

# SENSORY EVALUATION AND OVERALL ACCEPTABILITY OF THE FLAVOURED OKRA EXTRACT BY ORGANOLEPTIC EVALUATION

**Subhashree Dhanabalan**

*M.Phil. in Foods and Nutrition*

*Mother Teresa Women's University*

*Research and Extension Centre, Madurai*

**Geethanjali Santhanam**

*Assistant Professor, Department of Home Science*

*Mother Teresa Women's University*

*Research and Extension Centre-Madurai*

## ABSTRACT

Sensory evaluation is the methods used to identify the overall acceptance of food products. This method is used for product development so that the products quality can be improved based on the results obtained from the evaluation. Okra plant denoted *Abelmoschus esculentus* from the family *Malvaceae* and used by wide range of people in various countries. It is one of the most important vegetable crops growing in the both tropical and sub-tropical region in the world. Okra is rich in antioxidants, which acts against type 2 diabetes, cardiovascular disease, cancers and digestive diseases. Glycosylated compounds responsible for mucilaginous content in okra are used as food additive against many inflammatory diseases. In this study flavoured okra extract was prepared on different concentration and its sensory attributes were evaluated. Flavoured Okra extract was prepared using Fresh Okra Mucilaginous water, added with lime juice, spice mix and salt. Totally 5 samples were prepared in the ratio percentage of okra mucilaginous extract with water SF 1 – 90%: 10%, SF 2 – 80%: 20%, SF 3 – 70%: 30%, SF 4 – 60%: 40%, SF 5 – 50%: 50% (SF – Sample Flavoured Okra Extract). The control and all 5 samples were evaluated by 25 panellists. Sensory evaluation score sheet were given to them and their results were noted for sensory attributes. The standard 9 point hedonic scale used to assess the sensory evaluation score for this analysis. As a result SF 2-80%: 20% concentration of Flavoured Okra extract and Water was highly accepted by the panel members and it was considered for the further research.

**Keywords:** *Okra Extract, Sensory evaluation, mucilaginous water.*

## Introduction

Sensory evaluation is the methods used to identify the overall acceptance of food products. This method is used for product development so that the products quality can be improved based on the results obtained from the evaluation (Barwal *et al.*, 2010). Sensory evaluation is necessary to predict the products acceptability in the market. Sensory evaluation is a common process required for a new product before launching in market. It is implication of successfulness of products to survive in market.

Okra plant denoted *Abelmoschus esculentus* from the family *Malvaceae* (Naveed *et al.*, 2009) and used by wide range of people in various countries. It is one of the most important vegetable crops growing in the both tropical and sub-tropical region in the world (Saifullah and Rabbani, 2009; Andras *et al.*, 2005). Okra plant denoted *Abelmoschus*, which is a part of Hibiscus (Aladele *et al.* 2008).

On a review on health benefits of okra found that it contains high amount of fibre which is very much useful for reducing blood sugar level and kidney diseases. Okra is rich in antioxidants, which acts against type 2 diabetes, cardiovascular disease, cancers and digestive diseases (Adiaha, 2014). Glycosylated compounds responsible for mucilaginous content in okra are used as food additive against many inflammatory diseases (Akhtar *et al.*, 2017). All the parts of the okra plant are used in traditional medicine in treating fever, diabetics, muscle problem, urinary (Roy A, 2014).

Mucilaginous content from okra plant is a hydrocolloid substance which is a carbohydrate polysaccharides developed from monosaccharide (Deogade, Deshmukh and Sakarkar, 2012). This type of hydrocolloid substances not only present in okra plant but also in other plants such as yellow mustard, psyllium and flaxseed (Kaewmanee, 2014). Okra pods contains hydrocolloid substance made of polysaccharides is thick and sticky used as thickening agents in many food products (Ahiakpa *et al.*, 2014; Biswal *et al.*, 2014). Okra plant differs from other plant because of its high mucilaginous content (Jideani and Bello, 2009).

Mucilaginous content of okra contains nutrients such as carbohydrate, protein, fibre, neutral sugars, Iron, Calcium, Vitamin C, Flavonoids, Alkaloids and polysaccharides (Ahiakpa *et al.*, 2014). According to Ansari, Houlihan, Hussain, &

Pieroni, 2005, mucilage content of Okra is medically proven to act as anticancer, anti-ulcer activities, hypoglycemic, antimicrobial (Shui *et al.*, 2004).

In this study flavoured okra extract was prepared in mucilaginous water on different concentration and its sensory attributes and over all acceptability was evaluated.

### **Objectives**

- To standardize the procedure for preparing flavoured okra extract.
- To develop the flavoured okra extract on different concentration.
- To assess the sensory evaluation of different concentration of flavoured okra extract.
- To identify the best concentration on the basis of overall acceptability.

### **Methodology**

#### **Collection of Ingredients**

The Ingredients such as okra, lemon, salt, and other spices were purchased from the market located in Madurai, Tamilnadu.

#### **Study Location**

This study has been conducted in the Department of Foods and Nutrition at Mother Teresa Women's University, Extension and Research Centre, Madurai, Tamilnadu.

#### **Preparation of Flavoured Okra Extract**

##### **Materials required for preparing 200 mL Flavoured Okra Extract**

- 50 g of Fresh Okra
- 5 mL of Lime Juice
- Salt as required
- 0.5g of Spices mix for flavour

##### **Preparation Procedure**

Preparation procedure of the Flavoured Okra Extract was given in the flow chart (Fig.1).



**Figure 1** Flow chart for the preparation of Flavoured Okra juice

### Preparation of Spices Mix

1. In a heavy bottomed pan  $\frac{1}{4}$  cup cumin, 2 tbsp coriander seeds, 2 inch dry ginger, 1 dried red chilli, 2 tbsp black pepper,  $\frac{1}{2}$  tsp clove,  $\frac{1}{2}$  nutmegs and 3 tbsp mint are dry roasted on low flame until the spices turn aromatic, transfer to a large plate to cool.
2. Add  $\frac{1}{4}$  cup dry mango powder,  $\frac{1}{2}$  tsphing and 1 tsp salt.
3. Blend to fine powder making sure all the spices are powdered.
4. Spice mix is ready to use.

### Preparation of Different Concentration of Flavoured Okra Extract

The Raw Materials such as okra, lemon, salt, and other spices were purchased from the local market.

250 g of Fresh Okra was taken, washed and cut into two slits. These slits were shocked in 1000 mL water for 8 hours as shown in Fig 2. After 8 hours the mucilaginous water extracted by removing the Okra slits (Fig 3). From this extract 200 ml of fresh Okra extract wash separated and marked as **Control**.

To the remaining 800 ml of okra extract 20 ml of lime juice, 2g of Spice mix and salt as required are added and blended using mixer grinder.

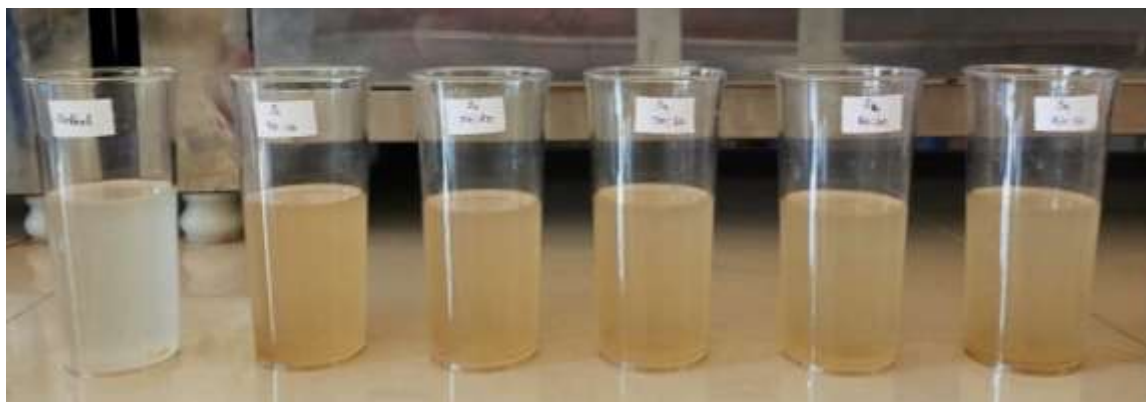
From this Flavoured okra extract different concentration of Flavoured Okra extract with Water is prepared for 200 mL for each sample. The different concentration of Flavoured Okra extract with Water is SF 1 – 90%: 10%, SF 2 – 80%: 20%, SF 3 – 70%: 30%, SF 4 – 60%: 40%, SF 5 – 50%: 50% (SF – Sample Flavoured Okra Extract).



**Figure 2 Soaking of okra    Figure 3 Okra Extract**

### Sensory Evaluation

Sensory evaluation and overall acceptability of the samples were evaluated by organoleptic method by 25 randomly selected panellist by providing 9 point Hedonic scale evaluation form. The samples were presented to the panel members in the order of Control (Fresh extract), SF 1 (90%:10%), SF 2 (80%:20%), SF 3 (70%:30%), SF 4 (60%:40%), SF 5 (50%:50%). Along with the samples, Control has also evaluated to identify the differences. The panel members were instructed to evaluate the sample in order of left to right as shown in Fig 4. They have been also instructed to take some time gap and water in between tasting each sample so that they differentiate the taste and flavours of the samples. Every panel members were asked to report individually and provided with sensory evaluation forms.



**Figure 4 Different concentration of Flavoured Okra Extract**

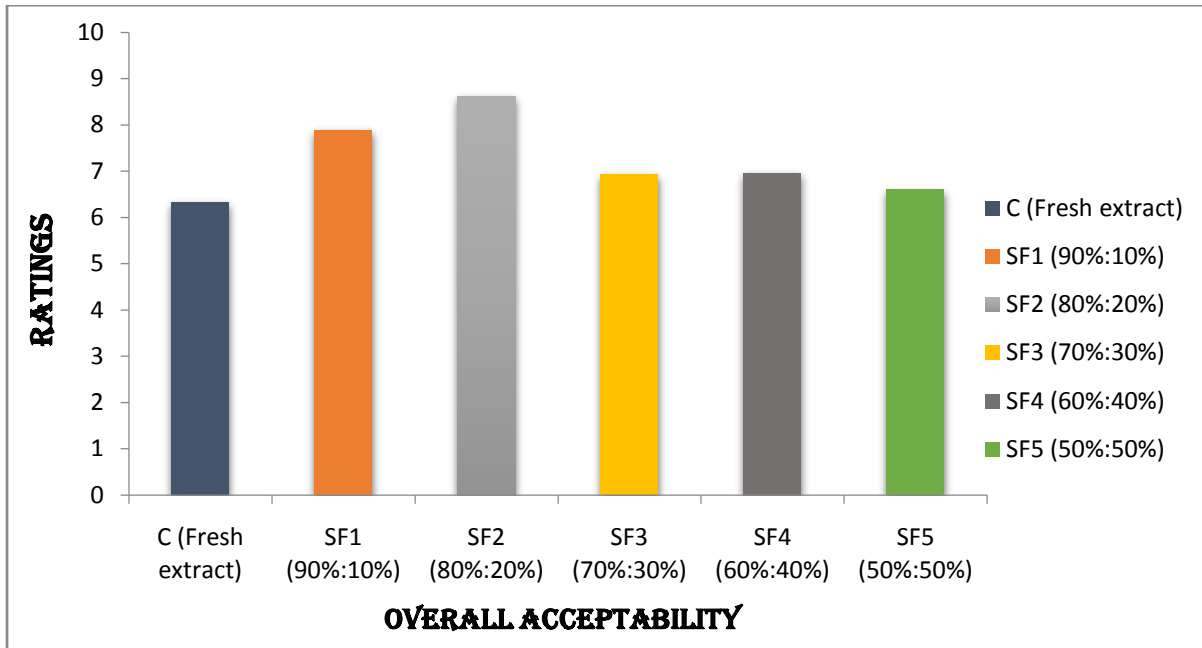
## Result and Discussion

Sensory evaluation and overall acceptability for six Samples such as Control (Fresh extract), SF 1 (90%:10%), SF 2 (80%:20%), SF 3 (70%:30%), SF 4 (60%:40%), SF 5 (50%:50%) was evaluated among 25 panellists. The results were calculated by taking the mean value of all parameters which is given in Table 1 and the comparison graph of overall acceptability of the samples were given in Fig 5. From Table 1 it was observed that Sample 2 was highly accepted by the panellist. When comparing the overall acceptability of all samples there were only slight differences. The results given by panel members were neatly tabulated on basis of individual sensory attributes such as appearance, taste/flavour, consistency, aroma/smell, overall acceptability. The mean value of all sensory attributes were calculated and given in the Table 1. According to this result overall acceptability of all samples were given in the comparison graph was given in Fig 5. The sensory analysis of Flavoured Okra extract was given in accordance with the results reported by Kunitake (2014).

As a result sample 2 that is 80%: 20% concentration of Flavoured Okra extract and Water was very much accepted by the panellist and it was consider for the further research.

**Table 1 Average Sensory Evaluation results for the samples.**

SAMPLES	APPEARANCE	TASTE/FLAVOUR	CONSISTENCY	AROMA/SMELL	OVERALL ACCEPTANCE
C (Fresh extract)	7	6.16	5.88	5.68	6.32
SF1 (90%:10%)	8.04	7.64	7.56	7.52	7.88
SF2 (80%:20%)	8.2	8.08	7.8	8	8.61
SF3 (70%:30%)	7.04	6.76	6.64	6.6	6.92
SF4 (60%:40%)	7.16	6.76	6.72	6.64	6.96
SF5 (50%:50%)	6.76	6.36	6.4	6.36	6.6



**Figure 5 Comparison of Sensory Properties and Over all Acceptability of the Samples**

**Conclusion**

In this study the overall acceptability of the different concentration of the Flavoured Okra extract was determined. Flavoured Okra extract was prepared using Fresh Okra mucilaginous water, lime juice, spice mix and salt. Mucilaginous water of okra has many health benefits. While in taking this mucilaginous water directly without adding any flavours its smell and consistency are not likely accepted as it was denoted as Control and its sensory evaluation results were given in Table 1. For this reason spice mixes is prepared and added to the mucilaginous water along with lime juice and salt. This mixer was blended in mixer grinder to give the acceptable consistency. This flavoured okra extract was prepared for different concentration as SF 1 (90%:10%), SF 2 (80%:20%), SF 3 (70%:30%), SF 4 (60%:40%), SF 5 (50%:50%). The control and all 5 samples were evaluated by 25 panellists. Sensory evaluation score sheet were given to them and their results were note for sensory attributes. The 9 point hedonic scale sensory evaluation score sheet was used for this analysis. As a result SF2 that is 80%: 20% concentration of

Flavoured Okra extract and Water was highly accepted by the panellist and it was consider for the further research.

## References

1. Adiaha MS, Effect of Okra (*Abelmoschus esculentus* L. Moench) on Human Development and its Impact on the Economy of Farmers in Obubra Rainforest Zone of Nigeria, *WNOFNS* .2017;10:80–85.
2. Ahiakpa, J. K., Amoatey, H. M., Amenorpe, G., Apatey, J., Ayeh, E. A., & Agbemavor, W. S. K. (2014). Mucilage Content of 21 accessions of Okra (*Abelmoschus* spp L.). *Scientia Agriculturae*, 2(2), 96–101.
3. Akhtar SN, Dhillon P, Prevalence of diagnosed diabetes and associated risk factors: Evidence from the large-scale surveys in India, *Journal of Social Health and Diabetes*, 2017;5:1.
4. Aladele, S.E., Ariyo, O.J. & Lapena, R.de. (2008). Genetic relationships among West African okra (*Abelmoschus caillei*) and Asian genotypes (*Abelmoschus esculentus*) using RAPD. *Indian Journal of Biotechnology* .7(10):1426-1431.
5. Andras, C.D., Simandi, B., Orsi, F., Lambrou, C., Tatla, D.M., Panayiotou, C., Domokos, J., & Doleschall. F. (2005). Supercritical carbon dioxide extraction of Okra (*Hibiscus esculentus* L.) seeds. *J. Sci. Food Agric.*, 85: 1415-1419.
6. Ansari, N. M., Houlihan, L., Hussain, B., & Pieroni, A. (2005). Antioxidant activity of five vegetables traditionally consumed by south-Asian migrants in Bradford, Yorkshire, UK. *Phytotherapy Research*, 19(10), 907– 911. [https://doi.org/10.1002/\(ISSN\)1099-1573](https://doi.org/10.1002/(ISSN)1099-1573)
7. Barwal, V. S., Garg, V. and Sharma, R., 2010, Development and quality evaluation of Amla mouth freshener. *J. Food Sci. Technol.*, 47(6): 697 – 699.
8. Biswal, B., Karna, N., & Patel, R. (2014). Okra mucilage act as a potential binder for the preparation of tablet formulation. *Der Pharmacia Lettre*, 6(3), 31–39.
9. Cruess, W.V., 1958, *Commercial Fruits and Vegetable products*. McGraw Hill Book Co. New York: 12-14.
10. Deogade, U. M., Deshmukh, V. N., & Sakarkar, D. M. (2012). Natural gums and mucilage's in NDDS: Applications and recent approaches. *International Journal of PharmTech Research*, 4(2), 799–814.



11. Gomathi A, Kamalam S, N Jeevaanand. To Study The Efficacy of Amla and Okra Juice on Blood Glucose Level Among Type 2 Diabetes in Selected Rural Settings of Puducherry. *Community and Public Health Nursing*. 2020;5(2):81–85.
12. Habtamu Fekadu Gemedu, Negussie Ratta, Gulelat Desse Haki & Ashagrie Z. Woldegiorgis Fekadu Beyene, Nutritional Quality and Health Benefits of Okra (*Abelmoschus Esculentus*): A Review, *Global Journal of Medical Research: K Interdisciplinary Volume 14 Issue 5 Version 1.0 Year 2014*.
13. Kaewmanee, T., Bagnasco, L., Benjakul, S., Lanteri, S., Morelli, C. F., Speranza, G., & Cosulich, M. E. (2014). Characterisation of mucilages extracted from seven Italian cultivars of flax. *Food Chemistry*, 148, 60– 69. <https://doi.org/10.1016/j.foodchem.2013.10.022>
14. Mirhosseini, H., & Amid, B. T. (2012). A review study on chemical composition and molecular structure of newly plant gum exudates and seed gums. *Food Research International*, 46(1), 387–398. <https://doi.org/10.1016/j.foodres.2011.11.017>
15. Naveed, A., Khan, A.A., & Khan, I.A. (2009). Generation mean analysis of water stress tolerance in okra (*Abelmoschus esculentus* L.). *Pak. J. Bot.*, 41: 195-205.
16. Oyelade, O.J., Ade-Omowaye, B.I.O., and Adeomi, V.F. (2003). Influence of variety on protein, fat contents and some physical characteristics of okra seeds. *J. Food Eng.*, 57: 111-114.
17. Roy A, Shrivastava SL, Mandal SM, Functional properties of Okra *Abelmoschus esculentus* L. (Moench): traditional claims and scientific evidences; *Plant Science Today*. 2014;1:(3):121–30.
18. Saifullah, M., & Rabbani, MG. (2009). Evaluation and characterization of okra (*Abelmoschus esculentus* L. Moench.) genotypes. *SAARC J. Agric*. 7: 92-99.
19. Sailaja S and Parameshwari .S, Sensory Evaluation of Ashgourd and Amla Based Juice and Soup, *International Journal of Scientific and Research Publications*, Volume 8, Issue 9, September 2018, ISSN 2250-3153.
20. Shui, G., & Peng, L. L. (2004). An improved method for the analysis of major antioxidants of *Hibiscus esculentus* Linn. *Journal of Chromatography A*, 1048(1), 17–24. [https://doi.org/10.1016/S0021-9673\(04\)01187-2](https://doi.org/10.1016/S0021-9673(04)01187-2)