RESEARCH PAPER

Comparative Regulatory Frameworks for Cosmetics in U.S, India and China

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ABSTRACT
Background: The global cosmetic industry is growing rapidly and is making a demand for strong and harmonized regulatory frameworks that are capable of providing consumer protection, quality and safety of cosmetic products. The markets of the United States, India, and China have made some significant cosmetic product regulatory reforms due to the ever-changing challenges in the cosmetic industry and to improve the oversight of cosmetic products.
Results: The review found notable differences in the regulatory approaches of the three countries. The United States has a post-market regulatory approach with the additional requirements for MoCRA 2022: facility registration, product listing, safety substantiation, and adverse event reporting. The Cosmetics Rules 2020 is a pre-market licensing system in place in India where the manufacturing and import approvals are obtained from CDSCO and State Licensing Authorities. China implements a risk based approach to CSAR, with registration for special cosmetics and notification for general cosmetics, with a comprehensive safety evaluation. All three systems have enhanced safety assessment, Good Manufacturing Practices (GMP) standards, transparency in labelling and post market surveillance.
Conclusion: Though the regulatory philosophies and market authorization processes differ, the US, India and China all have the shared goal of safeguarding the public's health and safety regarding cosmetics. Regulatory convergence is particularly relevant for the international cosmetics industry, as the regulatory landscape in these countries has recently been strengthened in terms of safety regulations, regulatory oversight and consumer protection.
KEYWORDS: COSMETIC REGULATIONS, MoCRA, COSMETICS RULES 2020, CSAR, COSMETIC SAFETY, LABELLING REQUIREMENTS
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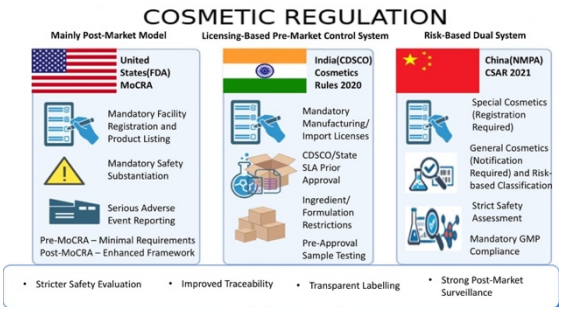
1. INTRODUCTION
The cosmetic market size in the world was USD 424.72 in 2025 and is expected to grow to about USD 802.04 in 2035 with 6.56% CAGR in the period 2026 to 2035, has necessitated a substantial change in regulation throughout the globe[1]. The US Federal Food, drug and Cosmetic Act, enacted in 1938, was left largely unchanged until 2022, when the Modernisation of Cosmetics Regulation Act (MoCRA) was the most significant reform of FDA cosmetics jurisdiction since 1938[2]. Equally, the 1989 Cosmetics Hygiene Supervision Regulations of China were substituted by the more generalised CSAR in 2021, and India followed suit with the Cosmetics Rules 2020, so that regulatory requirements can be simplified[3–5]. The three markets are worthy of comparison as the EU and the USA have a substantial share in the cosmetic market,

with regulations acting as an example to the developing countries. China has made large strides to change its framework in the last three years, and the various markets have regulatory frameworks that are not quite compatible, making it hard to operate globally. This is a comparative analysis of regulatory authorities' structure (FDA, CDSCO, NMPA), product classification, pre-market requirements, safety assessment, manufacturing standards, ingredient management, labelling requirements, and post-market surveillance in these jurisdictions[6,7]. These frameworks are very important to understand because the varying policies among countries will affect the competitiveness and profitability of the industry, new reforms have improved regulatory systems that join the EU and Japan as the global leaders in cosmetic safety, and these frameworks will enhance regulation that will ensure the safety of cosmetic products that individuals use every day, and consumers use, on average, 6 to 12 cosmetic products per day, and this will in effect protect consumers health as well as is able to plan strategically on compliance across the various markets globally[8,9].

Figure 1: Key Features of Cosmetic Regulatory Frameworks in United States, India, and China



This figure compares the cosmetic regulatory frameworks of the United States, India, and China, highlighting their distinct regulatory approaches.

METHODS

A comprehensive English-language literature search was conducted in this study from 2007 to 2025 to identify relevant information on cosmetic regulatory frameworks. The official regulatory sources and scientific literature, such as the publications of the U.S. Food and Drug Administration (FDA), Central Drugs Standard Control Organisation (CDSCO), and the National Medical Products Administration (NMPA), and peer-reviewed journals and online sources were used to gather data. Keywords such as Cosmetic regulations, MoCRA, Cosmetics Rules 2020, CSAR, cosmetic safety, and labelling requirements, in cosmetics were also used to find relevant literature to make sure that all the areas were covered.

RESULTS

2. REGULATORY FRAMEWORK OVERVIEW

2.1 United States - Modernisation of Cosmetics Regulation Act (MoCRA)

The Modernisation of Cosmetics Regulation Act (MoCRA) of 2022 is the most notable increase in the power of the FDA over cosmetics since the 1938 Federal Food, Drug, and Cosmetic Act. In the past, the FDA had minimal oversight, voluntary registration, no mandatory reporting of adverse events, no mandatory risk labelling, no formal control over quality systems and a lack of authority to promulgate recalls. MoCRA currently obliges manufacturing facilities of cosmetics to be registered (with bi-annual renewals) and keep records of products with ingredient information (also updated yearly), has serious adverse event reporting requirements within 15 business days and has safety substantiation records which companies must maintain. Though facility registration had to be done within one year of enactment (Dec 29, 2022), implementation was not actioned until July 1, 2024, and the FDA had to provide binding cosmetic GMP regulations by Dec 29, 2025. The law also empowers the FDA to suspend the registration of a facility in case of a product that presents a significant health hazard and order a recall to take place in case it is not undertaken voluntarily, and it preempts state and local registration, listing, GMP, records, recalls, adverse event reporting, and safety substantiation laws[10–12].

2.2 India - Cosmetics Rules under the Drugs & Cosmetics Act

Since the Drugs and Cosmetics Act 1940 had a separate codification and update outline of the import, manufacture, labelling, sale and distribution of cosmetic products, the Cosmetics Rules 2020, which are notified by the Drugs and Cosmetics Act 1940, were introduced to streamline the regulation and enhance compliance in the cosmetic industry in India. Selected provisions were revised again by the Cosmetics Amendment Rules 2025, notified on July 29, 2025, in order to be more transparent, streamline and strengthened regulatory control. The National Regulatory Authority in India is the Central Drugs Standard Control Organisation, which is under the Ministry of Health and Family Welfare, with the Drugs Controller General (India) being the Central Licensing Authority that handles the registration of imports and regulation of cosmetic imports, and the State licensing authorities regulating the manufacturing, sale, stock and distribution. Importation of cosmetics is not allowed without registering with the CLA, and they must meet the standards of ninth schedule or any other safety and quality regulation. The 2020 Rules also enacted the notion of new cosmetics that should be approved by CDSCO in advance, in case of new ingredients[13,14].

2.3 China - Cosmetic Supervision and Administration Regulation (CSAR)

The Cosmetic Supervision and Administration Regulation (CSAR) is a regulation of the State Council, which was issued on 2020 and became

effective on 2021, substituting Cosmetics Hygiene Supervision Regulation, and is the central component of a reformed, risk-based, cosmetic regulatory framework backed by many implementing measures. Enforced by the State Administration for Market Regulation (SAMR) through the National Medical Products Administration (NMPA), the system employs registration and notification of ingredients and finished products to make sure the lifecycle is published. Different cosmetics require NMPA registration, with a detailed review of safety and efficacy required, and general cosmetics may get on the market after being notified of their existence by the local authorities. The ingredients are controlled depending on the level of risk, where high-risk ingredients like new preservatives, sunscreens, colourants, hair dyes, and whitening agents should be registered and approved, whereas low-risk ingredients need notification only[15,16].

3. PRODUCT CLASSIFICATION AND REGISTRATION REQUIREMENTS

3.1 PRODUCT CLASSIFICATION

3.1.1 United States

Cosmetics, as defined in the U.S. within the Federal Food, Drug and Cosmetic Act, are those which are destined to clean, beautify, promote attractiveness or alter the look, but not the structure or functions of the body. In case a product asserts to treat, prevent or influence the functioning of the body, it is not a cosmetic but a drug (typically an OTC drug). Cosmeceutical is not legally recognised. Hence, borderline products like the anti-acne creams, sunscreen or other anti-dandruff shampoo may be classified as a drug or a cosmetic depending on their claims and dependency on their ingredients[10,17,18].

3.1.2 India

In India, cosmetics get their definition in the Drugs and Cosmetics Act, 1940, as the articles that are meant to be put on the human body to clean, beautify, enhance attractiveness or even change the appearance. Similar to the U.S., in India, there are no legal terms of cosmeceutical. Therapeutic or medical claims on the products can be controlled as drugs, Ayurvedic medicines or other classes of medicines based on their composition and use. Therefore, product claims and ingredients are important in classification[17,19].

3.1.3 China

In the context of China, cosmetics under the umbrella of CSAR relate to chemical substances that are used every day on the human body to cleanse, protect, beautify or change the appearance. China also separates cosmetics into special cosmetics (hair dyes, sunscreens, whitening products, anti-hair loss products, etc) and general cosmetics. Any product that is used as a medicine or therapy is not a cosmetic and will be regulated as a drug. This classification defines the registration (special cosmetics) or notification (general cosmetics) [20].

3.2 REGISTRATION VS NOTIFICATION SYSTEMS

3.2.1 United States

The U.S. has no pre-market approval system of cosmetics under MoCRA, but it added obligatory facilities registration and product listing. Cosmetic manufacturing and processing establishments are required to be registered with the FDA and renew registration every two years, whereas persons in charge are required to submit a listing of cosmetic products with ingredient information on them and renew lists in the form of an annual submission. The system enhances the visibility of the FDA regarding products and facilities; however, it does not entail approval of products prior to marketing[10,19,21].

3.2.2 India

India is a system based on licensing. Domestic cosmetic manufacturing firms should have a manufacturing license issued by the State licensing authority, whereas imported cosmetics should have an import registration certificate issued by the Central licensing authority (CDSCO/DCGI). No cosmetic would be produced or imported without prior permission, and the products have to adhere to set standards, and all these make the Indian system more pre-market control-oriented than the U.S[21,22].

3.2.3 China

China has a dual system of registration-notification that is determined by product risk. There are also special cosmetics (e.g., sunscreens, hair dyes, anti-hair loss products, shaving, whitening products) which should be registered with NMPA with the safety and efficacy review before sale. General cosmetics need only to be notified to the authorities, which is a less complicated procedure, but nonetheless required prior to market acceptance. A risk-based approach defines the degree of pre-market investigation[20,21,23].

4. INGREDIENT REGULATIONS

Aspects	United States	India	China
Prohibited/ Restricted Substances	Any substance that made cosmetic harmful (Eg, Mercury compounds, chloroform)	Scheduled/ prohibited lists in Drugs and Cosmetics. In the GHS, this category is categorized as a carcinogen (Eg; Lead, arsenic,	Specific and periodically revised prohibited and restricted lists. (Eg, Some

		hexachloro phene).	heavy metals, derivatives of chloro form)
Novel Ingredients	No pre-market approval (except colour additives); (Eg, New botanical extracts)	New cosmetics containing new ingredients must first be approved by CDSCO (Eg, novel chemical UV filters)	New ingredients are either registered or notified, depending on risk. (Eg; Thiamidol 630)
Colorants	Majority of these requires FDA approval (Eg; FD&C Red No.40, FD&C Blue No.1)	Should be up to the required standards/limits. (Eg, TiO2, Iron Oxides)	Frequently considered to be more risky; possible registration may be required
Preservatives	No prior approval is needed; the manufacturer has to make sure that it is safe. (Eg, parabens, phenoxyethanol)	Should be within the boundaries of regulations	Regarded as risky, it would be reviewed more strictly
Functional Ingredients	Controlled under claims; others	Managed using standards	Frequently classified as
	can be classified under OTC drugs. (eg, anti-dandruff agents, sunscreen actives, etc.)	and safety limits.	high-risk requires registration.

Table 1 : Ingredient regulation[24–26].

5. SAFETY SUBSTANTIATION

5.1 MoCRA: Safety Substantiation Mandate

A responsible individual must also provide and keep the records of sufficient safety substantiation of their cosmetic products, and the manufacturers may utilise the existing industrial safety data to substantiate product safety. In MoCRA, the term adequate substantiation refers to tests, studies, research, analyses or other evidence that are taken into account by qualified scientific experts and that substantiate reasonable certainty that a cosmetic product is safe. Safe- The cosmetic product is not harmful to the users under the labelled or customary conditions of use, and the FDA will not find a product to be harmful because it causes minor transient reactions and skin irritations to some users. MoCRA does demand sufficient substantiation of safety before a product is sold in the US, and a product that lacks sufficient substantiation will be deemed adulterated. The FDA regulations and the law do not require testing to establish the safety of any given product or ingredient, and the manufacturers are authorised to use the appropriate safety data that has already been done but this may be necessary to cover information gaps[2].

5.2 India: Safety Data Requirements

Manufacturers shall execute Safety assessment of the Cosmetics new to their product line in accordance with the IS 4011:2018 Methods of Test for Safety Evaluation of Cosmetics published by the BIS. The 2020 Rules established so-called new cosmetics with new ingredients not used anywhere in the world or which were not recognised as suitable to be used in the cosmetic product in national or international literature, that had to be approved by the Central Licensing Authority and were to submit the required data on the safety of the cosmetic product. No cosmetic will be imported or produced without meeting the specifications required under the Ninth Schedule or any other quality and safety standards. Under the rules, testing of both raw materials and finished goods must be conducted in batch and manufacturers must keep detailed batch records for a minimum of three years or more in case a product has a shelf life that exceeds three years[27–29].

5.3 China: Safety Assessment

The CSAR demands that the information be provided in the form of safety assessment reports on cosmetic products and new cosmetic ingredients to either undertake notification or registration. To replace the previous provisions, the NMPA published the Technical Guidelines for Cosmetic Safety Assessment (2021 Edition) that came into full effect on May 1, 2021, and as of January 1, 2022, product registration and notifications based on safety assessment in compliance with the Guidelines became obligatory. The registrant or notifier must carry out a safety assessment before registration or notification and present safety assessment reports to either themselves or professional institutions. Professional knowledge that the safety assessors conducting assessments must have should include fields like medicine, pharmacy, chemistry or toxicology[28,30,31].

6. LABELLING AND CLAIM REQUIREMENTS

Aspects	United States	India	China
Language Requirements	The label information must be in English so that consumers can comprehend the information about the use and safety of the products.	Labels should be in **English** (additional local language may also be used).	Labels should be in Chinese, which is stipulated by the national laws.
Ingredient Declaration	Ingredients are put in order of predominance in decreasing INCI name	Ingredients below the regulatory standard are written in decreasing order in the form of INCI names.	Ingredients should be listed according to instructions by NMPA and INCI/Chinese INCI
Warnings and Directions for Use	Safe use (e.g. coal-tar hair dye caution statements) should be mentioned in the Warnings and Directions to Use.	Products that have potential risks, like hair dyes and sunscreens, must have warnings and Usage directions.	Instructions and safety warnings are mandatory, particularly in the case of special cosmetics such as hair dye and sunscreens
Batch Coding and Traceability	Batch/lot number needed to identify the product and for recall purposes.	Traceability requirements, e.g. batch number, manufacturing details and expiry/use-before date.	Information about batch numbers and manufacturers will be needed to facilitate the market surveillance and recall management
Permitted vs. Prohibited Claims	No more than cosmetic claims (beautifying, cleansing, moisturising). Information that suggests a treatment change or change of structure/function (e.g. treats acne, heals eczema) is a drug claim, and is not allowed in cosmetics.	Cosmetic claims should not suggest any medical or therapeutic benefits.	The claims should be in line with the cosmetic functions (cleansing, beautifying, protection). Claims that are medical or inflated are not allowed.

Table 2 : Labelling and Claim Requirements[32–35]**.**

7. MANUFACTURING AND FACILITY

7.1 GOOD MANUFACTURING PRACTICES (GMP)

MoCRA obliges the FDA to come up with binding GMO regulations to the manufactures of cosmetics by December, 2025. Prior to MoCRA, the FDA issued a draft guidance in 1997, updated in 2008 and 2013, advising the use of GMP on cosmetic products, but these guides were not compulsory. In the past, the FDA promoted a global standard, ISO 22716, but MoCRA has enabled the FDA to establish specifications of GMP laws concerning the manufacturing of cosmetics. The GMP specifications of MoCRA entail rigorous personnel hygiene, manufacturing standard clean rooms, quality control at different production levels, and extensive records on all the manufacturing procedures, including raw materials, production procedures, and quality control. MoCRA creates a GMP exemption for small-scale manufacturers whose average gross sales are less than 1 million a year in three consecutive years, but companies producing some high-risk products are excluded[36,37]. In the case of India, ISO 22716:2007 is the global GMP standard of cosmetics that offers specifications of manufacture, control, storage and shipping of products in regard to quality and safety, and the Cosmetics Rules 2020 have developed regulations that concentrate on how qualified personnel who could manufacture safe and effective products[38]. In the case of China, the Cosmetic registrants, notifiers and entrusted production enterprises make arrangements to manufacture cosmetics in accordance with the cosmetics GMP, where all requirements were covered under ISO 22716. On January, 2022, NMPA published the final GMP guidance for cosmetics, which has implemented on July, 2022, and domestic manufacturers will need a cosmetic production license issued by NMPA and regular GMP inspections done, with NMPA carrying out random factory inspections and market surveillance to enforce compliance, and all personnel engaged in the manufacture of cosmetics will have to take GMP training[39].

7.2 FACILITY REGISTRATION

7.2.1 United States

The person in charge is obliged to present facility registration information and product listing information, with the responsible individual being the manufacturer, packer or distributor of a cosmetic product whose name is contained in the label. The term facility implies all the establishments that include an establishment of an importer that manufactures or processes cosmetic products sold within the United States, domestic and foreign establishments that only label, relabel, hold, distribute, package, and repack, but do not fill the containers with product, are not required to register. All the facilities that deal with the importation of cosmetic products should make sure that they are registered by the FDA by July 1, and the registration must be renewed every two years. The FDA can suspend registration of a particular facility in the event of a probable danger of severe adverse health effects. The foreign establishment agents in the U.S. have to help the FDA in communications, address questions about imported products, help in scheduling of inspection and receive information or documents given by the FDA on their behalf[40].

7.2.2 India

Production of cosmetics is governed by an inspection and licensing system by the State licensing authorities nominated by the respective State Governments, whereas the production of cosmetics is governed by a registration system by the Central licensing authority nominated by the Central Government. The manufacturing plant should meet Schedule VII of the Cosmetics Rules 2020, where the applicant makes a self-declaration on Form COS-7 to confirm that the Good Manufacturing Practices and premises, plants, and equipment requirements are complied with. The State licensing Authority or a subordinate officer inspected the site within thirty days of issuing a license to confirm the information in the self-declaration, and at least once in every three years, all licensed manufacturing facilities are to be inspected. When all the documents are received, the SLA will review the application and issue a license in the Form COS-8 or loan license in the Form COS-9 within 45 days of the date of application, and when the license is issued, the applicant should post a copy on the CDSCO website that will allow transparency and accessibility of the information publicly[41].

7.2.3 China

Manufacture of licensed products under cosmetics shall fall under general liquid unit, cream emulsion unit, powder unit, aerosol, toothpaste unit, soap-based unit and other unit according to the manufacturing process, condition and use of the finished goods, and those who have the manufacturing conditions of children skin care and eye care cosmetics are specially listed in the manufacturing licensed items. Those companies that intend to put cosmetics on the Chinese market should be registered or filed with NMPA or provincial MPA to obtain approval license or filing certificate, the cosmetics registrant or filer should be an enterprise or other organization that is established in accordance with the law, possesses a quality management system that is suitable to the cosmetics to be registered and filed and the ability to monitor and evaluate adverse reactions. Medical Products Administration (MPAs) are also available at the provincial level and under NMPA, which are responsible for the filing of domestic non-special use cosmetics and the issuance of cosmetics manufacturers' production license[16].

8. ADVERSE EVENT REPORTING

Aspect	United States	India	China

Reportable Events	Reportable Events: Incidents resulting in death, life-threatening reaction, hospitalisation, severe disability, infection or medical intervention	Issues related to cosmetics (significant adverse safety effects or harmful effects).	Effects that are undesirable to human health, especially serious reactions
Reporting System	The U.S. has a mandatory serious adverse event reporting system for cosmetics under MoCRA	India does not yet have a separate and structured system of reporting safety concerns involving cosmetics, but they are handled through the regulatory monitoring framework under CDSCO and state authorities.	National System of monitoring adverse reactions of cosmetics under NMPA
Who Must Report	Responsible person (manufacturer, packer or distributor whose name is printed on the label)	Manufacturers, importers, and marketers	Manufacturers, distributors, registrants and notifiers.
Reporting Timeline	Within 15 business days, all serious and unexpected adverse events should be reported to regulators	All serious and unexpected adverse events should be reported within 14 calendar days	General Reactions within 30 days, Serious Reactions within 15 days
Follow-up Obligations	Should be able to provide new medical data within 1 year and keep records	Should keep safety documentation and provide information to the regulators when necessary	Must carry out follow-up assessment and submit updated information to the authorities

Table 3 : Adverse event reporting[30,42,43]**.**

9. ENFORCEMENT AND PENALTIES

9.1 UNITED STATES

9.1.1 Compliance Monitoring

FDA observes adherence to MoCRA and sends warning letters to organisations that do not conform. As of January 1, 2025, there are 9,528 registered active facilities and 589,762 unique product listings registered by the FDA. The FDA can issue import warnings and letters of reprimand to organisations that produce or sell violative products. The FDA also carries out inspections of facilities where they are supposed to hold to standards of safety and quality[2,44]**.**

9.1.2 Penalties for Non-Compliance

The measures that may be used to enforce these are warning letters, forced recalls and injunction of the distribution of the product and the worst penalty is that the registration of the facilities may be suspended. Depending on the gravity of the violation, the financial penalties will be different[10,44].

9.2 INDIA

9.2.1 Compliance Monitoring

The State Licensing Authority can check the manufacturing premises within 30 days of issuing the license to confirm that the Good Manufacturing Practices are adhered to, and in the event that they are not, the license might be revoked. All licensed manufacturing facilities are inspected at least once every three years. CDSCO conducts compliance by licensing, sampling, and testing, receiving complaints and overseeing adverse reactions, and, in the event that product recalls are required[3].

9.2.2 Penalties for Non-Compliance

The penalties for misbranded cosmetics are fines not exceeding ₹50,000, with the same extended to 100,000 in case of a repeat. Failure to comply may lead to penalties in the form of fines, product confiscation, and, in some cases, manufacturing licenses may be suspended or cancelled[3,45].

9.3 CHINA

9.3.1 Compliance Monitoring

The NMPA comes up with a national cosmetics sampling inspection plan annually that is coordinated at the national, provincial and city levels. The cosmetics manufacturing and operators who intend to make their products available in China should be ready to sample inspection of cosmetics arranged by the appropriate department of drug supervision and administration. NMPA also provides on-site inspection as required by Cosmetic GMP standards[16,30]**.**

9.3.2 Penalties for Non-Compliance

False labelling fines more than 80,000 RMB to enterprises. Goods containing banned ingredients were fined a maximum of 2.49 million yuan, and in one instance, the company was fined 522,000 yuan due to the production of an anti-acnes cream of antibiotic nature[30].

10. RECENT TRENDS AND FUTURE DIRECTIONS

10.1 HARMONIZATION EFFORTS

Conformity to International Standards

The process of globalisation of the cosmetic industry has raised the demand of the harmonized regulatory framework on the safety of products, international trade, and regulatory standards across countries. Though cosmetic laws vary widely in jurisdictions, the regulatory bodies are slowly harmonising the national needs with the international regulations to ease regulatory violations and enhance consumer safety.

ISO 22716 is one of the most authoritative international standards in cosmetic production that includes the Good Manufacturing Practices (GMP) of cosmetic products. The standard offers guidelines on production, quality control, storage and distribution processes, which allows the same quality and safety of products throughout the cosmetic supply chain. GMP principles are now accepted by many regulatory systems such as in the United States, India, and China according to ISO standards as means of enhancing regulatory control and managing the quality of manufacturing.

Harmonization has also been achieved in terms of international regulatory cooperation initiatives. Organizations like the International Cooperation on Cosmetics Regulation (ICCR) must encourage the communication between regulatory authorities and the industry stakeholders and scientific experts to align safety assessment methods and regulatory policies on a global level. These movements promote the creation of internationally uniform ingredient evaluation and product safety testing standards as well as labeling standards[20,36,46].

10.2 EMERGING ISSUES

10.2.1 Regulation of Nanomaterials

Nanotechnology has become a significant innovation in the field of cosmetic science, which allows creating new delivery systems like liposomes, nano-emulsions, solid lipid nanoparticles, and so on, which increase the stability and can facilitate the permeation of cosmetic ingredients into the skin. Nevertheless, it is the physicochemical characteristics of nanomaterials that have drawn the concern on possible toxicity, bioaccumulation and environmental impact.

Research has indicated that nanoparticles can bypass the biological barriers and have varied effects on human tissue in comparison to the traditional ingredients, which can cause unknown health hazards. Regulatory organizations are therefore paying more attention to particular safety assessment guidelines to nanomaterials used in cosmetic products such as characterization, toxicological assessment and exposure. Other nations like China and members of the European Union have come up with regulation clauses to notify and carry out a safety evaluation of nanomaterials in cosmetic formulations. The regulatory systems to be adopted in the future are anticipated to have more detailed recommendations on rating and labelling of nano-enabled cosmetic products[47,48].

10.2.2 Microbiome-Related Products

Research in microbiomes has given rise to cosmetic products to preserve or replace the skin microbiome, such as products based on probiotics, prebiotics and post biotics. The effects of such products are to help maintain skin barrier activity, decrease inflammation, and enhance the skin in general.

Nevertheless, microbiome-based products pose a regulatory problem since their action mechanism can be similar to the action of therapeutic interventions. The regulatory agencies thus need to decide on which products should be regulated as cosmetics, drugs or biologics. Recent scientific reviews indicate that there are still big gaps in the regulation of the long-term effects of microbiome-targeted cosmetic ingredients and that the safety and efficacy of microbiome-targeted ingredients should be evaluated by a standardized framework[49,50].

10.2.3 Digital Product Labeling

There is a growing implementation of digital technologies in the cosmetic labeling systems so that the product could be more transparent and offer the consumers more comprehensive information on the products. The digital labeling technology (such as QR codes, electronic product information platforms, and smart packaging technologies) makes the consumers view the ingredient lists, safety information, and usage instructions on digital interfaces.

The rise of the use of e-commerce platforms and digital health, in turn, has increased the pace of switching towards electronic labeling solutions. Digital labeling is being discussed by regulatory bodies as one of the ways to increase the product traceability, consumer awareness and product regulatory compliance in cosmetics market[34,51].

10.3 FUTURE REGULATORY DIRECTIONS

The current regulatory environment of the cosmetic industry around the world keeps changing due to the scientific progress, demands of the consumers and the health needs of the people. Regulatory bodies and scientists speculate on various developments that can be made in the future to enhance the safety of products, transparency in the regulations, and international cooperation in provisions of regulations.

10.3.1 Expansion of Post-Market Surveillance Systems

Regulatory authorities are likely to tighten the post-market surveillance mechanisms in order to promote constant monitoring on the cosmetic product safety. The conventional system of cosmetic regulation has mostly been based on the pre-market compliance and responsibility of the manufacturer, but regulators are now considering the value of post-market monitoring products. The approaches to future regulations can involve the introduction of better adverse event reporting mechanisms, better product traceability mechanisms and tougher regulatory enforcement measures. Such measures will enable the regulatory agencies to detect any safety issues faster and react to the arising risks efficiently[51,52].

10.3.2 Increased Regulatory Oversight of Cosmetic Ingredients

One more of the expected regulatory patterns is the creation of more unified ingredient evaluation mechanisms. It is expected that the regulatory bodies will increase the size of ingredient safety databases and put a more rigorous vetting process on both old and new cosmetic ingredients. Analysts indicate that regulators can come up with periodic review schemes of cosmetic ingredients, just like the ones applied in drug and food regulation. These programs would make sure that ingredients are safe according to new scientific data[51,52].

10.3.3 Greater Transparency and Consumer Information

Enhancement of transparency and access to product information by consumers is likely to be a significant regulatory agenda. The regulatory bodies might come up with new conditions to act so that the consumers get clear, precise and complete information on the composition of cosmetic products, their safety and the dangers they may cause. The regulatory policies in the future will need better labeling regulations, more disclosure of fragrance allergens, and better communication of safety information that will boost the consumer trust and lead to informed purchase choices[51,53].

CONCLUSION

Conclusively, this comparation of cosmetic regulatory systems within the United States, India, and China shows that although all three jurisdictions have the same basic aim of providing product safety and protection to consumers, they differ widely in terms of regulatory philosophies. The United States uses post-market regulation reinforced by the Modernisation of Cosmetics Regulation Act (MoCRA), India adopts a pre-market regulation system that is based on licensing, and China uses a risk-based registration-notification framework (CSAR). Despite these differences, recent reforms in every regions show the global shift towards a more stringent approach to safety assessment, mandatory reporting of adverse events, adherence to GMP, labelling transparency, harmonization with international standards, including ISO 22716. The subsequent development of regulations is expected to be influenced by new concerns, including nanomaterials, microbiome-based products, sustainability claims, and even digital labelling, and it is paramount to note that the international cooperation and adaptive policy frameworks are required. Such regulatory divergences have strategic importance to the industry stakeholders in strategic market entry, compliance planning, as well as innovation and future research should be on the harmonization pathways developing science based and globally consistent regulatory strategies to enable safe and sustainable expansion of the cosmetic sector.

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