

## Consumer Perception and Household Practices Affecting the Storage and Quality of Dry Masala

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### **Abstract**

*In modern food science, maintaining the quality, flavor stability, and safety of commercial and homemade ground spice blends (dry masalas) is a primary area of focus in home science and food preservation. The main objective of this study is to identify the critical environmental and physical factors that influence the degradation of dry masala blends and to analyze their specific impacts. For this research, a sample size of 50 culinary households and local vendors from Meerut District was selected, and key data was collected using a structured questionnaire.*

*The study reveals that moisture absorption, elevated storage temperatures, lack of defensive packaging barrier layers, and the chemical composition of spice ingredients are the primary elements accelerating rancidity, caking, and aroma loss. Furthermore, cross-contamination and poor domestic handling significantly impact overall product stability.*

### **Keywords**

*Shelf Life, Dry Masala, Moisture Content, Packaging Barriers, Lipid Oxidation, Food Preservation.*

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## **Introduction**

In the daily dietary patterns of Indian households, dry masalas (such as Garam Masala, Sambar Masala, and Chaat Masala) form an indispensable component of food preparation. Grinding spices alters their physical matrix, greatly expanding their exposed surface-area-to-volume ratio. This physical transition leaves the volatile oils—the primary compounds responsible for distinctive flavor profiles and pungency—highly susceptible to ambient environmental conditions.

Within Meerut District, changes in bulk purchasing habits and long-term kitchen storage have made the shelf stability of these blends a vital household economic concern. Spoilage manifests not merely as microbial decay, but as sensory failure: the fading of carotenoid pigments (color loss), the volatilization of essential oils (Aroma loss), and oxidative rancidity. This research systematically isolates and evaluates the dynamics of moisture, temperature, structural ingredient composition, and multi-layer packaging films to establish optimized preservation standards



## **Objectives of the Study**

- To assess consumer awareness and perception regarding factors affecting the storage quality and shelf life of dry masala .
- To investigate the correlation between elevated storage temperatures and the rate of flavor/essential oil loss.
- To evaluate the protection efficiency offered by various traditional versus modern packaging materials.
- To identify user handling vulnerabilities that cause premature spice blend degradation in domestic settings.

## **Review of Literature**

### **1. Local and National Empirical Food Quality Reports (2025–2026)**

Recent regional food technology and consumer awareness dispatches indicate that standard household spice blends rapidly lose up to 40% of their therapeutic and aromatic qualities within 3 months if stored under improper barrier conditions. Studies emphasize that while raw materials are often sound, the post-

grinding storage phase in tropical climates accelerates structural flavor flattening. Emerging models also highlight that the deployment of nitrogen-flushed packaging and laminated metalized films among local self-help groups (SHGs) helps stabilize volatile compound profiles over extended periods.

**2. Analytical Models on Matrix Degradation (Goyal, Khakharia, and Thorat, 2023)**

Research conducted on spice shelf stability in commercial distribution chains indicates that fine-ground powder matrices are highly sensitive to moisture shocks and thermal variations. At elevated storage levels, high-fat components within masalas (such as cardamom or clove lipids) demonstrate rapid auto-oxidation, leading to off-flavors. This baseline literature establishes that maintaining stable ambient moisture indicators and robust light barriers is essential to prevent structural chemical staling.

**Research Methodology**

This research is built upon a **descriptive survey methodology** aimed at evaluating post-processing spice stability and handling practices.

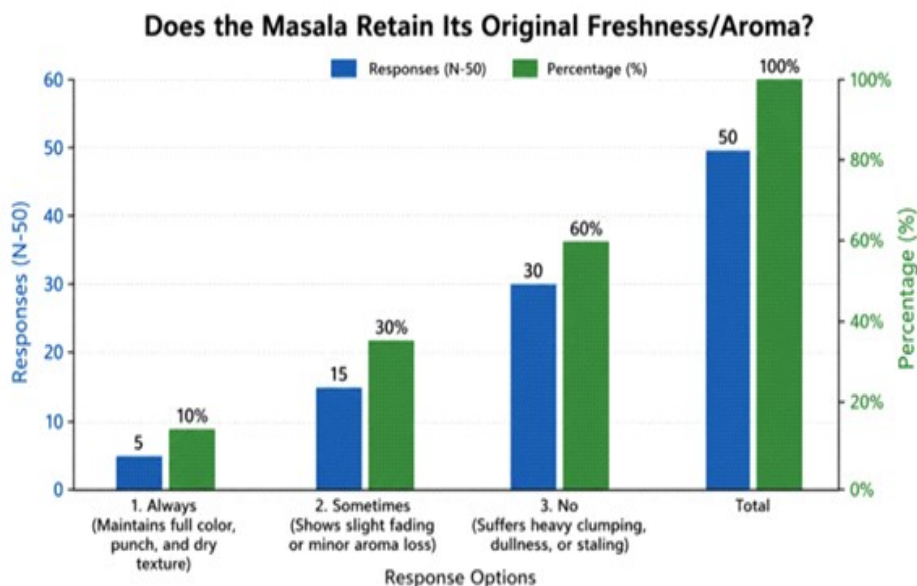
- **Geographical Scope:** The study was executed across residential households and domestic spice production clusters located in Meerut District, Uttar Pradesh.
- **Research Design:** Primary Empirical Survey.
- **Sample Size (N):** 50 active culinary kitchens and micro-scale vendors.
- **Data Collection Tools:** Structured survey questionnaires, direct observation methods, visual documentation, and storage tracking sheets.
- **Data Processing & Analysis:** Collected quantitative feedback was tabulated, converted into clean percentages, and visually modeled through data plots for clear evaluation.

**Results and Discussion**

**Table 1: Observed Quality Retention & Freshness Patterns of Stored Dry Masala**

This metric gauges whether standard household storage setups successfully maintain pristine freshness, flavor pungency, and original color consistency across a standard observation window.

S.No.	Does the Masala Retain Its Original Freshness/Aroma?	Responses (N-50)	Percentage (%)
1.	Always (Maintains full color, punch, and dry texture)	5	10%
2.	Sometimes (Shows slight fading or minor aroma loss)	15	30%
3.	No (Suffers heavy clumping, dullness, or staling)	30	60%
Total		50	100%



### Data Interpretation

The data shows that only **10%** of respondents experience consistent, uninterrupted freshness retention in their spice blends. Meanwhile, **30%** observe some degradation, and a significant **60%** report distinct quality loss, aroma flattening, or physical caking. This demonstrates that conventional home storage strategies often fail to provide complete protection against ambient environmental decay factors.

**Table 2: Primary Catalyst Causing Spice Degradation and Flavor Loss**

This section isolates the specific environmental or operational trigger that leads to visible texture spoilage or flavor loss within domestic setups.

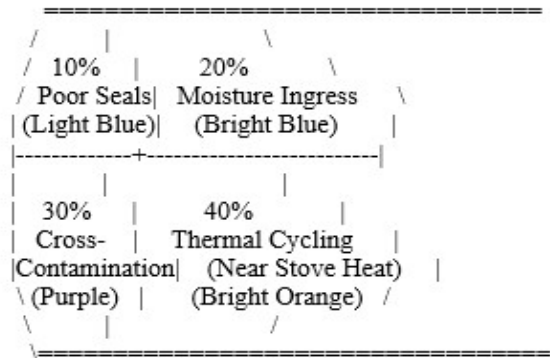
S.No.	Primary Environmental/Handling Factor Driving Spoilage	Responses (N-50)	Percentage (%)
1.	Moisture Ingress & High Humidity (Causes hard caking)	10	20%
2.	Thermal Cycling / Storage Near Cooking Heat	20	40%
3.	Poor Packaging Material / Inadequate Airtight Seals	5	10%
4.	Cross-Contamination (Wet spoons / Open exposure)	15	30%
<b>Total</b>		<b>50</b>	<b>100%</b>



### Data Interpretation

The survey highlights that **40%** of quality degradation cases stem from thermal exposure, which occurs when spice containers are stored close to stoves or active cooking zones. Cross-contamination via damp utensils or prolonged exposure accounts for **30%** of failures. Direct atmospheric moisture ingress drives **20%** of structural caking issues, while baseline packaging seal leaks make up the remaining **10%**.

### Chart 2: Primary Catalysts for Masala Degradation



### Limitations of the Study

This investigation is structurally confined to the urban and suburban households of **Meerut District (including Western Kutchery Road, Begambagh, and adjacent sectors, Uttar Pradesh - 250001)**. Storage behavior profiles and humidity response patterns reflect regional subtropical weather patterns. The sample index is restricted to 50 active respondents.

### Conclusion

The findings of this study indicate that the quality of dry masalas is influenced by storage conditions and handling practices adopted by consumers. Most respondents reported a decline in freshness, aroma, and overall quality during storage. Heat exposure, moisture, inadequate packaging, and improper handling were

identified as the major factors associated with quality deterioration. The study highlights the importance of using airtight containers, maintaining dry storage conditions, and following proper handling practices. Further research with larger samples and laboratory analysis is recommended to validate these findings.

**Recommendations & Practical Suggestions**  
**Optimize Kitchen Storage Layouts: Move spice storage containers away from hot preparation areas, ovens, and steam lines to eliminate thermal oil loss.**

1. **Upgrade Domestic Containers:** Transition from low-grade plastics to airtight, non-reactive amber glass or heavy-grade PET jars to block UV rays and humidity.
2. **Strict Handling Protocols:** Use dry, sterilized spoons and close containers immediately after use to prevent ambient moisture shocks.

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