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## Sensory assessment of ready-to-use bharwa spice-mix paste

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### Abstract

Bharwa spice-mix paste is the amalgamation of different spices used for stuffing of vegetables. The present study was aimed assess the sensory attributes of the ready-to-use bharwa spice-mix paste. Sensory attributes of bharwa spice-mix paste with the addition of vinegar, citric acid and oil were evaluated for its taste, color, texture, flavor, appearance and overall acceptability for 0 to 45 days of storage days. There was significant change in sensory attributes for all treatments. The acceptability of the sample depends on the consumer reviews. Considering all the parameters *viz.* the change in sensory parameter, safety of food and nutritional quality and acceptance by the consumer, bharwa spice-mix paste treated with oil can be stored in refrigeration temperature up to 45days of storage period.

**Keywords:** Bharwa spice-mix paste, sensory attributes, vinegar, citric acid and oil

### 1. Introduction

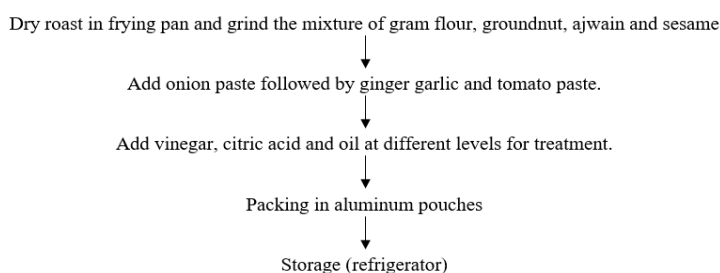
Bharwa spice-mix paste is made from different mixture of dry and wet spices which are used for stuffing in different type of vegetables. West Indian cuisine is famous for stuffed vegetables like bharwa bhendi (also known as Bharwan Bhendi, Bhendi Sambhariya), stuffed potato, stuffed eggplant & stuffed capsicum. The development of industrialized paste and sauces must ensure its stability and sensory and rheological properties. This paste is famous for its unique flavor and taste. But the fact which cannot be hide that it was a very consuming process. Thus, the knowledge is necessary to identify the components and processes responsible for guaranteeing a quality product to consumers (Sikora *et al.*, 2003) [7]. Therefore, there is a need to develop ready to use bharwa spice-mix paste for enhanced convenience and improved organoleptic properties. The main objective of the work was to study the effect of vinegar, citric acid and oil on taste, color, flavor, texture, appearance and overall acceptability of Bharwa spice-mix paste

### 2. Materials and methods

#### 2.1. Raw material and preparation of ginger paste sample

Bharwa spice-mix paste was procured from the spices generally available in the market. Whole spices were ground and mixed with other dry spices such as coriander powder, turmeric powder, chili powder, dry mango powder and salt. All these dry spice-mix was mixed with pre-heated onion paste, tomato paste and ginger-garlic paste. Bharwa spice-mix paste was treated by adding (0.1%, 0.2%, 0.3%) vinegar, (0.1%, 0.2%, 0.3%) citric acid and (3%, 5%, 7%) oil. The flow chart for the preparation of Bharwa spice-mix paste has been given in Figure 1. Approximately, 100g of bharwa spice-mix paste was filled into aluminum pouches and stored in refrigerator for storage and sensory quality studies. Samples were drawn up to 45 days and were analyzed for sensory parameters.

#### Flow chart the process



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**2.2 Sensory Evaluation**

Sensory evaluation of bharwa spice-mix paste was carried out for flavor, appearance, taste, color, texture and overall acceptability by panel members at interval of 0, 5, 10, 20, 30 and 45days. Samples were presented to panel members and were asked to rate evaluation according to 9-point Hedonic scale. Market reviews were taken for acceptance of spice-mix paste by the consumers as shown in table 1.

**2.3. Analysis of data**

The experiments were planned using factorial randomized block design (RBD) with three replications using one factor analysis (Panse and Sukhtame (1967) [1]) The data obtained were submitted to analysis of variance and the least significant differences were used to compare the different treatments individually.

**3. Results and discussion**

**3.1. Effect on Sensory attributes during storage**

Bharwa spice-mix paste samples stored at refrigeration

temperature were sensory evaluated at 0 to 45 days for flavor, appearance, color, taste, texture and overall acceptability. A decreasing trend in sensory scores of bharwa paste was observed with the length of time

**3.1.1 Effect on flavor**

Fig. 1 shows that differences in flavors were significant for vinegar, citric acid and oil for storage period starting from 0 to 45 days. This was expected as increase levels would have direct impact on flavor. However, studies show that the panelist would not purchase any product that has sensory score less than 7.5 (From table 1). Thus, the selection spectrum had narrowed down. Also, the manufacturer/business owner would like to select the one that has highest score after 45 days of storage period or the one which is economical. Among the accepted few the highest score for flavor after 45<sup>th</sup> days of storage period was observed in 3% oil and 5% oil levels. The close third was 0.3% vinegar. Prudent decision could be to select the least expensive among the three.

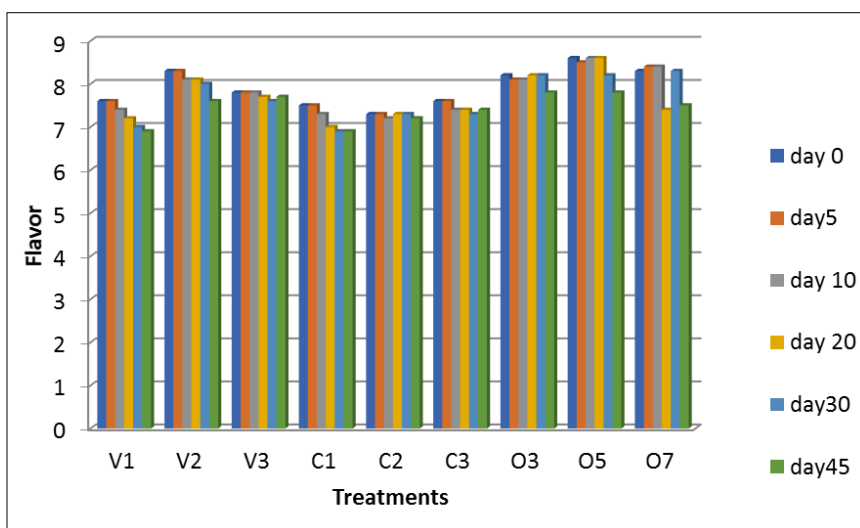


Fig 1: Effect of vinegar, citric acid and oil on flavor

**3.1.2 Effect on appearance**

Fig 2. shows that differences in appearance were significant for vinegar, citric acid and oil for storage periods starting from 0 to 45 days. Since, the selection spectrum had narrowed down up to 7.5 (From table 1). The highest score which was

acceptable for appearance after 45<sup>th</sup> days of storage period was observed in 3% oil and 5% oil levels. The closest was 7% oil and 0.3% vinegar. Decision could be to select the least expensive among these samples. Samples with citric acid and 0.1%, 0.2% vinegar were rejected after 45days of storage.

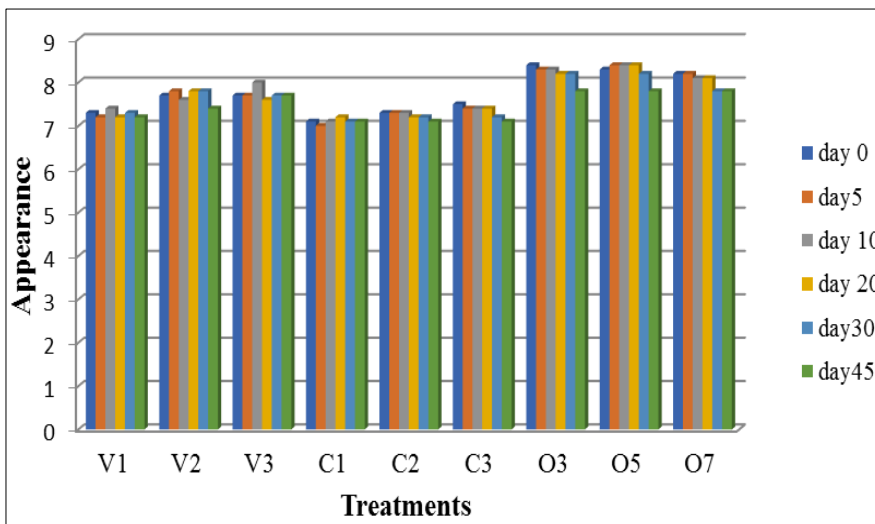


Fig 2: Effect of vinegar, citric acid and oil on appearance

**3.1.3 Effect on texture**

Fig 3. shows that there is a significant difference for vinegar, citric acid and oil for storage periods starting from 0 to 45 days. The highest score for texture after 45<sup>th</sup> days of storage

period was observed in 3% oil and 5% oil levels. The close third was 0.3% vinegar which scored above 7.5. Samples treated with citric acid and 0.1% vinegar was rejected.

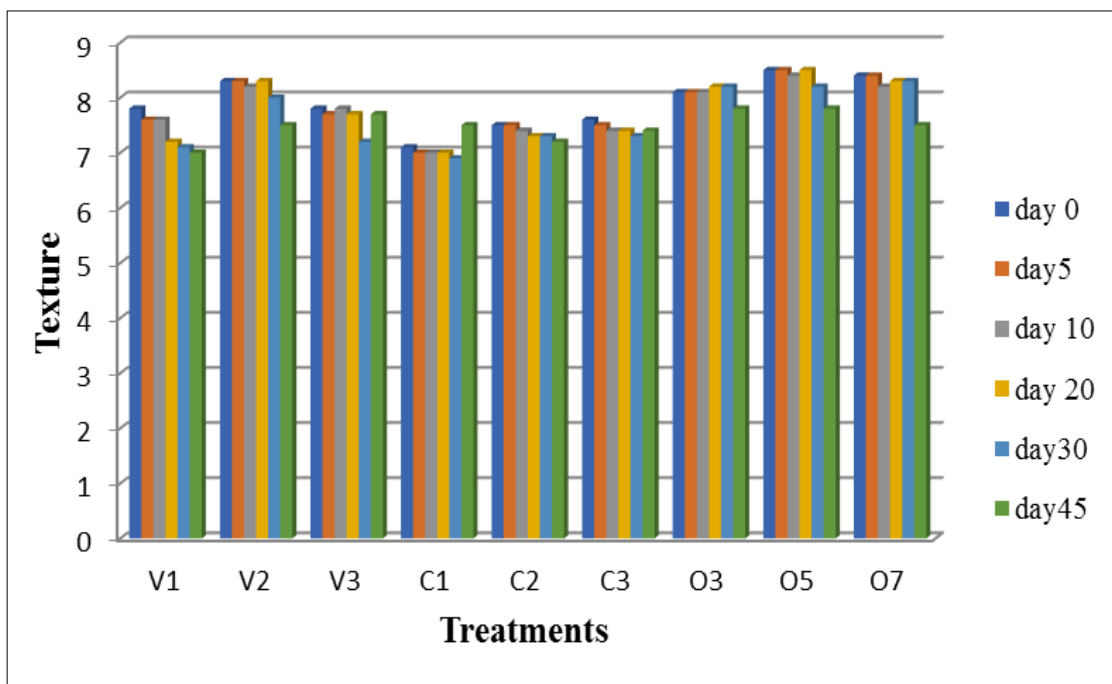


Fig 3: Effect of vinegar, citric acid and oil on texture

**3.1.4 Effect on color**

Due to the enzymatic changes occurring inside the product, chemical reaction takes place causes changes in the color of the samples. Fig 4. shows that there is a significant difference for vinegar, citric acid and oil for storage periods starting

from 0 to 45 days. The highest score for texture after 45<sup>th</sup> days of storage period was observed in 3% oil and 5% oil levels. The close third was 0.3% vinegar which scored above 7.5. Samples treated with citric acid and 0.1% vinegar was rejected.

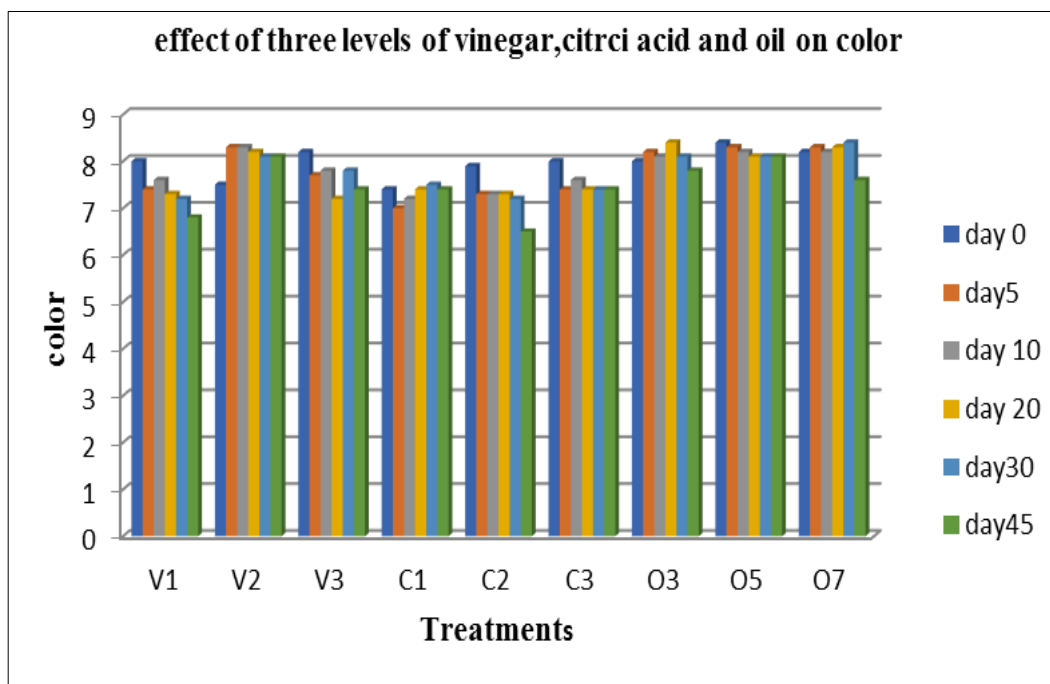


Fig 4: Effect of vinegar, citric acid and oil on color

**3.1.5 Effect on taste**

Due to the acidity and changes in the pH of the substances changes the taste of the substance to a large extent. Fig 5: shows that there is a significant difference for vinegar, citric acid and oil for storage periods starting from 0 to 45 days.

The highest score for texture after 45<sup>th</sup> days of storage period was observed in 3% oil and 5% oil levels. The close third was 0.3% vinegar which scored above 7.5. Samples treated with citric acid and 0.1% vinegar was rejected

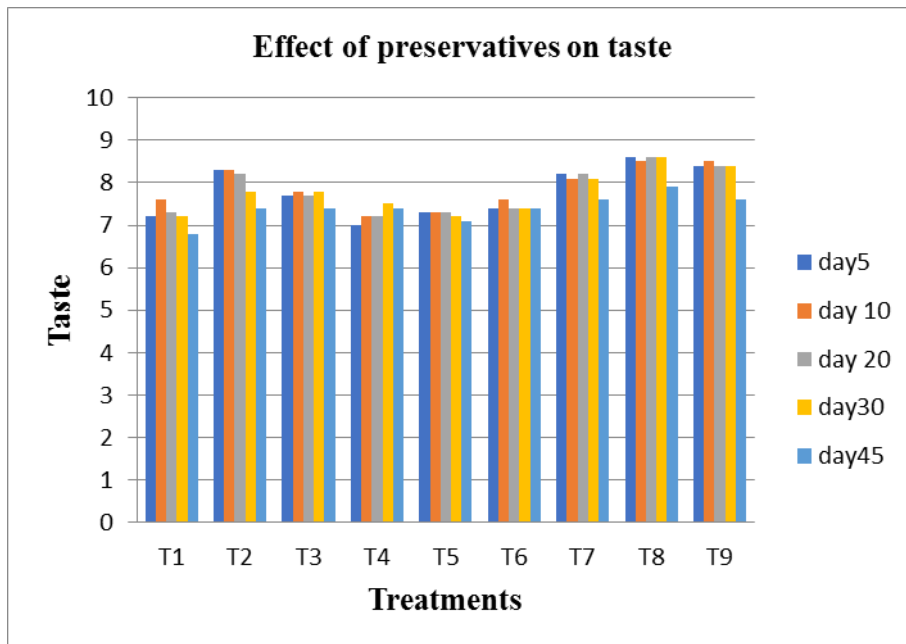


Fig 5: Effect of vinegar, citric acid and oil on taste

**3.1.6 Effect on overall acceptability of bharwa spice-mix paste**

According to table 1 market/consumer review survey the overall acceptability of the sample among the few which had the sensory score above 7.5 (From table 1) after 45<sup>th</sup> days of

storage period was observed in 5% oil and 7% oil levels. The closest was 3% oil and 0.3% vinegar. The manufacturer/business owner would like to select the one that has highest score after 45 days of storage period or the one which is economical.

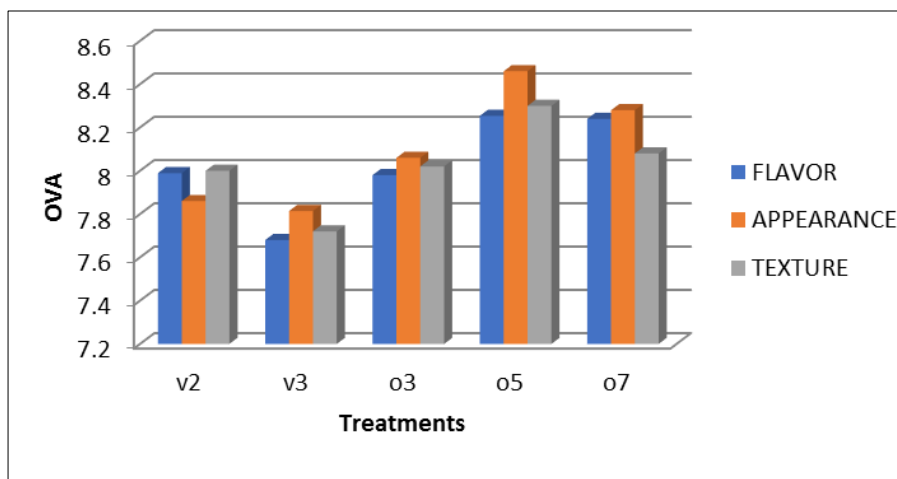


Fig 6: Effect of vinegar, citric acid and oil on overall acceptability

Table 1: Market/ Consumer Survey of acceptability of bharwa spice-mix paste

Samples	Flavor	Taste	Color	Appearance	Texture	Ova	Would You Buy It?
V1	7.14	6.9	7.1	7.26	7.18	7.193	NO
V2	7.94	7.78	7.46	7.86	8	7.933	YES
V3	7.68	7.64	7.56	7.814	7.72	7.738	YES
C1	7.2	7.6	7.4	7.28	7.12	7.2	NO
C2	7.26	6.6	6.8	7.22	7.28	7.253	NO
C3	7.44	7.65	7.1	7.36	7.36	7.387	NO
O3	7.98	7.7	7.8	8.06	8.02	8.02	YES
O5	8.254	8.5	8.2	8.46	8.3	8.338	YES
O7	8.24	8.7	8.4	8.28	8.08	8.2	YES

**4. Conclusions**

In the study we found that the addition of vinegar, citric acid and oil shows significant difference on the quality of Bharwa spice mix paste. The most effective result is showed by Bharwa spice mix paste treated with oil because the TMC increased with the storage period and sensory attributes are

best compared to vinegar and citric acid and can be more acceptable by the consumer. Considering the change in sensory attribute and safety of food, bharwa spice-mix paste treated with oil and vinegar filled in aluminum pouches at refrigeration temperature may be recommended to store up to 45 days. Further, more studies using various advanced

techniques of non-thermal processes are needed to extend the shelf life of the bharwa spice-mix paste.

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