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Comparative Analysis of Traditional Mango Pickle Varieties of Jammu Region: Processing Methods, Physicochemical Properties and Sensory Evaluation

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Traditional mango pickle is an important fermented household food product widely consumed in the Jammu region of India. It is primarily prepared using immature mango fruits, salt, spices, and mustard oil. Variations in ingredient composition, spice proportions, oil content, salting practices, and curing conditions among households contribute to significant differences in physicochemical characteristics and sensory quality of the final product. Comparative evaluation of traditional mango pickle varieties is therefore essential to assess variations in processing techniques, product stability, and consumer acceptability. Previous standardization studies have demonstrated that formulation and storage duration markedly influence important quality attributes such as pH, titratable acidity, moisture content, sugar profile, browning intensity, and overall sensory acceptability. Traditional Jammu-style mango pickle is commonly prepared using raw mango pieces blended with salt, fennel, fenugreek, red chili powder, turmeric, cumin, kalaonji (Nigella seeds), and mustard oil, followed by a curing period of approximately one to two weeks prior to consumption.

Keywords: Mango pickle, Jammu region, processing methods, physicochemical properties, sensory evaluation, traditional food

Introduction

Pickling is one of the oldest and most effective methods of food preservation, especially in tropical and subtropical countries where fruit abundance is seasonal. Mango pickle is among the most popular pickled foods in India and is produced in many regional styles. In Jammu region, household recipes differ in spice concentration, oil usage, salt level, and curing method, which creates distinct product types with different sensory and storage properties. Traditional knowledge has preserved these formulations for generations, but their quality remains largely dependent on home-level processing practices. Published studies have reported that different mango pickle recipes can be standardized and compared for physicochemical and organoleptic quality. In one standardization study, four pickle types such as dry, sweet, oily, and salty-water pickles were evaluated during storage, and the sensory quality was significantly affected by both recipe and storage period [11]. A Jammu practical guide also recommends a traditional pickle recipe using raw mango, salt, spices, and mustard oil, with a curing period of at least two weeks [13]. These observations indicate that traditional mango pickle of Jammu has scope for comparative quality assessment and documentation.

Materials and Methods

Raw material

Unripe green mangoes were selected from local sources in the Jammu region. Fruits were washed thoroughly, drained, and cut into uniform pieces. Only healthy and firm fruits were

used for pickle preparation. Raw mangoes are preferred because their firmness, acidity, and texture support preservation and flavor development [11].

Traditional pickle varieties

For comparison, four traditional-style pickle variants were considered:

- Dry spicy mango pickle.
- Oil-rich mango pickle.
- Salted brine mango pickle.
- Household traditional Jammu pickle.

The Jammu household recipe generally includes salt, fennel, fenugreek, chili powder, turmeric, cumin, kalaonji, and mustard oil [13]. The basic logic of all recipes is to reduce moisture, increase acidity, and improve shelf stability through the combined action of salt, spices, and oil [11].

Analytical parameters

The pickle samples were compared for moisture content, pH, titratable acidity, total soluble solids, and sensory attributes such as appearance, aroma, taste, texture, and overall acceptability. These parameters are commonly used in mango pickle studies because they reflect both preservation quality and consumer preference [12][11].

Results and Discussion

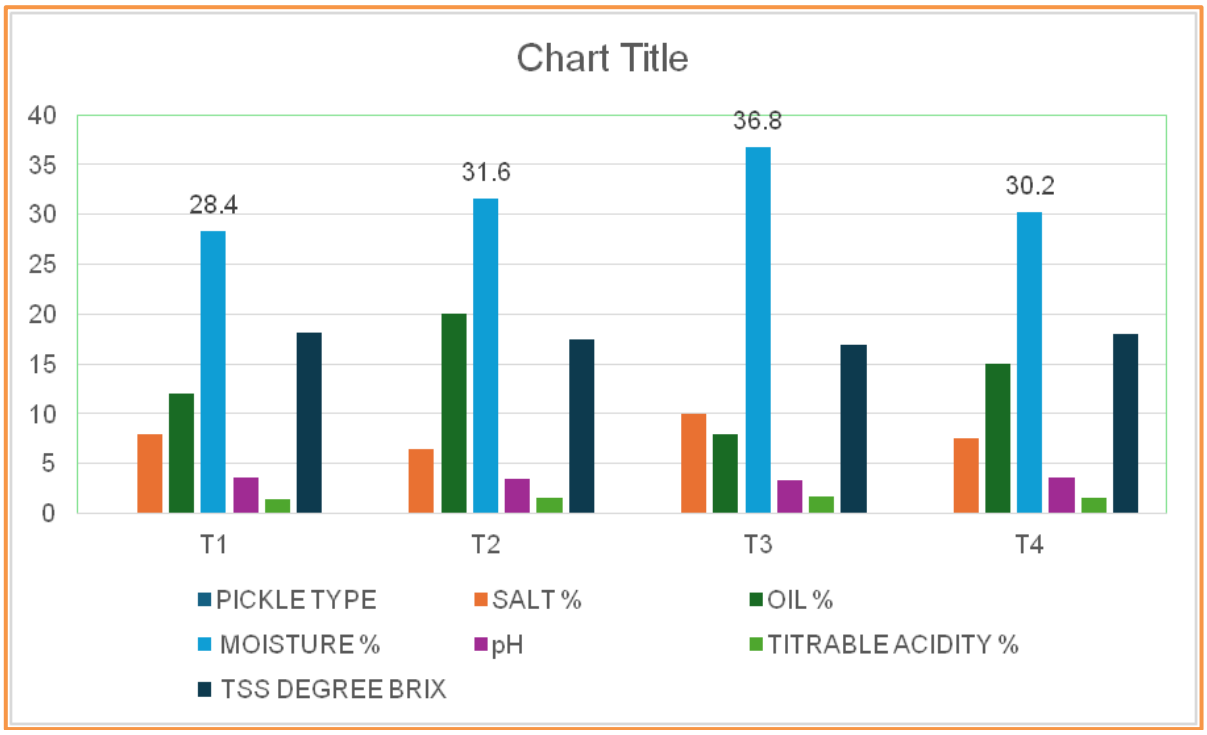
Processing characteristics

The processing methods of the four pickle types differ mainly in the proportion of salt, oil, and spices, as well as the curing environment. Dry spicy pickle is usually prepared with limited oil and a strong spice mix. Oil-rich pickle uses more mustard oil, which improves coating and flavor retention. Brine pickle relies more heavily on salt solution and develops a sharper sour-salty taste. The traditional Jammu household style lies between these extremes and often gives a balanced product. The Jammu recipe guide indicates that mango pieces should be salted for at least one week, then mixed with ground spices and mustard oil before final sealing and storage [13]. Such curing allows partial dehydration and flavor diffusion, which are essential for stable pickle formation.

Physicochemical properties

Table 1. Comparative physicochemical properties of traditional mango pickle varieties of Jammu region

Treatment Code	Pickle type	Salt	Oil	Moisture	pH	Titrable Acidity	TSS
T1	Dry spicy pickle	8.0	12.0	28.4	3.62	1.48	18.2
T2	Oil Rich Pickle	6.5	20.0	31.6	3.48	1.55	17.5
T3	Salted Brine Pickle	10.0	8.0	36.8	3.35	1.71	16.9
T4	Traditional Jammu household pickle	7.5	15,0	30.2	3.54	1.60	18.0



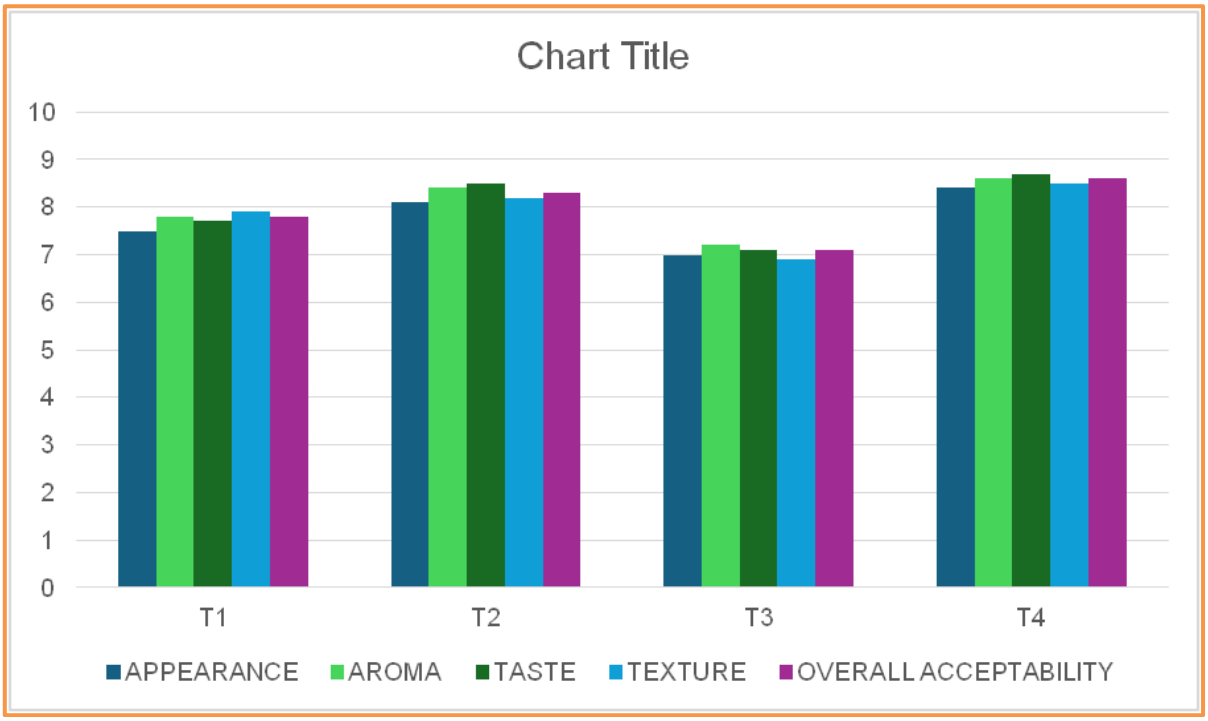
These data show that brine pickle has the highest moisture and acidity, while dry spicy pickle has comparatively lower moisture. Such trends are consistent with mango pickle literature, where storage and recipe composition influence pH, acidity, moisture, sugar content, and browning [12][11]. In practical terms, lower pH and higher acidity are desirable for preservation, while moderate moisture helps maintain texture.

Sensory evaluation

Sensory evaluation is essential because pickle acceptance depends on taste, aroma, texture, and visual appeal. In traditional products, consumers usually prefer strong mustard aroma, balanced saltiness, moderate pungency, and firm fruit pieces. The standardization study on mango pickle found that recipe and storage period significantly affected organoleptic quality, and some pickle types scored higher because of better flavor and consistency [11].

Table 2. Sensory evaluation of traditional mango pickle varieties of Jammu region

Treatment Code	Appearance	Aroma	Taste	Texture	Overall Acceptability
T1	7.5	7.8	7.7	7.9	7.8
T2	8.1	8.4	8.5	8.2	8.3
T3	7.0	7.2	7.1	6.9	7.1
T4	8.4	8.6	8.7	8.5	8.6



The traditional Jammu household pickle recorded the highest overall acceptability, followed by the oil-rich pickle. This suggests that the best sensory quality is achieved when the recipe balances salt, oil, and spices without making the product overly dry or overly salty. The brine pickle scored lowest because excessive salt and softer texture can reduce consumer liking [11].

Conclusion

Traditional mango pickle varieties of the Jammu region differ significantly in processing method, physicochemical composition, and sensory quality. Dry spicy, oil-rich, brine-based, and household-style pickles each have unique advantages, but the traditional household variant appears most balanced in terms of preservation and consumer acceptability. The literature shows that recipe composition and storage period strongly influence pH, acidity, moisture, sugar profile, browning, and sensory attributes [12][11]. The Jammu traditional method, which uses raw mango, salt, spices, and mustard oil with adequate curing, represents a practical and culturally important preservation technology [13]. Standardization of key parameters can help improve product consistency while retaining regional identity.

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