

# A Review on Standard Evaluation and Characterization Techniques for Lipstick Quality: Hardness, Breaking Point, Pay-Off, Melting Point, Spreadability, SPF Evaluation

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**Abstract:** Lipsticks are among the most widely used color cosmetic products, serving both functional and aesthetic purposes. Their formulation, quality, and sensory attributes significantly influence consumer acceptance and market competitiveness. To ensure safety, consistency, and performance, lipsticks undergo a comprehensive set of evaluation and characterization techniques. Parameters such as hardness, breaking point, pay-off, melting point, spreadability, and sun protection factor (SPF) evaluation are essential indicators of product stability, application behavior, and protective benefits. Hardness and breaking point testing reveal mechanical strength and resistance to fracture during application or handling. Pay-off measurement determines the intensity of color transfer, while melting point ensures resistance to temperature variations without compromising spreadability. Spreadability correlates with sensory perception, glide, and user comfort. In lipsticks containing UV-filter agents, SPF evaluation is critical to validate photoprotection claims and ensure safety against UV exposure.

This review provides a detailed discussion on standard quality assessment techniques, analytical tools, and evaluation methods used in the cosmetic and pharmaceutical industries. It highlights traditional and modern instrumental approaches, regulatory aspects, formulation variables influencing product characteristics, and the importance of characterization in research, development, and commercialization of lipstick products. The review emphasizes the need for harmonized global standards and scientifically validated methods to ensure high-quality, dermatologically safe, and consumer-preferred lipstick formulations.

**Keywords:** Lipstick evaluation; Hardness testing; Breaking point; Lipstick pay-off; Melting point; Spreadability; SPF evaluation; Cosmetic characterization; Quality control; Color cosmetics.

