



# Efficacy of Preservatives on the Shelf Life and Quality of Green Chilli Pickle

Y Prabhabati Devi

Krishi Vigyan Kendra, Chandel-ICAR, Manipur (Imphal)

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## ABSTRACT

The study was conducted to note down the efficacy of preservatives on the shelf life and quality of green chilli pickle. Observation was recorded 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, chilli pickle was prepared with 5 per cent salt, spices and 10 per cent mustard oil and stored in sterilized bottle. In the second treatment, chilli pickle was prepared with 8 per cent salt, spices and 20 per cent mustard oil and stored in sterilized bottle. In the third treatment, it was prepared with 9 per cent salt, spices and 25 per cent mustard oil and vinegar (10%) and stored in sterilized bottle. In the fourth treatment, chilli pickle was prepared with 10 per cent salt, spices, 30 per cent mustard oil and 0.15 per cent acetic acid and in the fifth treatment; it was prepared with vinegar-cured chilli, 10 per cent salt, spices, 35 per cent mustard oil. The result showed that 5<sup>th</sup> treatment was the best method for extending the shelf life and also for improving the quality of the product.

**Key Words:** Efficacy, Preservative, Shelf life, Sterilized, Observation.

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## INTRODUCTION

Chilli is a fruit plant from the genus *capsicum* member of the *solanaceae*. Three quarters of the world population eat chilli every day. Chilli is highly perishable vegetable and abundantly available during May to July-August. It is very cheap during season and cannot be kept for a long period of time without processing and preservation. Preservation is the process of prevention of decay or spoilage of food thus allowing it to be stored in a fit condition for future use. Drying, smoking and value addition of chilli in the form of dry preserves, powder, sauce and pickle can extend the shelf life to some extent (Mudabi and Rajagopal, 1982)). By using proper preservative, the shelf life of green chilli can extend even one to two years. Mustard oil, salt, and vinegar are the common preservative used for long time back (Devi and Roy, 2013).

Pickle is widely acceptable and usable food item in Manipur as well as all over country in India. The popular common pickle prepared by

the women entrepreneurs are mango, chilli, 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 chilli pickle is higher in Manipur, hence an attempt is made to minimize the spoilage by the proper use of preservatives and also to select good quality chilli. The present study was undertaken to prepare green chilli 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 green chillies were collected from Imphal market. The experiment was conducted for a period of one year. Observation was recorded at 2m interval up to 12m in order to see any change in colour, flavor, texture and appearance of fungus. Different treatment and its details were shown in table 1.

**Table 1. Different treatment and their details.**

Treatment	Detail of treatment
T <sub>1</sub>	Green chilli + 5 % salt + spice + 10 % M. oil and store in sterilized glass bottle
T <sub>2</sub>	Green chilli + 8 % salt + spice + 20 % M. oil and store in sterilized glass bottle
T <sub>3</sub>	Green chilli + 9 % salt + spice + 25 % M. oil + 10% vinegar and store in sterilized glass bottle
T <sub>4</sub>	Green chilli + 10 % salt + spice + 30 % M. oil + 0.15 % Acetic acid and store in sterilized glass bottle
T <sub>5</sub>	Vinegar cured Green chilli + 10 % salt + spice + 35 % M. oil and store in sterilized glass bottle

**Method of preparation of green chilli pickle**

The recipe of the green chilli pickle is given in table 2. Selected fresh, mature green chilli and washed thoroughly with tap water to remove dust and dirt. Then removed stalk and dried it for some time to remove moisture. Made slit at the top of the chilli in order to enter spices and other ingredients properly inside the chilli. Red chilli powder, turmeric powder, white mustard seed powder, cumin seed powder, ajwain powder, salt and mustard oil were also used. For storing pickle glass jar was sterilized at 100° C and dried it properly. In some treatment like T<sub>3</sub> and T<sub>5</sub> vinegar was used and in T<sub>4</sub> acetic acid

was used. For making green chilli pickle, mustard oil was heated and put all the spices, fried for few seconds and added the sliced green chilli and fried for 3-5min in low flame till it blended properly. Then salt and remaining oil were added. The fried chilli pickle was cooled, filled in to sterilized glass bottle and sealed airtight. The flow chart for the preparation of green chilli pickle was shown in fig 1. For treatment like T<sub>3</sub> and T<sub>4</sub> vinegar and acetic acid were added just before removing from fire and in case of T<sub>5</sub>, green chilli was cured in vinegar overnight and drain vinegar water and other process remain same with other treatments.

**Table 2. Recipe of different green chilli pickle treatments.**

Sr. No.	Ingredient	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
1.	Green Chilli (kg)	1	1	1	1	1
2.	Mustard Oil (ml)	100	200	250	300	350
3.	Salt (g)	50	80	90	100	100
4.	Chilli Powder (g)	10	10	10	10	10
5.	Jira Powder (g)	10	20	20	20	20
6.	White Mustard Seed Powder (g)	20	20	20	20	20
7.	Ajwain Powder (g)	5	10	10	10	10
8.	Turmeric Powder (g)	10	10	10	10	10
9.	Vinegar	-	-	100 ml	-	1 lt
10.	Acetic Acid (ml)	-	-	-	15	-

## Efficacy of Preservatives on the Shelf Life and Quality of Green Chilli Pickle

Fig 1. Flow chart for the preparation of green chilli pickle.

Treatment = 1-5.

Select fresh and healthy green chilli

Remove stalk and dry to remove moisture

Make slit

Fry spices in oil

Add green chilli to fried spices

Add salt and fry the mixture for about 5 minutes

Cool and fill in sterilised jar

Seal and store in cool dry place

### RESULTS AND DISCUSSION

#### Visual observation of fungus growth developed in green chilli pickle

The fungal growth developed in green chilli pickle at different storage period was examined through visual observation. Details of the observation were given in Table 3. Up to 2m of storage, no fungal growth was observed. During 4m of storage, the fungal growth was observed in T<sub>1</sub> due to low concentration of salt and mustard oil. Whitish fungal growth was observed on the surface of the pickle which may come from spices, other ingredients, from the air or from lid of the jar. From 6<sup>th</sup>m to 12m, excessive growth of fungus was observed in case of T<sub>1</sub> and T<sub>2</sub> and other treatments like T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub>, 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.

#### Storage studies of green chilli pickle

Green chilli pickles were stored at room temperature. The deterioration of the product was observed at a regular interval of one month upto 2m 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

Table 3. Fungal growth developed in green chilli pickle at different storage.

Storage Period (Month)	Treatment	Fungal Growth
1-3	T <sub>1</sub> to T <sub>5</sub>	No Growth
4	T <sub>1</sub>	Slightly Growth
	T <sub>2</sub> to T <sub>5</sub>	No Growth
6	T <sub>1</sub>	Excessive Growth
	T <sub>2</sub>	Slightly Growth
	T <sub>3</sub> to T <sub>5</sub>	No Growth
8-12	T <sub>1</sub>	Excessive Growth
	T <sub>2</sub>	Excessive Growth
	T <sub>3</sub> to T <sub>5</sub>	No Growth

treatment of green chilli pickle were used for storage studies at room temperature of 27<sup>o</sup> – 33<sup>o</sup> C from 1 m to 12 m. The effect of storage time on physical properties such as colour, flavour and texture of the pickles were studied. The processed green chilli pickles were in good condition upto 2m in case of T<sub>1</sub> and in case of T<sub>5</sub>, it was upto 12m. For T<sub>1</sub> and T<sub>2</sub>, change in color, flavour and texture started from 4<sup>th</sup> m 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 T<sub>3</sub>, changes started from 6m onwards and for T<sub>4</sub>, changes started from 10m onwards due to lack of right concentration of preservatives like vinegar and acetic acid. For T<sub>5</sub>, there was no change in color, flavour and texture upto 12m 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 12m.

#### Sensory evaluation of green chilli pickle

The consumer's acceptability of processed green chilli 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

**Table 4. Storage life of green chilli pickle.**

Shelf life (month)	Treatment	Colour	Flavour	Texture	Remark
1-2	T <sub>1</sub>	No Change	No off flavour	Firm	Good
	T <sub>2</sub>	No Change	No off flavour	Firm	Good
	T <sub>3</sub>	No Change	No off flavour	Firm	Good
	T <sub>4</sub>	No Change	No off flavour	Firm	Good
	T <sub>5</sub>	No Change	No off flavour	Firm	Good
4	T <sub>1</sub>	Change	Off flavour	Soft	Slightly spoiled
	T <sub>2</sub>	No Change	Slightly off Flavour	Slightly soft	Fair
	T <sub>3</sub>	No Change	No off flavour	Firm	Good
	T <sub>4</sub>	No Change	No off flavour	Firm	Good
	T <sub>5</sub>	No Change	No off flavour	Firm	Good
6	T <sub>1</sub>	Change	Off flavour	Extremely soft	spoiled
	T <sub>2</sub>	Change	Off flavour	soft	Slightly spoiled
	T <sub>3</sub>	Slightly Change	Slightly off Flavour	Slightly soft	fair
	T <sub>4</sub>	No Change	No off flavour	Firm	Good
	T <sub>5</sub>	No Change	No off flavour	Firm	Good
8	T <sub>1</sub>	Change	Off flavour	Extremely soft	Completely spoiled
	T <sub>2</sub>	Change	Off flavour	Extremely soft	Spoiled
	T <sub>3</sub>	Change	Off flavour	soft	Slightly spoiled
	T <sub>4</sub>	No Change	No off flavour	Firm	Good
	T <sub>5</sub>	No Change	No off flavour	Firm	Good
10	T <sub>1</sub>	Change	Off flavour	Extremely soft	Completely spoiled
	T <sub>2</sub>	Change	Off flavour	Extremely soft	Spoiled
	T <sub>3</sub>	Change	Off flavour	Extremely soft	Spoiled
	T <sub>4</sub>	Slight Change	Slight off flavour	Soft	Slightly spoiled
	T <sub>5</sub>	No Change	No off flavour	Firm	Good
12	T <sub>1</sub>	Change	off flavour	Extremely soft	Completely spoiled
	T <sub>2</sub>	Change	off flavour	Extremely soft	Completely spoiled
	T <sub>3</sub>	Change	off flavour	Extremely soft	Spoiled
	T <sub>4</sub>	Change	off flavour	Soft	Slightly spoiled
	T <sub>5</sub>	No Change	No off flavour	Firm	Good

the processed green chilli 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 green chilli pickles was presented in table 5.it was seen that T<sub>5</sub> secured the highest score 8.3 for

## Efficacy of Preservatives on the Shelf Life and Quality of Green Chilli Pickle

**Table 5. Mean score for performance of color, flavor, texture and overall acceptability of various treatments of green chilli pickle.**

Treatment	Sensory attributes			
	Colour	Flavour	Texture	Overall acceptability
T <sub>1</sub>	7.0	6.5	7.0	5.5
T <sub>2</sub>	7.2	6.8	7.2	5.8
T <sub>3</sub>	7.3	7.0	7.5	7.4
T <sub>4</sub>	7.5	7.2	7.5	7.8
T <sub>5</sub>	8.3	8.2	7.8	8.5

colour, 8.2 for flavour, 7.8 for texture and 8.5 for overall acceptability and was ranked as like very much. It also showed that T<sub>1</sub> got the lowest value than the other sample. So, this indicated that color, flavour, texture of T<sub>5</sub> is more acceptable than other.

### CONCLUSION

Green chilli 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 chilli (T<sub>5</sub>) was the most acceptable. In case of shelf life, T<sub>5</sub> have better shelf life than other treatment. It was proved that T<sub>5</sub> was the best method for extending the shelf life and also for improving the quality of the pickle. This study gave a good prospect on processing of green chilli. 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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