

The importance of cosmetic quality assurance: Investigation of the contamination in commonly used topical cosmetic preparations

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INTRODUCTION

Nowadays, topical cosmetics and personal care products are considered an essential part of our daily care routine. These preparations are intended to be rubbed, sprinkled, poured, or sprayed for cleansing, beautifying, adding attractiveness or modifying the physical appearance. Topical preparations can be applied to several body parts such as hair, skin, and nails; therefore, they must be effective, stable, and safe for human use. Quality assurance and monitoring are significant practices to guarantee that preparations are safe and effective. A desired quality in the finished product is granted when the quality is controlled and maintained in each step from acquiring the raw material till the product reaches the consumer; this can be varied by standardized tests that are required by regulatory agencies. However, no such tests are required by authority agencies to ensure the safety and quality of cosmetic products or ingredients.

OBJECTIVES

This study aims to assess the most common use topical cosmetic products and to examine the quality of these preparations by assessing organoleptic properties, microbial load and heavy metals impurities.



Figure 1: Some of the tested topical cosmetic products.

METHODS

To select tested products, a cross-sectional survey was distributed online featuring the most used type and brand products. Based on the answers, products were selected, and the quality of the products was tested in terms of microbial load, heavy metals content, and organoleptic properties. The microbial contamination load was investigated using the aerobic plate count method. Lead (Pb), aluminum (Al), cadmium (Cd), cobalt (Co), chromium (Cr), copper (Cu), manganese (Mn), nickel (Ni), zinc (Zn), iron (Fe), and arsenic (As) impurities were analyzed using an inductively coupled plasma mass spectrometer.

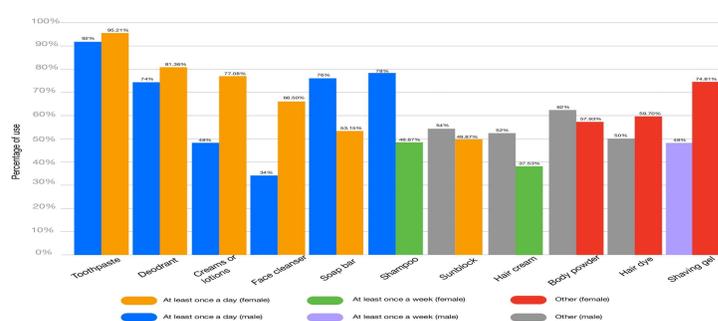


Figure 2: The most frequent use of cosmetics products among respondents (n=447).

RESULTS

Based on 447 responses from both males and females with different ages and education levels, 21 different products chosen as sample products, including sunblock, lip balm, cream, hair cream, shampoo, cleanser, baby oil, baby powder, soap bar, hair dye, make-up, deodorant, hair serum, shaving gel, and toothpaste (Figure 1,2). Microbial contaminations were found in 14 of the products ranging between 1467.5 cfu/ml to 299.5 cfu/ml (Figure 3, 4). The most isolated microorganism was Staphylococcus aureus, and Bacillus species. Most of the tested products showed metals impurities. Toothpaste showed the highest concentration of Pb, Cr, As, Cu and Ni. Samples showed no lumps, discoloration, or a characteristic odor with a pH ranging from 6.90 to 8.10.

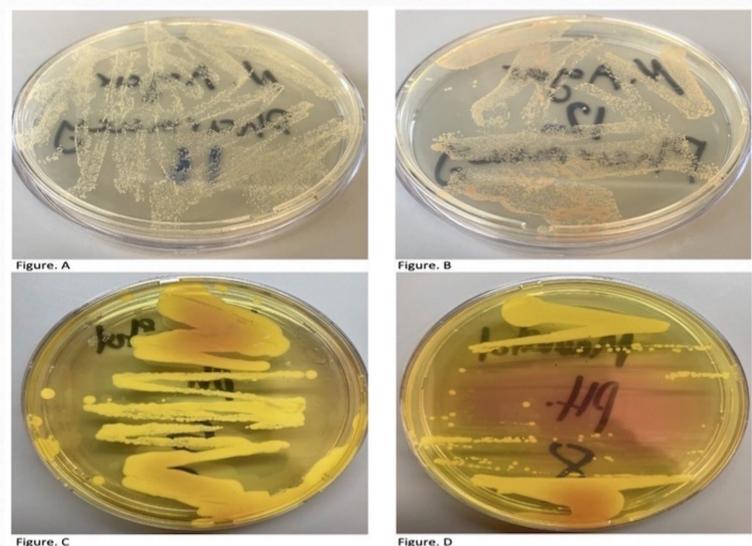


Figure 3: Sample growth in nutrient agar shown in Figure B (Hair serum and make up powder), and in mannitol salt agar in Figure C and D (Hair cream and baby oil).

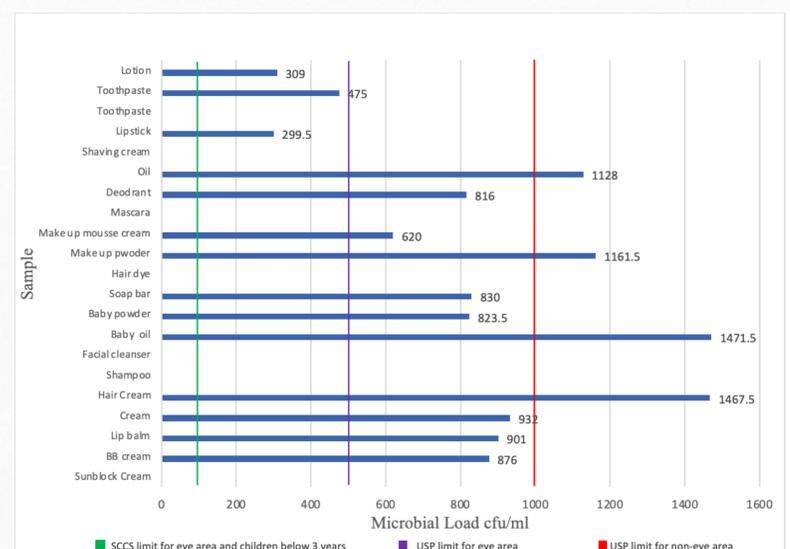


Figure 4: Microbial counts results and permitted limits.

CONCLUSION

Several of the examined cosmetic items, which are widely consumed in Saudi Arabia, showed microbial and heavy metal contaminations. The continuous usage of such products could lead to serious negative consequences. As a result, ensuring the quality of cosmetic products is critical. Regulatory authorities are required to enforce strict legislation on cosmetic manufacturing to assess and ensure quality and safety before reaching consumers.