



(RESEARCH ARTICLE)



Use, composition, and regulatory compliance of glutathione-based cosmetic products in Yaoundé, Cameroon: A cross-sectional study

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Abstract

Background: Voluntary skin depigmentation is a widespread practice in sub-Saharan Africa and constitutes a major public health concern due to its prevalence and associated complications. Glutathione has emerged as an alternative to conventional depigmenting agents; however, limited data are available regarding its commercialization and regulatory compliance in Central Africa.

Objective: To describe the use, composition, and compliance with Cameroonian standards of glutathione-based cosmetic products in Yaoundé.

Methods: A descriptive cross-sectional study was conducted between March and April 2020 in three major markets in Yaoundé. Vendors selling glutathione-based cosmetic products were interviewed, and products were inventoried and photographed to assess pharmaceutical form, origin, composition, and labeling compliance according to national standards (NC 804 and NC 814).

Results: Forty vendors were included. All were aware of the depigmenting properties of glutathione. Artisanal manufacturing was frequent (65%), with systematic use of glutathione powder. Among 54 identified products, the predominant forms were body milks (31%) and serums (28%), mostly imported from Asia or of unknown origin. Only 9% contained glutathione alone; most combined glutathione with other active ingredients (vitamins C and E, kojic acid). None complied with all mandatory labeling requirements, and specific warnings were rarely mentioned.

Conclusion: Glutathione-based products are widely used in Yaoundé, often in artisanal formulations, with insufficient regulatory compliance. These findings provide a valuable baseline for strengthening regulation and surveillance of skin-lightening cosmetics.

Keywords: Glutathione; Voluntary Skin Depigmentation; Cosmetics; Regulatory Compliance; Cameroon

1. Introduction

Voluntary skin depigmentation (VSD) is widely practiced in sub-Saharan Africa and is associated with significant dermatological and systemic complications [1,2]. Regulatory concerns regarding cosmetic labeling and product composition have previously been documented in Cameroon [3] and other African settings [4].

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Historically, hydroquinone, topical corticosteroids, and mercury derivatives were the principal depigmenting agents, but their toxicity led to regulatory restrictions in several countries [1,2]. In this context, glutathione has emerged as an alternative agent promoted as safer due to its endogenous antioxidant properties [5].

Glutathione modulates melanogenesis through tyrosinase inhibition and alteration of melanin synthesis pathways [5,8]. Clinical trials have reported modest reductions in melanin index with topical or oral use [6,7], while systematic reviews highlight heterogeneity and methodological limitations [9]. Concerns have also been raised regarding high-dose or intravenous administration [10].

Despite growing commercialization, data on the composition and regulatory compliance of glutathione-based cosmetics in Central Africa remain limited [3,4]. This study aimed to provide a baseline assessment of such products marketed in Yaoundé.

2. Methods

2.1. Study Design and Setting

A descriptive cross-sectional study with prospective data collection was conducted between March and April 2020 in three major markets in Yaoundé: Mofolo, Central Market, and Moog-Mbi.

2.2. Study Population and Sampling

Vendors selling glutathione-based cosmetic products and providing informed consent were included. Sampling was non-probabilistic and non-exhaustive.

2.3. Data Collection Procedures

2.3.1. Data collection included

- An anonymous questionnaire assessing usage practices and vendor knowledge
- Inventory and photographic documentation of products
- Analysis of pharmaceutical form, country of origin, and declared composition
- Assessment of labeling compliance according to Cameroonian standards NC 804 (general cosmetic labeling requirements) and NC 814 (specific requirements for skin-lightening products)

2.4. Statistical Analysis

Data were entered using CSPRO 7.0 and analyzed with Excel 2016. Variables were expressed as frequencies and percentages.

3. Results

3.1. Usage Practices

All vendors (100%) were aware of the skin-lightening properties of glutathione and reported that it was widely preferred to hydroquinone.

Artisanal preparation was common (65%), typically involving systematic use of glutathione powder incorporated into cosmetic bases. The principal motivations were rapid action and perceived effectiveness.

Client follow-up was limited, with fewer than half of vendors reporting post-sale monitoring. No adverse effect complaints were declared.

3.2. Product Characteristics

Pharmaceutical Forms (N = 54)

Glutathione-based products were mainly marketed as Body milks (31%), Serums (28%). Other forms included creams, lotions, and soaps (figure 1).

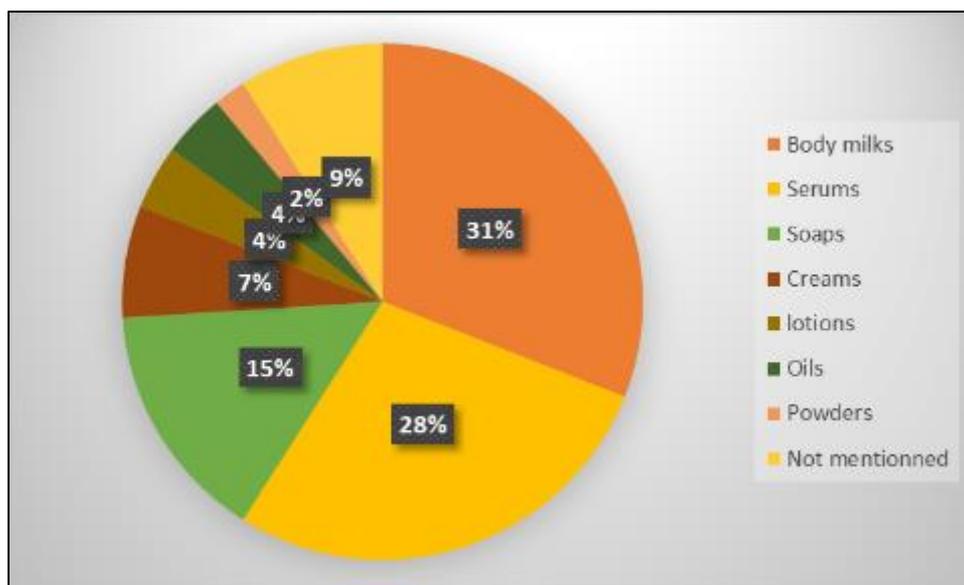


Figure 1 Pharmaceuticals forms

3.3. Country of Origin

Most products originated from Asia, Thailand (22%), Philippines (7%) and Japan (4%). However, the country of manufacture was not specified for approximately half of the products. Overall, 39% were imported and 11% locally manufactured (figure 2).

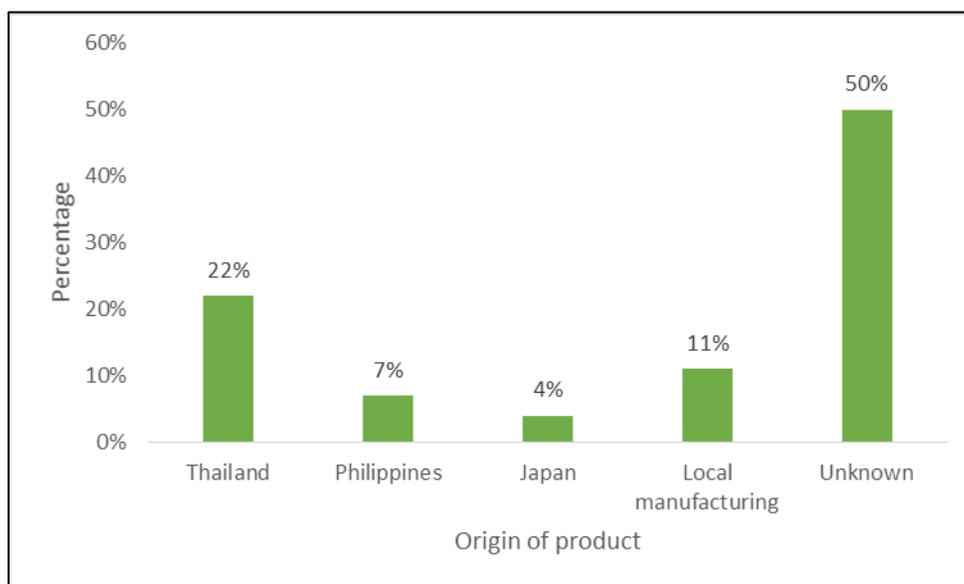


Figure 2 Product's origin

3.4. Composition

Figure 3 shows that, only 9% of products contained glutathione as the sole declared active ingredient. Most products (67%) combined glutathione with other depigmenting agents, including: Vitamin C, Vitamin E, Kojic acid, Fruit acids, Arbutin, Vitamin B3. In rare cases, clobetasol propionate was identified. Additionally, 24% of products mentioned "glutathione" without clearly specifying the full ingredient list.

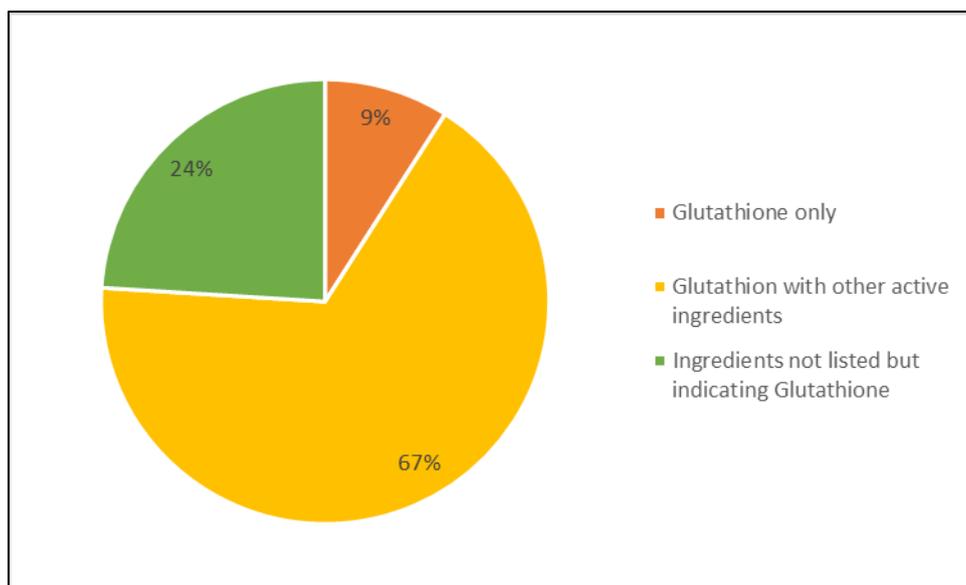


Figure 3 Product's composition

3.5. Regulatory Compliance

Compliance with general labeling requirements (NC 804) was partial: Ingredient list present 76%, Instructions for use 67%, Manufacturing date 35%, Safety warnings 4% (figure 4).

None of the products complied with all mandatory labeling requirements.

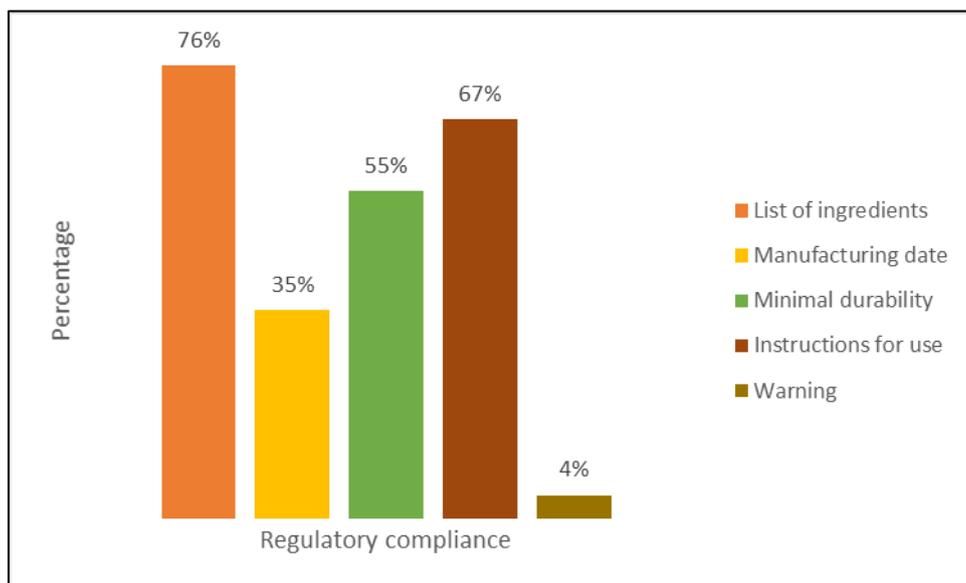


Figure 4 Regulatory compliance

4. Discussion

This study provides baseline data on glutathione-based cosmetic products marketed in Yaoundé and highlights significant regulatory and public health concerns. The findings reveal a market characterized by artisanal production, polylactide formulations, and widespread labeling non-compliance.

Voluntary skin depigmentation remains prevalent in sub-Saharan Africa [2-4]. While regulatory restrictions have targeted hydroquinone and corticosteroids, consumer demand appears to have shifted toward alternative agents such as glutathione. This shift reflects substitution rather than elimination of risk.

Glutathione's mechanism of action in melanogenesis regulation is biologically plausible [5,8], and clinical trials suggest modest depigmenting effects [6,7]. However, systematic reviews emphasize short study durations and variable methodological quality [9]. Safety concerns persist, particularly regarding systemic exposure and high-dose administration [10]. Thus, its perceived safety may not be fully supported by long-term evidence.

The frequent combination of glutathione with vitamins C and E, kojic acid, and other depigmenting agents is pharmacologically coherent [5,8], yet multi-active formulations complicate safety assessment. Prolonged or unsupervised use may increase risks of irritation, dyschromia, or barrier alteration.

The identification of clobetasol propionate in certain formulations aligns with previous Cameroonian findings on cosmetic mixtures [1] and raises concern given the well-documented adverse effects of potent corticosteroids.

Artisanal preparation (65%) further amplifies regulatory challenges. The uncontrolled incorporation of glutathione powder may result in concentration variability, instability due to oxidation, and absence of quality assurance. Informal compounding also falls outside structured cosmetovigilance systems.

Universal labeling deficiencies, consistent with prior Cameroonian studies [3], undermine consumer protection and traceability. Additionally, the high proportion of products with unspecified origin complicates regulatory oversight.

Although limited by its cross-sectional design and reliance on declared labeling information, this study provides an important reference for regulatory authorities. Strengthened enforcement, improved import traceability, and targeted public health education are essential to mitigate potential risks.

5. Conclusion

Glutathione-based cosmetic products are widely used in Yaoundé, frequently through artisanal formulations, and demonstrate insufficient regulatory compliance.

Strengthening regulatory enforcement, improving market surveillance, and enhancing education of vendors and consumers are essential to mitigate potential public health risks.

Compliance with ethical standards

Disclosure of conflict of interest

No conflicts of interest or commercial sponsorship influenced the study design, data collection, analysis, or interpretation.

Statement of ethical approval

This study did not involve clinical experimentation, biological sampling, or intervention on human participants. Data collection consisted exclusively of anonymous interviews with cosmetic vendors and documentation of commercially available products in public marketplaces.

The study was conducted in accordance with principles of the Declaration of Helsinki applicable to non-interventional research and complied with national ethical standards for public health research in Cameroon. Data were anonymized and used solely for academic and regulatory research purposes.

Statement of informed consent

All participating vendors provided verbal informed consent prior to inclusion. No personal identifying information was collected. Participation was voluntary, and vendors were free to decline or withdraw at any time.

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