



ASSESSMENT OF SENSORY AND STORAGE LIFE FOR DETERMINING THE QUALITY OF BITTER BRINJAL PICKLE

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ABSTRACT

This study was conducted with five sample and five treatments in order to see the efficacy of preservatives on the shelf life and sensorial quality of bitter brinjal pickle. Observation was done for a period of one year in order to see the change in colour, flavor, texture and appearance of fungus. Sensory evaluation was done in order to see the acceptability of the product. In the first treatment, bitter brinjal pickle was prepared with 5% salt, spices and 10% mustard oil and stored in sterialized bottle. In the second treatment, bitter brinjal pickle was prepared with 8% salt, spices and 20% mustard oil and stored in sterialized bottle. In the third treatment, it was prepared with 9% salt, spices and 25% mustard oil and vinegar (10%) and stored in sterialized bottle. In the fourth treatment, bitter brinjal pickle was prepared with 10% salt, spices, 30% mustard oil and 0.15% acetic acid and in the fifth treatment, it was prepared with vinegar-cured bitter brinjal 10% salt, spices, 35% mustard oil. The result showed that 5th treatment is the best method for extending the shelf life and also for improving the quality of the product.

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INTRODUCTION

Bitter brinjal is a fruit plant from the genus solanum family of the solanaceae. It is widely used as vegetables and also as a traditional medicine. It is highly perishable and the shelf life can be extended by preserving in the form of pickle. Pickle is a good appetizer consumed by all age of people which contain large amount of lactobacilli bacteria which are important for the digestion of grains and vegetables which have usual beneficial probiotics properties used by the body. (Shahzor, G.K *et al.* 2015). For pickling proper concentration of salt is very important for better shelf life and also to reduce the infestation of mold, yeast and bacteria. If salt concentration is less, the product gets slimy, soft and holds lots of water. Therefore the average salt concentration should not be less than 5.3%. (Rajablou *et al.* 2012). Sensory attribute is one of the important factors govern the consumers acceptance of food products and their purchase intent. The overall quality of any food product is related to several sensory attribute like appearance, texture and flavor. (Barrett *et al.* 2010; Nandane and Jain, 2011) Texture is also one of the most important sensorial quantitative characteristics of pickle and its effects on product acceptance by the buyer is crucial.

(Sadeghizadeh, Y. J. *et al.* 2018). The process of pickle production is carried out under optimal condition, some changes occur in the texture of primary products which affects

the quality of pickle. (Rodrige and Alvarruiz, 2010). Mustard oil, salt, and vinegar are the common preservative used for long time back (Devi, Y. Prabhabati, 2013). The popular common pickle prepared by the women entrepreneurs are mango, chilli, bitter brinjal, mixed vegetable, garlic, wild apple, hog plum, fish and chicken pickle. But the quality and shelf life of these pickles are of question. The problem of shelf life of bitter brinjal pickle is higher in Manipur as it is highly perishable and hence an attempt is made to minimize the spoilage by the proper use of preservatives and also to select good quality bitter brinjal. The present study was undertaken to prepare green bitter brinjal pickle by use of different preservatives, to observe shelf life at different storage period, to evaluate the fungal growth and also to assess the overall acceptability of pickle by sensory evaluation.

MATERIALS AND METHODS

The matured, healthy bitter brinjal were collected from Imphal market. The experiment was conducted for a period of one year. Observation was done at the end of every month for the period of 2 months and 2 months interval for the period up to 12 months in order to see any change in colour, flavor, texture and appearance of fungus. Method of collection of sample along with treatment was shown in Table 1.

Method of Preparation of Bitter Brinjal Pickle

The recipe of the bitter brinjal pickle is given in Table 2. Select fresh, mature bitter brinjal and wash thoroughly with tap water to remove dust and dirt. Then remove stalk and cut in to

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half. Blanch it for 3 min and drain water properly. Fry spices in oil and add blanched bitter brinjal and mix it properly. For storing pickle glass jar was sterilised at 100°C and dry it properly. In some treatment like T₃ and T₅ vinegar was used and in T₄ acetic acid was used. For making bitter brinjal pickle, mustard oil was heated and put all the spices, fry for few seconds and added the blanched bitter brinjal and fry for 3-5 minutes in low flame till it blended properly. Then salt and remaining oil were added. Then the fried bitter brinjal pickle was cooled, filled in to sterilized glass bottle and sealed airtight. The flow chart for the preparation of bitter brinjal pickle was shown in fig 1. For treatment like T₃ and T₄ vinegar and acetic acid were added just before removing from fire and in case of T₅, blanched bitter brinjal was cured in vinegar overnight and drain vinegar water and other process remain same with other treatments.

Table 1 Method of Selection of Sample with Different Treatment

Sample	Treatment
Sample - 1	Blanched bitter brinjal + 5 % salt + spice + 10 % M. oil and store in sterialised glass bottle
Sample - 2	Blanched bitter brinjal + 8 % salt + spice + 20 % M. oil and store in sterialised glass bottle
Sample - 3	Blanched bitter brinjal + 9 % salt + spice + 25 % M. oil + 10% vinegar and store in sterialised glass bottle
Sample - 4	Blanched bitter brinjal + 10 % salt + spice + 30 % M. oil + 0.15 % Acetic acid and store in sterialised glass bottle
Sample - 5	Vinegar cured blanched bitter brinjal + 10 % salt + spice + 35 % M. oil and store in sterialised glass bottle

Table 2 Recipe of Bitter Brinjal Pickle

Ingredients	T1	T2	T3	T4	T5
Blanched bitter brinjal	1 kg	1 kg	1 kg	1 kg	1 kg
Mustard Oil	100 ml	200 ml	250 ml	300 ml	350 ml
Salt	50 gm	80 gm	90 gm	100 gm	100 gm
Chilli Powder	10 gm	10 gm	10 gm	10 gm	10 gm
Jira Powder	10 gm	20 gm	20 gm	20 gm	20 gm
White Mustard Seed Powder	20 gm	20 gm	20 gm	20 gm	20 gm
Ajwain Powder	5 gm	10 gm	10 gm	10 gm	10 gm
Turmeric Powder	10 gm	10 gm	10 gm	10 gm	10 gm
Vinegar	-	-	100 ml	-	1 lt
Acetic Acid	-	-	-	15ml	-

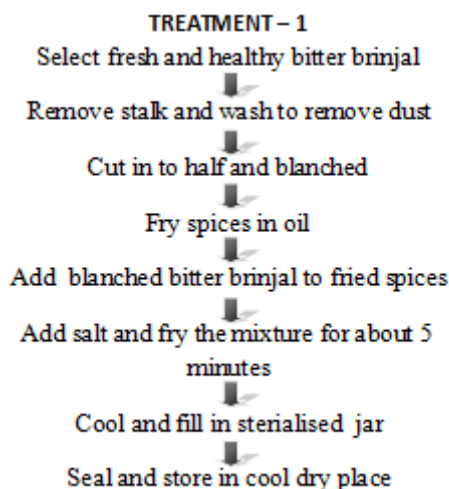


Fig 1 Flow Chart for THE Preparation of Bitter Brinjal Pickle

RESULTS AND DISCUSSION

Visual Observation of Fungus Growth Developed in Bitter Brinjal Pickle

The fungal growth developed in bitter brinjal pickle at different storage period was examined through visual observation. Details of the observation were given in Table 3. Up to 2 months of storage, no fungal growth was observed. During 4 months of storage, the fungal growth was observed in T1 due to low concentration of salt and mustard oil. Whitish fungal growth was observed on the surface of the pickle. They may come from spices, other ingredients, from the air or from lid of the jar. From 6th months to 12 months, excessive growth of fungus was observed in case of T1 and T₂ and other treatments like T₃, T₄ and T₅, there was no fungal appearance on the surface of the pickle due to high concentration of salt, mustard oil, vinegar and acetic acid. The covering of oil as well as proper concentration of salt helped to prevent microbial contamination and vinegar and acetic acid helped to maintain the proper pH of the pickle.

Table 3 Visual Observation of Fungus Growth Developed In Bitter Brinjal Pickle at Different Storage

Storage Period (Month)	Sample	Fungal Growth
1 month	S1	No Growth
	S2	No Growth
	S3	No Growth
	S4	No Growth
	S5	No Growth
2 month	S1	No Growth
	S2	No Growth
	S3	No Growth
	S4	No Growth
	S5	No Growth
4 month	S1	Slightly Growth
	S2	No Growth
	S3	No Growth
	S4	No Growth
	S5	No Growth
6 month	S1	Excessive Growth
	S2	Slightly Growth
	S3	No Growth
	S4	No Growth
	S5	No Growth
8 month	S1	Excessive Growth
	S2	Excessive Growth
	S3	No Growth
	S4	No Growth
	S5	No Growth
10 month	S1	Excessive Growth
	S2	Excessive Growth
	S3	No Growth
	S4	No Growth
	S5	No Growth
12 month	S1	Excessive Growth
	S2	Excessive Growth
	S3	No Growth
	S4	No Growth
	S5	No Growth

Storage Studies of Bitter Brinjal Pickle

Bitter brinjal pickles were stored at room temperature. The deterioration of the product was observed at a regular interval of one month upto 2 months and 2 months interval for a period upto 12 months. The change in color, flavour and texture were observed for a period of 1 year. Five different sample of green chilli pickle were used for storage studies at room temperature of 27^o – 33^o C from 1 month to 12 months.

Table 4 Storage Life of Bitter Brinjal Pickle

Shelf life (month)	Sample	Colour	Flavour	Texture	Remark
1	S1	No Change	No off flavour	Firm	Good
	S2	No Change	No off flavour	Firm	Good
	S3	No Change	No off flavour	Firm	Good
	S4	No Change	No off flavour	Firm	Good
	S5	No Change	No off flavour	Firm	Good
2	S1	No Change	No off flavour	Firm	Good
	S2	No Change	No off flavour	Firm	Good
	S3	No Change	No off flavour	Firm	Good
	S4	No Change	No off flavour	Firm	Good
	S5	No Change	No off flavour	Firm	Good
4	S1	Change	Off flavour	Soft	Slightly spoiled
	S2	No Change	Slightly off Flavour	Slightly soft	Fair
	S3	No Change	No off flavour	Firm	Good
	S4	No Change	No off flavour	Firm	Good
	S5	No Change	No off flavour	Firm	Good
6	S1	Change	Off flavour	Extremely soft	spoiled
	S2	Change	Off flavour	soft	Slightly spoiled
	S3	Slightly Change	Slightly off Flavour	Slightly soft	fair
	S4	No Change	No off flavour	Firm	Good
	S5	No Change	No off flavour	Firm	Good
8	S1	Change	Off flavour	Extremely soft	Completely spoiled
	S2	Change	Off flavour	Extremely soft	Spoiled
	S3	Change	Off flavour	soft	Slightly spoiled
	S4	No Change	No off flavour	Firm	Good
	S5	No Change	No off flavour	Firm	Good
10	S1	Change	Off flavour	Extremely soft	Completely spoiled
	S2	Change	Off flavour	Extremely soft	Spoiled
	S3	Change	Off flavour	Extremely soft	Spoiled
	S4	Slight Change	Slight off flavour	Soft	Slightly spoiled
	S5	No Change	No off flavour	Firm	Good
12	S1	Change	off flavour	Extremely soft	Completely spoiled
	S2	Change	off flavour	Extremely soft	Completely spoiled
	S3	Change	off flavour	Extremely soft	Spoiled
	S4	Change	off flavour	Soft	Slightly spoiled
	S5	No Change	No off flavour	Firm	Good

Table 5 Mean score for Performance of color, flavor, Texture and Overall Acceptability of Various Sample of Bitter Brinjal Pickle.

Sample Code	Sensory attributes			Overall acceptability
	Colour	Flavour	Texture	
S1	7.5	6.3	7.0	6.6
S2	7.6	6.8	7.2	7.3
S3	7.4	7.2	7.5	7.4
S4	7.8	7.3	7.5	7.5
S5	8.2	7.8	7.5	8.0

The effect of storage time on physical properties such as colour, flavour and texture of the pickles were studied. The processed bitter brinjal pickles were in good condition upto 2 months in case of T₁ and in case of T₅, it was upto 12 months. For T₁ and T₂, change in color, flavour and texture started from 4th months onwards which was shown in Table 4. This may be due to lack of proper concentration of preservatives like salt and mustard oil. In case of T₃, changes started from 6 months onwards and for T₄, changes started from 10 months onwards due to lack of right concentration of preservatives like vinegar and acetic acid. For T₅, there was no change in color, flavour and texture upto 12 months as the chilli was cured in vinegar for overnight and right concentration of salt and mustard oil were added which helped to extend the shelf life upto 12 months.

Sensory Evaluation of Bitter Brinjal Pickle

The consumer’s acceptability of processed bitter brinjal pickle was evaluated by a taste testing panel. The hedonic rating test was used to determine the acceptability of pickle.

The panelists were selected from women entrepreneur of Imphal, Manipur. Panelists were asked to give scores for characteristic color, flavour, texture and overall acceptability of the processed bitter brinjal pickle. The scale was arranged such that 9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like or dislike, 4 = Dislike slightly, 3 = Dislike moderately, 2 = Dislike very much, 1 = Dislike extremely. The mean score of performance of bitter brinjal pickles were presented in Table 5.

From the table, it is seen that T₅ secure the highest score 8.2 for colour, 7.8 for flavour, 7.5 for texture and 8.0 for overall acceptability and was ranked as like very much. It also showed that T₁ got the lowest value than the other sample. So, this indicated that color, flavour, texture of T₅ is more acceptable than the others.

CONCLUSION

Bitter brinjal pickle is highly perishable. So, proper preservatives like salt, mustard oil, acetic acid and vinegar should be used in proper concentration to extend the shelf life of the pickle. From this study, it was found that fungal growth was a great problem of pickle. If we add proper concentration of preservatives, the fungal growth becomes very low. The panelists also tested the product and gave the score for color, flavour, texture and overall acceptability. The score of panel test indicated that among the five treatments, the pickle which was prepared with vinegar cured blanched bitter brinjal (T₅) was the most acceptable. In case of shelf life, T₅ have better shelf life than other 4 treatment. It was proved that T₅ is the

best method for extending the shelf life and also for improving the quality of the pickle. This study gives a good prospect on processing of bitter brinjal. This technology may be adopted on large scale by the women entrepreneurs and farm women in order to generate income and occupy a space in the market.

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