

Summary

This project performed an analysis of the Sephora product catalog, evaluating both Market Efficiency (Pricing Strategy vs. Customer Satisfaction) and Regulatory Compliance (Ingredient Safety).

Using SQL for text mining and relational modeling, I audited the dataset against the "Clean at Sephora" exclusion list. The analysis revealed that high price points do not correlate with increased customer satisfaction or ingredient safety. Specifically, the audit flagged \$7762 in inventory containing "Excluded" substances such as Acrylates and Formaldehyde, predominantly within the Ultra-Luxury price tier.

Methodology

Data Modeling: Designed a relational schema linking Product Sales Data with a custom regulatory reference table based on EU Annex II and Sephora "Clean" standards.

SQL Logic: Used INNER JOIN with pattern matching (LIKE) to parse unstructured ingredient lists and identify chemical violations. Implemented CASE logic to triage risks into "Excluded" (Zero Tolerance) vs. "Restricted" (Quality Control).

Visualization: Developed a Power BI dashboard to quantify financial risk and visualize market positioning.

Insights: Market Efficiency

- A. The "Luxury Ceiling" (Diminishing Returns)

An analysis of pricing tiers revealed a non linear relationship between price and performance:

- ❖ Budget Tier (<\$25): Lowest rating (3.87), indicating perceived quality issues.
- ❖ Mid-Range Tier (25–60): The optimal "sweet spot." Satisfaction peaks (4.03 rating) with high sales volume.
- ❖ Luxury Tier (>60): (a 200% markup over Mid-Range), customer satisfaction remains stagnant at 4.04.

Strategic Insight: Customers are paying for brand prestige, not tangible product performance. The Mid-Range tier offers the highest ROI for customer loyalty.

- B. The "Retinol Premium"

Data: Retinol products command an average price of \$ 70.77 ,significantly higher than VitaminC (\$52.89) or Hyaluronic Acid (\$55.07). This premium is technically justified by the chemical instability of Retinol, which requires advanced encapsulation technologies to prevent oxidation, unlike stable acids like Vitamin C.

Regulatory Compliance Risk

- A. Financial Exposure

The SQL audit identified \$7762 in inventory value currently tied to non compliant products. This represents "dead stock" that cannot be marketed under the "Clean at Sephora" seal and faces potential recall risks.

- B. The "Dirty Luxury"

High-priced heritage brands were found to be the primary offenders of regulatory standards.

Example Findings:

Eve Lom and Alpha-H contained Ethyl Acrylate and Oxybenzone (excluded substances).

Sunday Riley (\$130): Contained DMDM Hydantoin (Formaldehyde Releaser). This creates a significant reputational risk. Customers paying premium prices expect the highest safety standards, yet these products failed the audit while cheaper brands often passed.

- C. Chemical Family Violations:

Acrylates: Represent the highest volume of "Excluded" violations.

Preservatives (Phenoxyethanol): Represent the highest volume of "Restricted" flags, requiring lab verification to ensure concentration is <1%.

Strategic Recommendations

- Reformulation (R&D): Prioritize the reformulation of the Acrylate containing products. As the largest category of "Excluded" items, fixing this chemical family will recover the majority of the at risk inventory.
- Marketing Pivot: Shift marketing budget towards Mid-Range (25–60) products. The data proves this is the zone of highest customer satisfaction. Pushing luxury products (\$100+) yields diminishing returns on user experience.
- Inventory Liquidation: The finance team should relabel these products to remove "Clean" claims immediately to avoid legal liability.

References:

CosIng - cosmetics - GROWTH - European commission. (s/f). Europa.eu. Recuperado el 5 de enero de 2026, de <https://ec.europa.eu/growth/tools-databases/cosing/>

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