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Analysis of the Integration of Vegan Formulas into Eyelash Extension Materials and Eyebrow Dyes: Chemical Stability and Allergy Minimization in Accordance with Updated FDA Regulations for 2025

 **Tetiana Zrobok**

CEO Magnetic Look LLC, Traverse City, Michigan, USA

Certified Lash and Brow Educator and Specialist, Lash Lamination

Specialist, and Beauty Industry Researcher

M.Sc. in Chemical Technology of Fuel and Carbonaceous

Materials, Lviv Polytechnic National University, Ukraine

Abstract: The conducted study provides a comprehensive analysis of implementing vegan formulations in professional eyelash and eyebrow products in light of the updated requirements of the United States Food and Drug Administration (FDA) set forth by the Modernization of Cosmetics Regulation Act (MoCRA). The aim is to evaluate the chemical stability, functional characteristics, and allergy profile of vegan substitutes for traditional ingredients and to determine pathways to align them with tightened safety standards. The methodological approach includes a systematic review of scientific publications, content analysis of FDA regulatory materials and manufacturers' technical dossiers, as well as synthesis of data from industry reports. The work demonstrates that the shift to vegan formulas in eyelash extension adhesives, eyebrow dyes, and lamination compositions generally preserves key synthetic actives (in particular, cyanoacrylates and p-phenylenediamine derivatives), creating a vegan paradox in which marketing notions of naturalness and safety diverge from the actual chemical nature of the products. It is established that the main vegan alternative to p-phenylenediamine (PPD), toluene-2,5-diamine sulfate (PTDS), is characterized by a high level of cross-reactivity ($\approx 42,9\%$), which substantially limits its hypoallergenic potential. It is concluded that MoCRA shifts manufacturers from declarative promises to evidence-based safety substantiation, complicating and increasing the cost of bringing vegan products to market. The material is addressed to cosmetic industry

chemical technologists, regulatory specialists, dermatologists, and practicing beauty-service professionals.

Keywords: vegan cosmetics, eyelash extensions, eyebrow dye, Modernization of Cosmetics Regulation Act (MoCRA), FDA 2025, allergic contact dermatitis, p-phenylenediamine (PPD), cyanoacrylate, chemical stability, safety substantiation.

Introduction

The cosmetic sector is entering a phase of profound transformation driven by two interrelated factors: the rapid expansion of demand for vegan solutions and the radical renewal of the regulatory architecture in the United States. On the one hand, the global vegan cosmetics market is demonstrating sustained expansion: in 2024 its size was estimated at USD 18.25–18.36 billion, and forecast trajectories indicate a compound annual growth rate (CAGR) of about 7.2–9.1%, which implies surpassing the threshold of USD 35 billion by 2033 [1, 2]. This dynamic is fueled by a shift in consumer preferences toward ethics, environmental sustainability, and clean formulations perceived as safer and more natural [3, 4].

On the other hand, the Modernization of Cosmetics Regulation Act (MoCRA), enacted in 2022, represents the most extensive expansion of the authority of the U.S. Food and Drug Administration (FDA) since the 1938 Act [5, 6]. Full implementation of the provisions in 2025 introduces unprecedentedly stringent obligations: facility registration, product listing, reporting of serious adverse events, and, crucially, scientifically substantiated safety for each marketed product [5]. These requirements radically reshape the compliance landscape for all market participants, especially those who claim specific attributes such as vegan or hypoallergenic.

At the intersection of growing market demand and tightening standards, a substantial research gap emerges. Although individual aspects of market trends and legislative changes have been described in detail, there is no holistic academic analysis of the specific tasks of development, safety validation, and regulatory compliance for professional vegan ophthalmocosmetic products (adhesives, pigments, laminating compositions) within the framework of the new MoCRA paradigm. The present work aims to address this deficiency.

The objective of the study is to conduct a critical evaluation of the chemical stability, functional-operational characteristics, and allergenic potential of vegan formulations in products for eyelashes and eyebrows, as well as to determine practical pathways for aligning them with the updated FDA requirements taking effect in 2025.

The author's hypothesis asserts that the integration of vegan formulations, which meets the ethical expectations of consumers, does not in itself ensure an automatic reduction in allergenicity or simplify the pathway to regulatory compliance. On the contrary, replacing well-studied traditional components with plant-based alternatives generates new challenges for chemical stability and requires a more rigorous, data-centric approach to safety substantiation in order to fulfill MoCRA mandates.

The scientific novelty lies in the interdisciplinary synthesis of regulatory analytics, principles of chemical formulation, and clinical-dermatological observations, enabling the creation of an integrated model for assessing the risks and benefits of vegan eye cosmetics in the post-MoCRA context.

Materials and methods

This study relies on a multi-faceted qualitative methodology aimed at a comprehensive understanding of the research question. The methodological architecture comprises four complementary directions. First, a systematic literature review was conducted: a targeted search and critical appraisal of peer-reviewed publications in Scopus, PubMed, and Web of Science using the key queries allergic contact dermatitis cosmetics, paraphenylenediamine, cyanoacrylate toxicology, hydrolyzed plant protein. This enabled the formation of an initial knowledge base on the dermatological and chemical-toxicological aspects of key ingredients. Second, a regulatory content analysis of primary FDA documents and materials of the United States Congress devoted to MoCRA was performed, focusing on the extraction and synthesis of legal requirements, definitions (including adequate substantiation of safety, serious adverse event), and the implementation timeline of regulatory provisions. Third, a comparative analysis of technical documentation (INCI compositions, MSDS safety data sheets) was carried out for a representative sample of leading brands in the U.S. market specified in the assignment. For materials on eyelash extensions, Xtreme Lashes, Yegi Beauty, and KBL

Cosmetics were selected. For lamination compositions, LB (LashBox LA) and Lash Stuff USA were analyzed. For eyebrow dyes, RefectoCil USA, Godefroy Tint Kit USA, and Just For Men (Brow & Beard Tint) were included. This sample made it possible to verify theses on chemical composition and marketing claims using market leaders as examples. Fourth, market data were synthesized by summarizing analytical reports of leading research agencies (McKinsey & Company, Research and Markets, IMARC Group) to determine market size, growth trajectories, and consumer behavior patterns in the vegan cosmetics segment.

The combination of methods ensured sufficient analytical depth, cross-verification of data, and an integrated representation of the interrelations among the chemical, clinical-medical, market, and regulatory dimensions of the issue under consideration.

Results and discussion

The adoption of MoCRA marked a turning point in the regulation of the US cosmetics sector: the priority is shifting from reactive postmarket oversight to preventive assurance of safety. The essence of the reform is the transition from voluntary statements to mandatory scientific verification of the safety of each item in the product portfolio. Before MoCRA, the FDA's authority was significantly limited: the agency did not conduct premarket approval of cosmetic products and did not require manufacturers to submit a mandatory body of safety data [19]. The law now introduces the figure of the responsible person, who is obligated to ensure the availability and maintain records of documentation substantiating an adequate safety rationale for each cosmetic product [6].

By adequate safety rationale, the law means tests or studies, scientific investigations, analyses, or other evidence or information that are considered sufficient by experts qualified by their scientific education and experience to assess the safety of cosmetic products and their ingredients, to support a reasonable certainty that the cosmetic product is safe [8]. In this way, the regulation moves the industry to a risk-based, evidence-driven paradigm, logically comparable to approaches applied to medicinal products.

Although MoCRA does not establish legal definitions for the marketing designations vegan and hypoallergenic, its requirements directly change the practice of their use.

Statement Vegan. Such positioning presupposes the complete absence of components of animal origin. Under the new conditions, the manufacturer is obliged to confirm this not only at the level of the formulation, but also to document a complete safety dossier for all plant-based or synthetic substitutes. Thus, for a new hydrolyzed plant protein, the volume and persuasiveness of safety evidence must at least correspond to the evidence for the animal keratin it replaces.

Statement Hypoallergenic. The formulation indicating a reduced propensity to cause allergic reactions carries the highest legal risks. To support it, the manufacturer must possess a robust scientific basis — results of repeated human repeat insult patch tests (HRIPT), data from clinical studies, or toxicological risk assessments — demonstrating a statistically significant reduction in allergenic potential compared to standard formulations [14, 34]. Simply excluding a known allergen from the formula is no longer sufficient.

A shift in regulatory practice is confirmed by the expansion of the FDA's enforcement toolkit: the agency has been granted authority to initiate a mandatory product recall and to suspend a facility's registration if it determines that its products have a reasonable probability of causing serious adverse health consequences [6]. This markedly increases both the financial burden on unscrupulous operators and their legal vulnerability for failure to meet requirements.

At the same time, MoCRA establishes a direct regulatory linkage between a deficit of safety evidence and the classification of a product as adulterated or misbranded. The statute introduces an additional basis for deeming a cosmetic product adulterated — the absence of adequate safety substantiation for the specific product [19]. In parallel, existing provisions classify a product as misbranded where labeling is false or misleading in any respect [31, 32]. Taken together, this creates a new enforcement contour. For example, if a consumer with a PPD allergy uses a product labeled as PPD-Free and Hypoallergenic but in fact contains the known cross-reactive component PTDS, and as a result experiences a pronounced adverse reaction, the FDA is entitled to demand the safety dossier. If the company is unable to provide convincing data demonstrating the safety of the product for the intended target group (including sensitive users at whom the labeling is directed), the product may be classified as adulterated. Simultaneously, the assertion Hypoallergenic may be

deemed misleading, which will lead to the product being classified as misbranded. Consequently, the FDA gains the ability to impose sanctions not only with respect to products with proven harm, but also in cases lacking an evidentiary basis corroborating the safety of the claimed properties.

The main provisions of MoCRA 2025 and their impact on the claims Vegan and Hypoallergenic are presented below in Table 1.

Table 1. Key provisions of MoCRA 2025 and their impact on the claims Vegan and Hypoallergenic (compiled by the author based on [6]).

Provision	MoCRA requirement	Impact on the Vegan claim	Impact on the Hypoallergenic claim
Safety substantiation	Mandatory availability of a dossier with scientific data demonstrating product safety under normal use.	A complete toxicological dossier is required for all plant-based and synthetic alternatives to animal-derived ingredients.	Clinical or preclinical data (e.g., HRIPT) are required to demonstrate a statistically significant reduction in allergenic potential.
Adverse event reporting	Mandatory notification to the FDA of serious adverse events within 15 business days.	Increases accountability for reactions to novel plant-derived components that may be insufficiently studied.	Any serious allergic reaction becomes a trigger for a regulatory review of the safety dossier.
Allergen labeling in fragrances	The FDA must develop rules for mandatory labeling of specified allergens present in fragrance compositions.	Requires thorough analysis of the composition of botanical extracts and essential oils, which are frequently used in vegan products.	Strengthens composition transparency requirements and complicates the substantiation of hypoallergenicity in the presence of fragrances.
Good Manufacturing Practice (GMP)	The FDA must establish enforceable GMP rules for cosmetic manufacturing.	Applies to the manufacture of vegan products, requiring quality control of raw materials and manufacturing processes.	Requires stringent controls to prevent cross-contamination with allergens in manufacturing.
Mandatory recall	The FDA gains the authority to initiate a mandatory recall of unsafe products.	Increases financial risks if the safety of vegan ingredients is not adequately substantiated.	A direct FDA response mechanism for products that elicit allergic reactions despite labeling.

Analysis of the compositions of modern vegan products for eyelashes and eyebrows shows that their specificity, compared with traditional formulations, is more often

associated not with a revision of key functional components but with the replacement of auxiliary substances and the rejection of animal testing.

Both traditional and vegan eyelash extension adhesives are based on cyanoacrylate esters, predominantly ethyl 2-cyanoacrylate. These monomers provide a key characteristic — rapid moisture-sensitive polymerization with the formation of a strong adhesive bond. Polymethyl methacrylate (PMMA) is additionally introduced to increase the mechanical strength and elasticity of the cured layer, as is carbon black to obtain an intense black shade [23]. The designation vegan for products such as LashBox LA Pure Vegan and NovaLash Platinum Bond 2024 Formula [28] means that stabilizers and rheology modifiers are of non-animal origin and that the product was not tested on animals; at the same time, the active chemical base remains synthetic and by definition is already vegan.

An analysis of flagship products from leaders of the U.S. market, such as Xtreme Lashes (with their FlexFusion® adhesives) and Yegi Beauty (for example, the Infinity adhesive), confirms this conclusion. Despite emphases on hypoallergenicity, medical grade, and compliance with safety standards (as with KBL Cosmetics), their adhesive base remains unchanged — ethyl-, methyl-, or butyl-cyanoacrylates. Thus, the vegan paradox and the risks associated with monomer vapors apply equally to the entire category, including premium players.

Further, speaking about permanent eyebrow dyes, they achieve coloring through oxidative processes. Historically, the main color precursor was p-phenylenediamine (PPD) — a highly effective component with pronounced allergenic potential. Vegan options, including Elleeplex Vegan Tint [24] and RefectoCil Vegan Line [25], exclude PPD; however, analysis of their INCI lists shows frequent substitution with toluene-2,5-diamine sulfate (PTDS) — a structurally related analog of PPD and a known cross-allergen [13]. Consequently, the vegan status in this case pertains primarily to the emulsion matrix and ethical aspects of production, but does not guarantee a transition to a fundamentally different, less sensitizing class of dyes.

The eyebrow lamination procedure comprises two sequential chemical stages: first, a reducing agent (often

ammonium thioglycolate) cleaves keratin disulfide bonds; then, an oxidizing agent (typically hydrogen peroxide) fixes new conformations of the hair fiber [22]. In classical systems, the final care step is implemented with animal-derived proteins — keratin or collagen hydrolysates. Vegan complexes, such as Thuya Vegan Brow Lamination and InLei Brow Bomber [27], replace them with plant-based alternatives: in Thuya these are hemp and rice protein hydrolysates, in InLei — nourishing macadamia and argan oils [26, 27]. The key technological challenge lies in selecting plant proteins with an optimal molecular-weight distribution and amino-acid profile that provide functional equivalence to animal keratin [16].

A similar approach is observed among popular US brands. The LB system (LashBox LA) also uses thioglycolates as agents for disulfide bond cleavage. Of particular interest is the Lash Stuff USA brand, which actively promotes its systems as gentle and sodium bromate-free. This demonstrates a shift of focus toward excluding a single contentious component (bromate); however, the core two-stage chemical process (reduction–oxidation), which requires rigorous safety substantiation under MoCRA standards, remains unchanged.

In summary, a vegan paradox emerges. Consumers often interpret the vegan label as an indicator of naturalness, mildness, and greater safety [1]. However, to achieve professional performance characteristics — long-lasting adhesive durability (6–8 weeks) and permanent coloring — formulations inevitably rely on chemically active synthetic classes of compounds. Therefore, in pursuing comparable results, vegan products effectively use the same chemical platforms (cyanoacrylates, aromatic amines, thioglycolates) as their conventional counterparts. The vegan label accurately reflects the absence of animal-derived ingredients, but it may be misunderstood if equated with the exclusion of aggressive synthetic chemistry.

Table 2 presents a comparative chemical analysis of vegan and conventional formulations.

Table 2. Comparative chemical analysis of vegan and traditional formulas (compiled by the author based on [13]).

Product category	Traditional key ingredient	Vegan key ingredient alternative	Function	Primary allergenic concern
Eyelash adhesive	Ethyl-2-Cyanoacrylate	Ethyl-2-Cyanoacrylate (synthetic)	Adhesion, polymerization	Monomer vapors, respiratory irritation
Eyebrow dye	p-Phenylenediamine (PPD)	Toluene-2,5-Diamine Sulfate (PTDS)	Permanent color precursor	High sensitizing potential, cross-reactivity
Lamination conditioner	Hydrolyzed Keratin (animal)	Hydrolyzed Rice/Hemp Protein	Hair structure restoration	Potential sensitization to plant proteins

Allergic contact dermatitis (ACD) induced by cosmetic products represents a significant clinical-dermatological problem. According to studies, up to 27% of ACD episodes are attributable to the use of cosmetics; the key etiological agents are fragrances, preservatives, and hair dyes [9, 11]. The prevalence of laboratory- and clinically-verified allergy to cosmetic components in the general population is estimated at 2–3%.

Para-phenylenediamine (PPD) is among the most potent contact sensitizers used in cosmetics. As shown above, in products labeled as PPD-free and positioned as vegan, it is often replaced by para-toluene-2,5-diamine (PTDS). However, a retrospective analysis of patch-testing results revealed a critically important circumstance: among patients with confirmed sensitization to PPD, approximately 42,9% also demonstrate a positive reaction to PTDS [13]. This indicates high immunological cross-reactivity between these molecules. Consequently, for almost half of individuals sensitized to PPD, switching to PTDS-based dyes does not provide clinical benefit and is highly likely to provoke an analogous allergic reaction, which calls into question the correctness of positioning such products as hypoallergenic for this consumer group.

The clinical significance of this conclusion becomes evident when analyzing the assortments of leading US brands.

- RefectoCil USA: This brand provides an ideal illustration of the problem. Its standard line (for

example, RefectoCil No. 3 Natural Brown) contains para-phenylenediamine (PPD). At the same time, as already noted, their vegan line (RefectoCil Vegan Line) replaces PPD with toluene-2,5-diamine sulfate (PTDS) [25]. Thus, for ≈42,9% of patients with allergy to PPD [13], the vegan alternative from the same manufacturer does not resolve the problem of sensitization.

- Just For Men: This product, initially intended for beards, is widely used by practitioners for eyebrows off-label due to its ammonia-free formulation. However, many of its formulations positioned as PPD-Free contain PTDS or its derivatives. This is a classic example in which the PPD-Free claim may mislead the consumer without eliminating the risk of cross-reaction.
- Godefroy Tint Kit USA: This brand, valued for its capsule format, also uses oxidative dyes in its formulas, including diamine derivatives that fall into the same class of sensitizers.

This analysis of market leaders demonstrates that the substitution of PPD with PTDS is not hypothetical. It is a standard industry practice that directly creates risks for consumers and places manufacturers in a vulnerable position in light of the forthcoming MoCRA requirements for adequate safety substantiation for Hypoallergenic claims.

Figure 1 demonstrates the chemical structures of para-phenylenediamine (PPD) and its analogue toluene-2,5-diamine (PTD), which underlies PTDS.

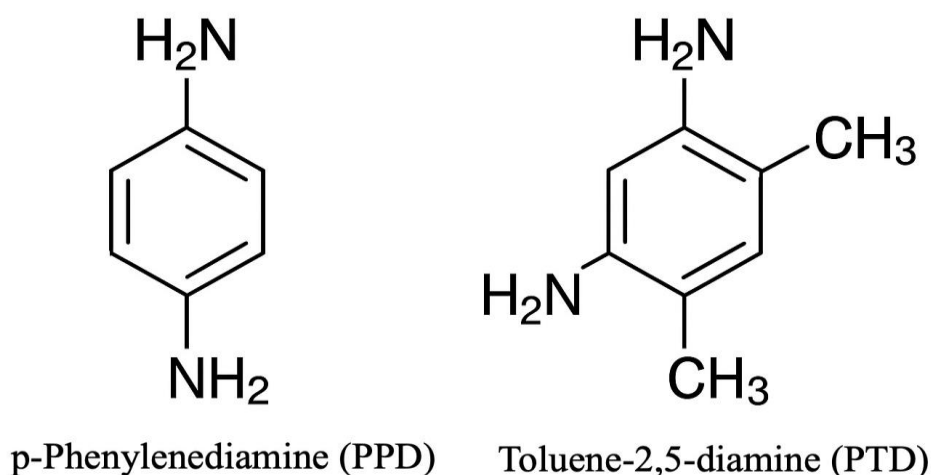


Fig.1. Chemical structures of p-phenylenediamine (PPD) and its toluene-2,5-diamine (PTD) analog underlying PTDS (compiled by the author on the basis of [13, 25, 30]).

The problem is aggravated by discrepancies between the actual composition and the declared labeling. According to high-performance liquid chromatography analysis, in a number of products marketed as PPD-free, PPD was detected; in certain samples its fraction exceeded 2% by mass [12]. For sensitized users this poses a direct health threat and, within MoCRA, unambiguously falls under the category misbranding (incorrect labeling) [7, 10].

Although the key polymer component of adhesives, ethyl 2-cyanoacrylate, is considered acceptable for cosmetic use in the cured state, its monomeric forms are volatile. Inhalation of cyanoacrylate vapors can irritate mucous membranes and the respiratory tract, and with repeated exposures approximately 5% of individuals develop sensitization with allergic manifestations, including influenza-like symptoms [15]. Direct contact of liquid adhesive with skin or contact with cotton materials can initiate exothermic polymerization and lead to a chemical burn [15, 21]. Consequently, the

principal hazard is determined not so much by the properties of the final coating as by the application technology and the presence of volatile components.

Replacing animal keratin with hydrolyzed plant proteins in laminating formulations is a central element of their veganization. Although such ingredients are often positioned as gentler, they are not inherently nonallergenic: the protein source (soy, wheat, rice, hemp) and the molecular weight distribution of its hydrolysates determine the ability to penetrate the skin barrier and initiate an immune response. Despite an overall favorable safety assessment, their allergenic potential is subject to rigorous verification and documentation in the product safety dossier in accordance with MoCRA requirements.

A key driver of the adoption of vegan formulations remains sustained, high-intensity consumer demand; the vegan cosmetics market shows dynamic growth, which makes such developments economically and strategically attractive for manufacturers (see Fig. 2).

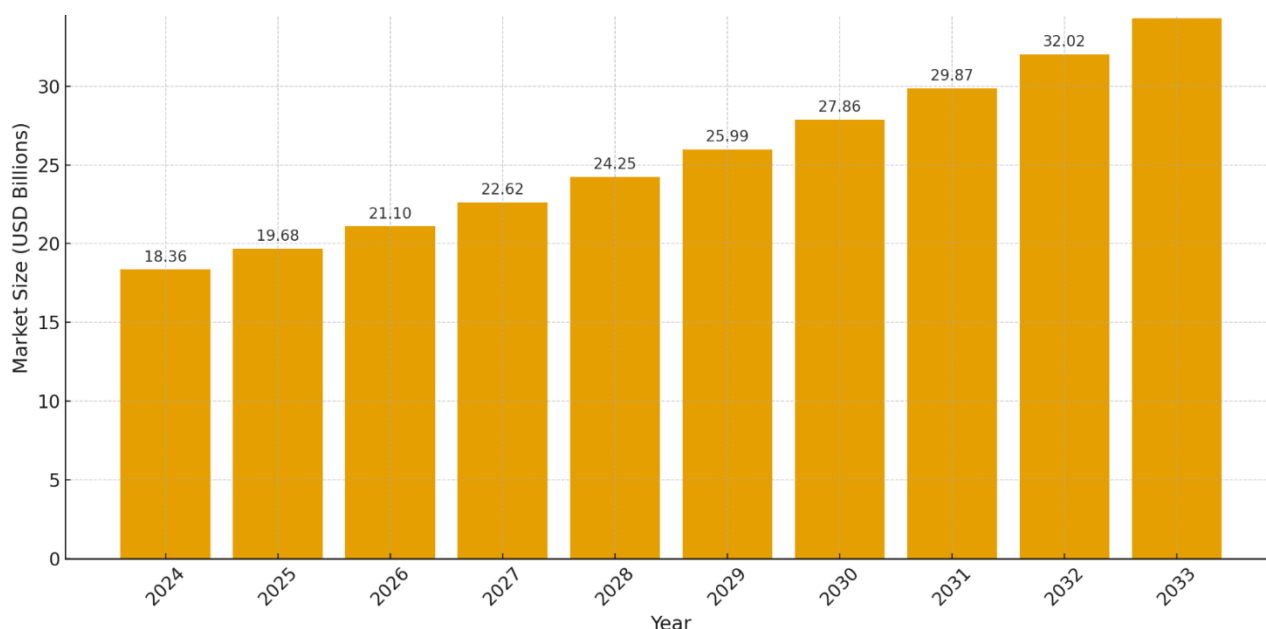


Fig.2. Projected growth of the global vegan cosmetics market (billion US dollars, 2024-2033) (compiled by the author based on [2]).

However, on the crest of this growth a more fundamental shift is emerging that poses serious challenges. According to McKinsey analytical reports, buyers are increasingly skeptical of marketing claims and, in their choices, prioritize demonstrated performance and price-to-value over brand story or even environmental arguments [29]. At the same time, 75% of executives at cosmetics companies believe that the consumer focus on real consumer value will be the key factor shaping the configuration of the industry [29].

This gives rise to a set of obstacles to the implementation of vegan formulas:

- **Formulation complexity:** Developing stable and high-performance vegan products is a demanding task in colloid and polymer chemistry. In particular, for plant proteins to reproduce the strengthening action of animal keratin, precise selection by molecular weight distribution and amino acid profile is required [16, 20].
- **Regulatory costs:** Compliance with MoCRA entails substantial financial and operational burdens. Conducting costly safety studies, maintaining exhaustive documentation, and paying registration fees raise the barrier to market entry for new products, which is especially acute for small independent brands [17, 34].
- **Risk of greenwashing:** The mismatch between the marketed image of a vegan product (gentle, natural) and its actual chemical nature (often synthetic and

highly active) increases the likelihood of accusations of greenwashing. Under MoCRA, misleading claims carry serious legal consequences, turning marketing from a promotional instrument into a source of legal vulnerability [18, 19].

As a result, two trajectories converge: the growing drive for vegan solutions and the demand for evidence-based efficacy, with MoCRA acting as the de facto arbiter. Whereas previously it was sufficient to position within the vegan niche, going forward a product will have to compete with traditional analogs on objective performance metrics and rely on a formalized safety dossier. The vegan label, having been a key sales driver, risks becoming a secondary attribute. The winners will be those companies that manage to convert the toolkit of vegan chemistry into superior, experimentally validated effects.

Conclusion

The conducted study makes it possible to formulate a number of fundamental conclusions with high theoretical and applied significance for the cosmetics industry on the threshold of 2025.

First, the Modernization of Cosmetics Regulation Act (MoCRA) radically restructures the regulatory architecture of the United States, shifting the industry from a long-standing de facto self-regulation model to a strict requirement for scientifically substantiated evidence of safety. This directly affects vegan and hypoallergenic claims: the manufacturer is obliged to

maintain a complete dossier with verifiable data confirming not only the absence of animal-derived components, but also the safety of their plant-based or synthetic substitutes, as well as demonstrating a genuinely reduced allergenic potential.

Second, chemical-technological analysis indicates that the transition to vegan formulations in professional products for eyelashes and eyebrows often remains superficial at the level of key functional chemistry. To preserve performance characteristics, formulas retain highly active synthetic ingredients (cyanoacrylates, PTDS, thioglycolates). As a result, a vegan paradox arises: the marketing image of mildness and naturalness conflicts with the actual chemical nature of the product.

Third, as shown by the analysis of the compositions of leading U.S. brands (including RefectoCil, Just For Men, and others), vegan substitutions for critical allergens, in particular replacing PPD with PTDS, provide limited advantages for a significant share of the sensitized population. The high frequency of cross-reactivity (on the order of 42,9%) renders PPD-free or hypoallergenic claims based on PTDS potentially misleading and vulnerable from an enforcement standpoint under the new MoCRA requirements.

Thus, the results fully confirm the original hypothesis: the integration of vegan formulas does not simplify but, on the contrary, complicates the assurance of stability, safety, and regulatory compliance, creating a new contour of risks and tasks for manufacturers.

The practical significance of the work lies in proposing a roadmap for key market stakeholders. Manufacturers should promptly invest in comprehensive toxicological and clinical studies to develop robust safety dossiers and align marketing claims with chemical reality. Professional practitioners need to develop competencies in interpreting INCI lists, focusing not on label markers but on the actual composition to ensure client safety. For dermatologists and regulators, the present work provides a scientifically grounded platform for assessing risks associated with new vegan products and for advising patients with established contact sensitization.

References

1. Vegan Cosmetics Market Report 2025 [Electronic resource]. - Access mode: <https://www.researchandmarkets.com/reports/5766750/vegan-cosmetics-market-report> (date accessed: 09/12/2025).
2. Vegan Cosmetics Market Size, Share & Trends Forecast 2033 [Electronic resource]. - Access mode: <https://www.imarcgroup.com/vegan-cosmetics-market> (date accessed: 09/14/2025).
3. Vegan Cosmetics Market Report 2025 - Trends And Forecast 2034 [Electronic resource]. - Access mode: <https://www.thebusinessresearchcompany.com/report/vegan-cosmetics-global-market-report> (date accessed: 09/14/2025).
4. 7 trends shaping the beauty industry in 2024 | Radial [Electronic resource]. - Access mode: <https://www.radial.com/eur/insights/7-trends-shaping-the-beauty-industry-in-2024> (date accessed: 09/15/2025).
5. Registration & Listing of Cosmetic Product Facilities and Products - FDA [Electronic resource]. - Access mode: <https://www.fda.gov/cosmetics/registration-listing-cosmetic-product-facilities-and-products> (date accessed: 09/16/2025).
6. Modernization of Cosmetics Regulation Act of 2022 (MoCRA) - FDA [Electronic resource]. - Access mode: <https://www.fda.gov/cosmetics/cosmetics-laws-regulations/modernization-cosmetics-regulation-act-2022-mocra> (date accessed: 09/16/2025).
7. Meet MoCRA: Getting to Know the Modernization of Cosmetics Regulation Act - Food and Drug Law Institute (FDLI) [Electronic resource]. - Access mode: <https://www.fdpi.org/2023/04/meet-mocra-getting-to-know-the-modernization-of-cosmetics-regulation-act/> (date accessed: 09/16/2025).
8. MoCRA Increases FDA Oversight of the Cosmetics Industry [Electronic resource]. - Access mode: <https://www.loeb.com/en/insights/publications/2023/03/mocra-increases-fda-oversight-of-the-cosmetics-industry> (date accessed: 09/16/2025).
9. Zirwas M. J. Contact dermatitis to cosmetics //Clinical Reviews in Allergy & Immunology. – 2019. – Vol. 56 (1). – pp. 119-128.
10. Hafner M. F. S., Rodrigues A. C., Lazzarini R. Allergic contact dermatitis to cosmetics: retrospective analysis of a population subjected to patch tests between 2004 and 2017 //Anais brasileiros de dermatologia. – 2020. – Vol. 95. – pp. 696-701. <https://doi.org/10.1016/j.abd.2020.04.011>.

11. Diepgen T. L., Weisshaar E. Contact dermatitis: epidemiology and frequent sensitizers to cosmetics //Journal of the European Academy of Dermatology and Venereology. – 2007. – Vol. 21. – pp. 9-13. <https://doi.org/10.1111/j.1468-3083.2007.02381.x>.
12. Needle C. D. et al. Contact Allergens in “PPD-Free” Hair Dyes //Dermatitis®. – 2025. <https://doi.org/10.1089/derm.2024.0542>.
13. Venkatesan G. et al. Development of novel alternative hair dyes to hazardous para-phenylenediamine //Journal of Hazardous Materials. – 2021. – Vol. 402. <https://doi.org/10.1016/j.jhazmat.2020.123712>
14. Palaniappan V., Karthikeyan K., Anusuya S. Dermatological adverse effects of hair dye use: A narrative review //Indian Journal of Dermatology, Venereology and Leprology. – 2024. – Vol. 90 (4). – pp. 458-470.
15. Comby P. O. et al. Endovascular use of cyanoacrylate-lipiodol mixture for peripheral embolization: properties, techniques, pitfalls, and applications //Journal of Clinical Medicine. – 2021. – Vol 10 (19). <https://doi.org/10.3390/jcm10194320>.
16. Perinelli D. R. et al. Exploring the Functional Properties of Hydrolyzed Keratin: Filling the Knowledge Gap on Surface Active, Emulsifying, and Thickening Properties //ACS omega. – 2025. – Vol. 10 (12). – pp. 12224-12232.
17. Pan J. et al. Beyond benchmarks: Dynamic, automatic and systematic red-teaming agents for trustworthy medical language models //arXiv preprint arXiv:2508.00923. – 2025. <https://doi.org/10.48550/arXiv.2508.00923>.
18. Guidance for Industry: Registration and Listing of Cosmetic Product Facilities and Products - FDA [Electronic resource]. - Access mode: <https://www.fda.gov/media/170732/download> (date accessed: 09/20/2025).
19. FDA Regulation of Cosmetics and Personal Care Products Under the Modernization of Cosmetics Regulation Act of 2022 (MoCRA) [Electronic resource]. - Access mode: <https://www.congress.gov/crs-product/R47826> (date accessed: 09/20/2025).
20. Guidance for Industry: Registration and Listing of Cosmetic Product Facilities and Products [Electronic resource]. - Access mode: <https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-registration-and-listing-cosmetic-product-facilities-and-products> (date accessed: 09/22/2025).
21. MATERIAL SAFETY DATA SHEET - Ellisons [Electronic resource]. - Access mode: https://www.ellisons.co.uk/content/ellisons/products/datasheets/TH11102051_TH11102046_TH11102049_TH11102050_TH11102045_TH11102054_TH11102047_TH11102016_TH11102053_TH11102052_Thuya_lashbrow_tint_14ml_Datasheet.pdf (date accessed: 10/10/2025).
22. Thuya Brow Lamination Kit | Trusted by Professionals Worldwide [Electronic resource]. - Access mode: <https://thuyanyc.com/products/thuya-eyebrow-lamination-kit> (date accessed: 10/10/2025).
23. Adhesive finder - LashBox LA Australia [Electronic resource]. - Access mode: <https://lashboxla.com.au/pages/adhesive-finder> (date accessed: 10/10/2025).
24. Elleebana Elleeplex Regen 20 ml - Salon First Beauty Supplies [Electronic resource]. - Access mode: <https://www.salonfirst.com.au/elleebana-elleeplex-regen> (date accessed: 10/12/2025).
25. RefectoCil No. 3.1 Light Brown - Silverlines AS [Electronic resource]. - Access mode: https://silverlines.no/images_hovedside/2022%20PRODUKTDOKUMENTER/100006177%20PRODUKTBLAD.pdf (date accessed: 10/12/2025).
26. Refectocil - Lash & Brow Tint - Bella Beauty Professional [Electronic resource]. - Access mode: <https://bellabeautyprofessional.com/products/refectocil-lash-brow-tint> (date accessed: 10/12/2025).
27. brow bomber > brow lamination - InLei® [Electronic resource]. - Access mode: <https://inlei.com/collections/inlei%C2%AE-brow-bomber> (date accessed: 10/12/2025).
28. Material Safety Data Sheet - NovaLash [Electronic resource]. - Access mode: https://novalash.com/wp-content/uploads/2015/07/MSDS.PlatBond_R08052009.pdf (date accessed: 10/12/2025).

- 29.** Beauty - McKinsey [Electronic resource]. - Access mode: <https://www.mckinsey.com/~media/mckinsey/industries/consumer%20packaged%20goods/our%20insights/state%20of%20beauty/2025/the-state-of-fashion-beauty-june-2025-f.pdf> (date accessed: 10/15/2025).
- 30.** A close look at the global beauty industry in 2025 - McKinsey [Electronic resource]. - Access mode: <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/a-close-look-at-the-global-beauty-industry-in-2025> (date accessed: 10/15/2025).
- 31.** State of Beauty industry trends 2025 | McKinsey [Electronic resource]. - Access mode: <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/state-of-beauty> (date accessed: 10/17/2025).
- 32.** FDA Authority Over Cosmetics: How Cosmetics Are Not FDA-Approved, but Are FDA-Regulated | FDA [Electronic resource]. - Access mode: <https://www.fda.gov/cosmetics/cosmetics-laws-regulations/fda-authority-over-cosmetics-how-cosmetics-are-not-fda-approved-are-fda-regulated> (date accessed: 10/17/2025).