the requirements of Chapter V of the act. And in addition, the term ingredient means any single chemical entity or mixture used as a component in the manufacture of a cosmetic product [32].

Figure 3 shows a trend map generated by VOSviewer [1] inputting PubMed Science database from 1980 to 2025 [2,33] focused on Cosmetic ingredients and their related processes. In this 45 years old timeline the most significant technical terms and their relation exemplified by the color groups were: fruit, flavonoid, bioactive compound, biological activity, polysaccharide and extraction in red; fatty acid, seed, fraction and oil in blue; skin, water, solvent, combination and emulsion in green; and in yellow, fragrance and essential oils linked to the extraction group. It is important to mention this mental map could change depending on the database, terms and years of the desired search.

Figure 3. Cosmetic ingredients and their processes map generated by VOSviewer [1] input PubMed database from 1980 to 2025 [2].



4. NATURAL FORMULATIONS AND INDEXES

Natural cosmetic products are identified as products containing natural ingredients of animal, vegetable or mineral derivation, meaning that they derive from raw materials rather than synthetic ones, whereas an organic cosmetic product is identified as containing ingredients that derive from organic agriculture and/or farms [35]. There are many standards and certification agencies that could validate a natural cosmetic, their ingredients and define their indexes. Table 1 shows the standards

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their certification mechanisms and agencies considering their classification to active indexes of green, organic, natural and major sustainable trends for cosmetics product categories.

Table 1. Standards their certification mechanisms and agency considering their classification to active indexes of green, organic, natural and major sustainable trends for this product category

Cosmetic natural definition accrodinally standards adopted and certification mechanisms						
ID	**Name**	**Description**	**Industrial case**	**Standard**	**Certification type for cosmetics**	**Reference**
1	ISO 16128	Provides the framework for evaluating the naturalness of ingredients and cosmetic products. This harmonized methodology ensures transparency in line with our corporate policy and international presence. The standard is divided into two parts: ISO 16128-1:2016 and ISO 16128-2:2017. ISO 16128-1:2016 standard focuses on defining cosmetic ingredients according to their	Colonial Chemical	ISO	-	[10,12,14]

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		origin. ISO 16128-2:2017 standard defines the calculation methods used to determine natural indices.				
2	Cosmos	The Cosmos ORGANIC signature is available for products that comply with the COSMOS-standard in all respects and contain the required percentages of organic ingredients to the specified in the COSMOS-standard. COSMOS NATURAL signature is available for products that comply with the COSMOS-standard in all respects but do not meet the required minimum organic percentages as specified in the	INDIE LEE COSMOS		(1)Cosmos Organic; (2)Cosmos Natural; (3)Cosmos Certification Bodies	[8,13,16]

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		COSMOS-standard. The COSMOS BODIES work with manufacturers to provide technical support, COSMOS certification services, auditing and arrange payment for the COSMOS license fee (applicable to retail products and raw materials).				
3	Ecocert	Assist stakeholders in the implementation and promotion of sustainable practices through certification, consulting and training services. Committed to organic farming since its creation, Ecocert now has extended its efforts to many other sectors. The follow sectors are certified	Acorelle's, Backyard Lab	COSMOS; ISO; Nature	(1)Ecocert Organic and Natural Cosmetics; (2)Ecocert Sustainable Wellbeing Center; (3)Green Impact Index; (4)Nature; (5)ISSO 16128 Raw Material Verification and (5) EcoBeautyScore	[9,15,16,17]

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		accordinly Ecocert practices: agri-food, homecare, textiles, forestry, cosmetics and sustainable materials.				
4	Nature	NATRUE's label criteria was to set and build strict requirements for natural and organic cosmetic products particularly for organic cosmetics packaging and products' formulations which could not be found in other labels. The NATRUE Label goes hence further than other definitions of "natural cosmetics established in Europe in terms of consistency and transparency. The natural label is recognized to certificates (1) Finished	Weleda NATRUE		(1)NATRUE Finished products; (2)NATRUE Raw materials; (3)NATRUE Formulas	[11,18,19]

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		products; (2) Raw materials and (3) Formulas.				
5 USDA		Organic certification checks that your farm or handling facility complies with the USDA organic regulations. Once You are certified. you can sell, label, and represent your products to the organic. These regulations describe the specific standards required for you to use the word “organic” or the USDA organic seal on food, feed, or fiber USDA products certificates: (1)Crops; (2)Livestock; (3)Processed products and (4) Wild products.	Evanhealy	ISO and HACCP	(1) 100% Organic; (2) Organic; (3) Made with organic and (4) Specific Organic Ingredient Listings.	[16,20,21]

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6	IBD	IBD is the largest certifier in Latin America and the only Brazilian certifier of organic products that is accredited under IFOAM (international market), ISO Guide 65 (European market, rule CE 834/2007), Demeter (international market), USDA/NOP (North American (market) and INMETRO / MAPA (Brazilian market), making it's certificate accepted globally.	MARFUGA	Bioagricert and NATURE	(1) Cosmetic of Natural Origin; (2) Organic Cosmetic and (3) Plant Based Cosmetic for Bioagricert; and (1)NATRUE Finished products; (2)NATRUE Raw materials for NATRUE.	[16,22,23]
7	Other Agencies	The major certification agencies for natural and organic products	Bundesverband Deutscher Industrie und Handelsunternehmen (BDIH) in Germany; National Association for Sustainable Agriculture, Australia (NASAA) in Australia; Soil Association Organic Standard in United Kingdom; Institute for the Ethical and Environmental Certification (ICEA) in Italy; Quality Assurance International (QAI) in United States of America; Oregon Tilth in United States of America.			[16]

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5. REGULATORY COSMETIC CATEGORIES: FDA *VERSUS* ANVISA *VERSUS* EU

Cosmetics encompass a vast range of products, this class of products are defined considering the range of regulated categories for each regulatory agency or space. Figure 4 summarizes the cosmetics product categories according to their agencies in North America, South America and Europe [4,5,6]. It is important to mention that each regulatory agency, country or continent suggests these classes considering their harmonized valid regulations.

FDA considers 17 categories of cosmetic products [4]. The valid categories are: (01) Baby products (02) Bath preparations; (03) Eye makeup preparations (other than children's eye makeup preparations); (04) Children's eye makeup preparations; (05) Fragrance preparations; (06) Hair preparations (non-coloring); (07) Hair coloring preparations; (08) Makeup preparations (not eye)(other than makeup preparations for children); (09) Makeup preparations for children (not eyes); (10) Manicuring preparations; (11) Oral products; (12) Personal cleanliness; (13) Shaving preparations; (14) Skin care preparations, (creams, lotions, powders, and sprays); (15) Suntan preparations; (16) Tattoo preparations and (17) Other preparations (ie, those preparations that do not fit another category) [4].

ANVISA considers accordingly the RDC nº 949, of 12/12/2024, another structure of categories considering only 2 main groups divided into Product Grades (1) and (2). Inside these groups 120 subcategories were listed [5]. The FDA, ANVISA and EU subcategories could be found in the supplementary material of these study.

EU defines only 11 categories [6] and list in another regulation their specific class of functions detailed in 83 different definitions considering the product [34]. The 11 categories are: (a) 'Rinse-off product'; (b)'Leave-on product'; (c) 'Hair product'; (d) 'Skin product'; (e) 'Lip product'; (f) 'Face product'; (g) 'Nail product'; (h) 'Oral product'; (i) 'Product applied on mucous membranes'; (j) 'Eye product' and (k) 'Professional use'.

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Figure 4. Cosmetics product categories according to their agencies in North America, South America and Europe summarized via Flourish [7].

FDA-USA [4]

ANVISA-BRAZIL [5]

EU-EUROPE [6]

6. NANOMATERIALS DEFINITION: EU *VERSUS* FDA *VERSUS* ANVISA

A wide number of technical terms are defined differently in each country or economic region according to their regulatory agencies. Considering the most important economic and living spaces in the world, Europe and Americas are significant areas and agencies as EU-Commission to the European Parliament, FDA-US Department of Health and Human Services Food and Drug Administration Center for Food Safety and Applied Nutrition and ANVISA-Brazilian Health Regulatory Agency, presents a different definition for nanomaterials.

Accordinly the Commission to the European Parliament, "Nanomaterial" means a natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50 % or more of the particles in the number size distribution, one or more external dimensions are in the size range 1 nm - 100 nm. In specific cases and where warranted by concerns for the environment, health, safety or competitiveness the number size distribution threshold of 50 % may be replaced by a threshold between 1 and 50 % [26].

FDA has not established regulatory definitions of “nanotechnology,” “nanomaterial,” “nanoscale,” or other related terms. In June 2014, FDA issued a guidance for industry titled “Considering Whether an FDA-Regulated Product Involves the Application of Nanotechnology”. To the described in that guidance, at this time, when considering whether an FDA-regulated product involves

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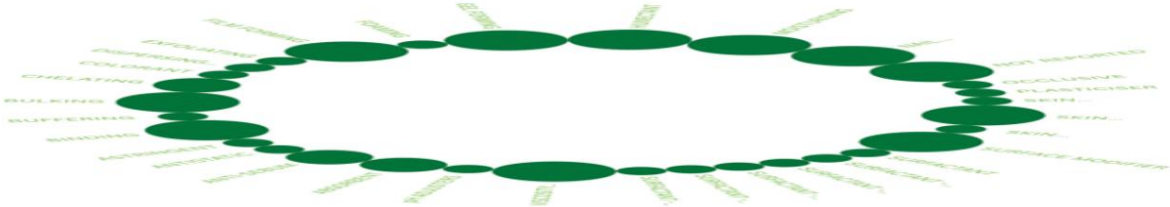
the application of nanotechnology, FDA will ask: (1) whether a material or end product is engineered to have at least one external dimension, or an internal or surface structure, in the nanoscale range (approximately 1 nm to 100 nm); and (2) whether a material or end product is engineered to exhibit properties or phenomena, including physical or chemical properties or biological effects, that are attributable to its dimension(s), even if these dimensions fall outside the nanoscale range, up to one micrometer (1,000 nm). We will apply these considerations broadly to all FDA-regulated products, including cosmetic products [27].

Finally, ANVISA, accordinly the risk classification, notification and marketing authorization systems, as well as labeling requirements and use instructions regarding medical devices define “Nanomaterial”: natural, incidental, or manufactured material containing particles in non-attached state or in the form of aggregate or agglomerate, where 50% or more of the number of particles have a size distribution within 1 to 100 nm, in one or more of its external dimensions, which may include: a) fullerenes, graphene flakes, and simple wall carbon nanotubes with one or more external dimensions of less than 1 nm are also considered nanomaterials;b) materials manufactured with dimensions that extrapolate the upper limit of nanoscale (established between 1 and 100 nm), to the landmark of 1000 nm, and which present size-dependent properties or phenomena that are different from those presented by the same material in macroscale, may be included in the definition of nanomaterial [28].

7. SUGGESTED CLASSES FOR NANOCELLULOSE APPLICATION

Nanocelluloses have the potential to be qualified as bioingredients for various sectors, among the most challenging are beauty, health and food as being those in which regulations and toxicity and safety tests are required and mandatory [31]. Figure 5 shows the suggested cosmetic classes for nanocellulose application in this study, their recipes or formulation accordingly function and description in EU regulation [6] summarized via Flourish [7] in 3 main categories of importance (Small, medium and large considering the circle size).

Figure 5. Cosmetic suggested classes for nanocellulose application in this study, their recipes or formulation accordingly function and description in EU regulation [6] summarized via Flourish [7] in 3 main categories of importance (Small, medium and large considering the circle size).



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8. CONCLUSIONS AND FUTURE OUTLOOK

Numerous new materials have been studied regarding their compositions and functionality, exerting their safe aspects into the production and design of new products and materials for the industry. The most significant trends for this area as the formulation, their components, ingredients and available concentration to become a product to interact with the consumer sphere where sustainability, impact and product attitude was the major trends founded. There are many standards and certification agencies that could validate a natural cosmetic, their ingredients and define their indexes according to their regulatory agencies and countries. Cosmetics encompass a vast range of products, this class of products are defined considering the range of regulated categories for each regulatory agency, FDA, ANVISA and EU. Finally, it is clear observe that many cosmetic categories and ingredient functions are unique regulated in accordance with the local laws established by the agencies the FDA, ANVISA and EU. Even with all existing differences throughout each regulatory agencies, new bioingredients derive from worldwide sustainable sources, as cellulose, has attract an unique attention considering the cosmetic industry.

9. REFERENCES

[1] Center for Science and Technology Studies, Leiden University. *VOSviewer: Visualizing scientific landscapes.* Updated October 31, 2023. Accessed November 30, 2025. https://www.vosviewer.com

[2] National Library of Medicine. PubMed. Ingredients AND cosmetic [search query]. Updated November 17, 2025. Accessed November 30, 2025. https://pubmed.ncbi.nlm.nih.gov/?term=%28ingredients%29+AND+%28cosmetic%29&sort=&filter=dates.1980%2F1%2F12025%2F11%2F17&filter=articleattr.data&filter=dates.1980%2F1%2F1-2025%2F11%2F17&filter=articleattr.data

[3] Clarivate. Web of Science Core Collection. Accessed November 30, 2025. https://www.webofscience.com/wos/woscc/summary/0a990111-6ce2-4d5e-84b6-bcc46574b42b- 018d02a2e1/relevance/1

[4] US Food and Drug Administration. Cosmetic product categories and codes. Updated 2025. Accessed November 30, 2025. https://www.fda.gov/cosmetics/registration-listing-cosmetic-product-facilities-and-products/cosmetic-product-categories-and-codes

[5] Brazil. National Health Surveillance Agency (ANVISA). Collegiate Board Resolution – RDC No. 949, of March 13, 2024. Brasília, DF: ANVISA; 2024. Accessed November 30, 2025. https://anvisalegis.datalegis.net/action/ActionDatalegis.php?acao=abrirTextoAto&link=S&tipo=RDC&numeroAto=00000949&seqAto=000&valorAno=2024&orgao=RDC/DC/ANVISA/MS&codTipo=&desItem=&desItemFim=&cod_modulo=310&cod_menu=9434

Year VI, v.1 2026 | Submission: 02/02/2026 | Accepted: 04/02/2026 | Publication: 06/02/2026

[6] European Commission. COSING: Cosmetic Ingredients and Substances Database – Reference Regulations. Brussels, Belgium: European Commission; 2025. Accessed November 30, 2025. https://ec.europa.eu/growth/tools databases/cosing/reference/regulations

[7] Flourish. Visualization: 26544079. Flourish Studio; 2025. Accessed November 30, 2025. https://app.flourish.studio/visualisation/26544079/edit

[8]COSMOSstandard AISBL. COSMOS certification: organic and natural cosmetic product & ingr editent certification. COSMOSstandard. Published 2025. Accessed December 3, 2025. https://www.cosmos-standard.org/en/certification/cosmos-certification/

[9]Ecocert. Cosmetics: certification for organic and natural cosmetic products. Ecocert. Published 2 025. Accessed December 3, 2025. https://www.ecocert.com/en-US/business-sectors/cosmetics

[10]International Organization for Standardization (ISO). ISO 14044:2006—Environmental managementLife cycle assessmentRequirements and guidelines. ISO. Published 200 6. Accessed December 3, 2025. https://www.iso.org/standard/65197.html#lifecycle

[11]NATRUE. Certification process: step by step. NATRUE. Published 2025. Accessed December 3, 2025. https://natrue.org/our-standard/certification-process-step-step/

[12]Sophim. ISO 16128: a standard for assessing the naturalness of cosmetic ingredients. Sophim. Pu blished 2023. Accessed December 3, 2025. https://www.sophim.com/en/iso-16128-standard-and-natural-index-in-cosmetics-sophim/

[13] Indie Lee. Squalane Facial Oil Travel Size. Indie Lee Skincare. Published 2025. Accessed December 8, 2025. https://indielee.com/products/squalane-facial-oil-travel

[14] Colonial Chemical, Inc. ISO 16128 – Guidelines on Natural and Organic Cosmetic Ingredients. Colonial Chemical. Published 2025. Accessed December 8, 2025. https://colonialchem.com/company/iso-16128/

[15] Ecocert. Certifications List. Ecocert. Published 2025. Accessed December 8, 2025. https://www.ecocert.com/en/certifications-list

[16] Fonseca-Santos, Bruno & Corrêa, Marcos & Chorilli, Marlus. (2015). Sustainability, natural and organic cosmetics: Consumer, products, efficacy, toxicological and regulatory considerations. Brazilian Journal of Pharmaceutical Science. 51. 17-26. 10.1590/S1984-82502015000100002

[17] Ecco Verde. Ecocert Certified Cosmetics – Page 4. Ecco Verde Online Shop. Published 2025. Accessed December 8, 2025. https://www.ecco-verde.com/categories/ecocert?page=4

[18] NATRUE. Certification Process Step by Step. NATRUE. Published 2025. Accessed December 8, 2025. https://natrue.org/our-standard/certification-process-step-step/

Year VI, v.1 2026 | Submission: 02/02/2026 | Accepted: 04/02/2026 | Publication: 06/02/2026

[19] Weleda. Certification labels. Weleda website. https://www.weleda.co.uk/natural- ingredients/quality/certifications-labels. Accessed December 8, 2025.

[20] US Department of Agriculture, Agricultural Marketing Service. Organic labeling. USDA website. https://www.ams.usda.gov/rules-regulations/organic/labeling#4%20labels. Accessed December 8, 2025.

[21] Evanhealy. Evanhealy website. https://www.evanhealy.com. Accessed December 8, 2025.

[22]Bioagricert. Cosmetic certification. Bioagricert website. https://www.bioagricert.org/en/certification/no-food-and-other-services/cosmetic/. Accessed December 8, 2025.

[23] Marfuga Biocosmetics. Biocosmetics—Cosmetici naturali all'olio extravergine di olive. Marfuga Biocosmetics website. https://www.marfugabiocosmetics.it/en/marfuga-biocosmetics/. Accessed December 8, 2025

[24] Weaver K, Lesko Pacchia M, Hudson S, Wolfer A, Saint Olive A, Zampouridis A. The beauty boom and beyond: Can the industry maintain its growth? McKinsey & Company. Published September 11, 2024. Accessed December 8, 2025. https://www.mckinsey.com/industries/consumer- packaged-goods/our-insights/the-beauty-boom-and-beyond-can-the-industry-maintain-its-growth#/

[25] Weitnauer Group. Global trends in cosmetics market 2025: regional overview. Weitnauer Group website. Published October 14, 2025. Accessed December 8, 2025. https://weitnauer.com/trends-in-cosmetics-market-2025-regional-overview

[26] European Commission. Commission Staff Working Document: SWD(2012) 288. European Commission; 2012. Accessed January 27, 2026. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=swd:SWD_2012_0288

[27] US Food and Drug Administration. Guidance for Industry: Safety of Nanomaterials in Cosmetic Products. US Department of Health and Human Services; 2014. Accessed January 27, 2026. https://www.fda.gov/media/83957/download

[28]Brazilian Health Regulatory Agency (ANVISA). Resolution RDC No. 751/2022: Classification Rules and Requirements for Labeling and Instructions for Use of Medical Devices. ANVISA; 2022. Accessed January 27, 2026. https://www.gov.br/anvisa/ptbr/assuntos/produtosparasaude/temas-em-destaque/arquivos/2024/rdc-751-2022-en.pdf

[29] European Commission (2024) CosIng – Cosmetics Ingredients Database

[30] Damasio RAP, Redmond EF, Costa JC, Aljiboury, A, Eufrade HJ (2025) Protein from Tunicates as Bioingredient: Structure Identification, Application and Regulation. J Nano Res Appl Vol. 11 No. 7:171

[31] DAMÁSIO, Renato Augusto Pereira; PEREIRA, Bárbara Luísa Corradi; GOMES, Fernando

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Available in:
at https://submissoesrevistarcmos.com.br/rcmos/article/view/1296. Accessed on: January 27, 2026

[32] US Food and Drug Administration. Cosmetics: General Provisions. 21 CFR Part 700. US Food and Drug Administration; 2024. Accessed January 27, 2026. https://www.ecfr.gov/current/title- 21/chapter-I/subchapter-G/part-700

[33] National Library of Medicine. PubMed. National Institutes of Health. Accessed January 27, 2026. https://pubmed.ncbi.nlm.nih.gov

[34] European Commission. CosIng: Functions – Cosmetic Ingredient Functions Reference. European Commission; 2024. Accessed January 27, 2026. https://ec.europa.eu/growth/tools- databases/cosing/reference/functions

[35] Bozza A, Campi C, Garelli S, Ugazio E, Battaglia L. Current regulatory and market frameworks in green cosmetics: the role of certification. Author manuscript version. Published 2022. Accessed January 27, 2026. https://iris.unito.it/retrieve/27951047-db09-4c8d-bf57-40d07f496c1c/review%20certificazioni.pdf

[36] Barros, C.; Barros, RBG Natural and Organic Cosmetics: Definition and Concepts. Preprints 2020, 2020050374. https://doi.org/10.20944/preprints202005.0374.v2

[37] Girotto G. Sustainability and Green Strategies in the Cosmetic Industry: Analysis of Natural and Organic Cosmetic Products from the Value Chain to Final Certification. [master's thesis]. Venice, Italy: Università Ca' Foscari Venezia; 2012

[38] Mintel. Mintel Announces 2026 Global Beauty and Personal Care Predictions. Mintel. Published 2024. Accessed January 27, 2026. https://www.mintel.com/press-centre/mintel-announces-2026-global-beauty-and-personal-care-predictions/

CONSENT AND ETHICAL APPROVAL

It is not applicable.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare no generative AI technologies such as Large Language Models, etc. have been used.

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