

**EFFECT OF DIFFERENT VOLUME OF VINEGAR ON SHRIMP PICKLE  
QUALITY AND SENSORY ATTRIBUTES****GADHIYA SONAL\*<sup>1</sup>,  
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**ABSTRACT**

Shrimp pickle was produced using a smaller variety of shrimp (*Litopenaeus vannamei*). Vinegar and salt were used to preserve the shrimp pickle against microbial spoilage. Different concentrated vinegar is used in shrimp pickle. The distilled white vinegar is made from acetic acid and water. In this experiment four different types of concentrated vinegar were used in which the T1 sample has a 10% volume, T2 has 20%, T3 has 30% volume and T4 has 40% volume vinegar. The analytical observation was found positive results with 20% (w/v) vinegar added shrimp pickle. Most bacteria can grow in the best pH range 6 to 7. The desirable pH range of shrimp pickle was 4.2, which is preferred to preserve shrimp pickle for a longer period. This pH range has no spoilage and less microbial content observed in T2 20% compared to the other three concentrated vinegar on shrimp pickle i.e. 10%, 30 %, and 40 % (w/v) vinegar. The peroxide value was found to be in the range of  $3.46 \pm 0.05$ ,  $2.91 \pm 0.12$ ,  $3.1 \pm 0.1$  and  $3.33 \pm 0.05$  in T1, T2, T3, and T4 respectively. No value was observed beyond the prescribed limit as per the BIS standard. Sensory evaluation of shrimp pickle was judge by consisting of nine members after several trials were carried out. To arrive at a final recipe as judged best by the taste panel. During a sensory evaluation, the T2 sample (20% vinegar) is best concentrated on shrimp pickle. Therefore, in the production of shrimp pickle at a declining level of vinegar volume, pickle can be preserved by dropping its pH to the desired level to avoid spoilage during storage.

**Keywords: -**

shrimp pickle, vinegar, pH, chemical composition

**INTRODUCTION**

India, the world's second-largest fish producer, is on the verge of a blue revolution. At the same time, it's worth mentioning that a large amount of the total available catch is made up of commercially irrelevant types, and thus goes unused. As a result, only a few fish have been processed, leaving the rest to rot (Tanuja and Hameed 1998).

Various types of fish products have long been a popular diet around the world. Seafood is pickled in India with salt as a pickling ingredient. Seafood pickles are now made with organic acid, salt, and spices as pickling agents. The quality of the pickled food is preserved for a long time. Seafood pickles are safe with no harmful bacteria and have a long shelf life at ambient temperature for more than 6 months. Jawahar and Shetty (1994) conducted a detailed study on the preparation of pickles from crustaceans and reported shelf life for 6 months (Saritha, *et al.* 2014)

Pickling is an ancient food preservation method. Pickling is one of the preservative methods of finfish and shellfish, which is an easy and safe method. (Kumar and Basu, 2001). Pickled fish is a tasty appetizer that is also quite healthful. There is no need for expensive equipment, and the entire expenditure is minimal. (Waghmare *et al.*, 2015).

Shrimp one of the most popular shellfish including White shrimp (*Litopenaeus vannamei*) is one of the key brackish water species in shrimp farming. It is a good source of protein, lipid, carbohydrate, moisture, and ash, also contains calcium, sodium, potassium, manganese, copper, chromium. Shrimp have a low-fat content, less cholesterol, and high PUFA. (Nguyen *et al.*, 2019). Pickling can have perishable food stored for months.

Shrimp pickle shelf life is 4-6 months. Antimicrobial herbs and spices including mustard seed, garlic, cinnamon or cloves are often added.

The purpose of present research activities was to investigate the effectiveness of different volumes of vinegar to make good quality of pickle and that will ensure it is not deteriorated in the quality.

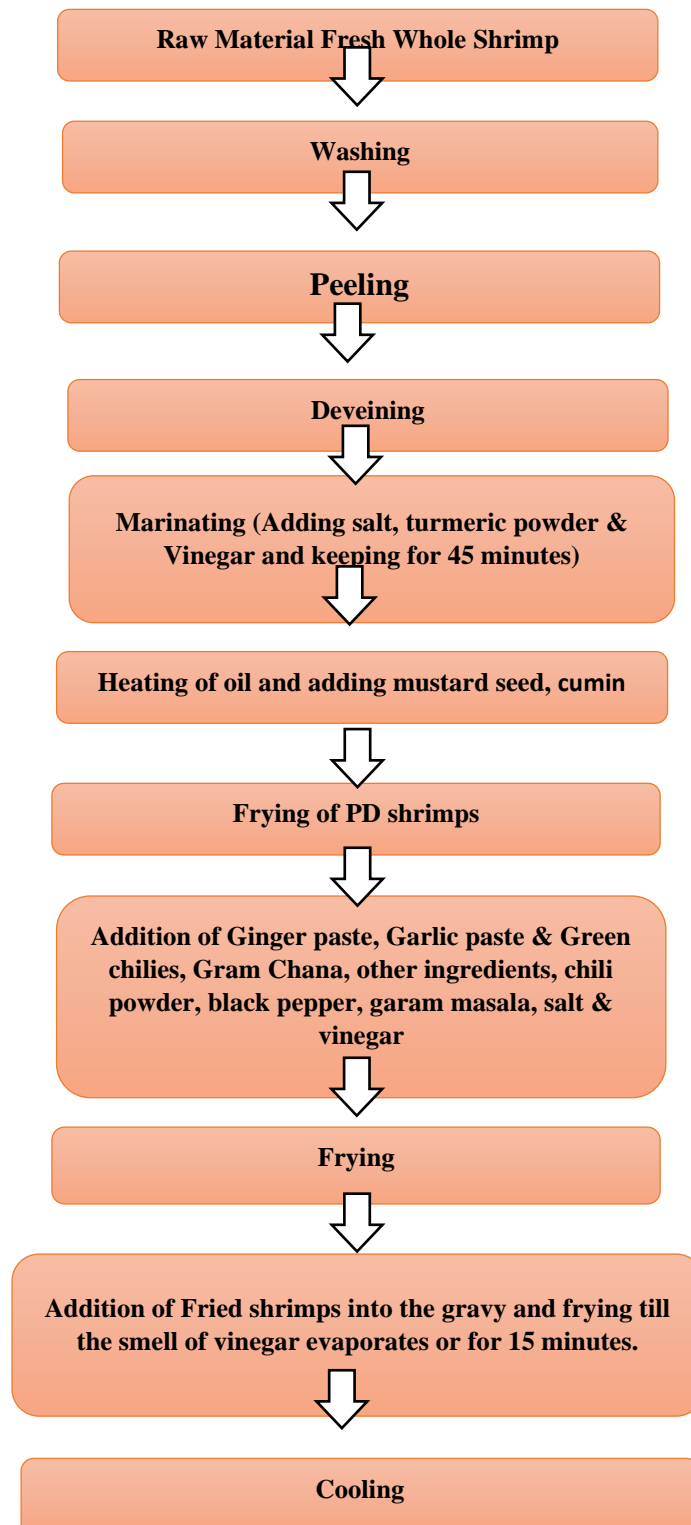
**TABLE 1: - MATERIAL AND METHOD**

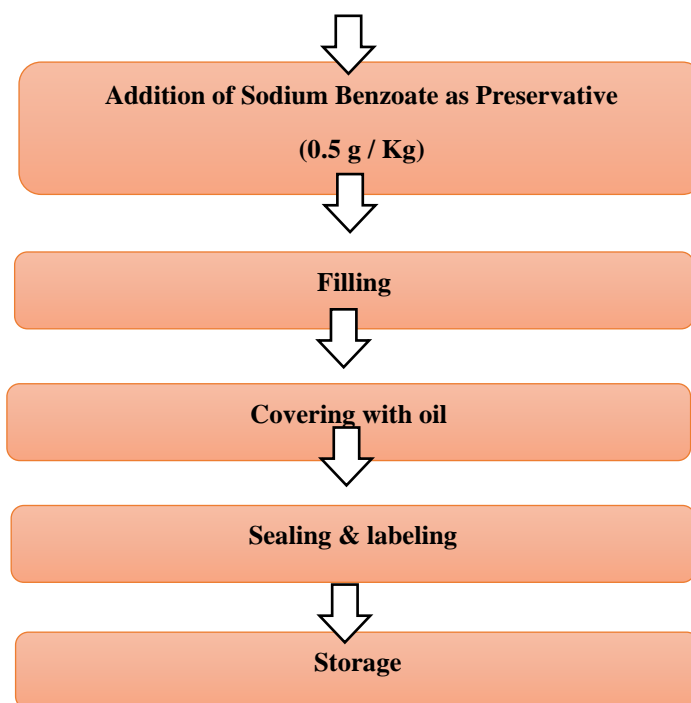
Material	Quantity (gram)
Fresh raw shrimp	1000 gram
Ginger	120 gram
Green chili's	80 gram
Garlic	120 gram
Chili powder	120gram
cumin seeds	25 gram
Roasted masala	10 gram
Fenugreek	10 gram
Mustard	25 gram
Turmeric powder	10 gram
Curry leaves	10 gram
Vinegar	300 ml
Salt	80 gram
Citric acid	5 gram
Sodium benzoate	0.5 gram
Refined sunflower oil	400 ml
Asafetida	15 gram

**SAMPLE PREPARATION**

Shrimp (*Littopenaeus vannamei*) was procured from the local landing center of Veraval harbor, brought to the laboratory and washed properly with potable water to make it free from sand and any other extraneous material. Washed shrimps peeled hygienically and weighed. Then after a freeze in overnight in the deep freezer for -40°C temp. After removing the hard shell and dressing should be done for removing unwanted parts of the shrimp. Then 2% of the total salt was mixed with peeled shrimp and kept aside for 30-45 min for the salt to penetrate the muscle. The required amount of garlic, ginger and green chilly was made into a paste (called the 1st paste). Dry chili powder, turmeric powder, and cumin powder were made into another paste (called the 2nd paste) by mixing with water. Fifty percent of the oil was added to the frying pan and treated prawns were fried and then kept aside. The remaining amount of oil was added to the frying pan. Then the first paste was added to the oil and fried for a while when half fried, the 2nd paste was added and frying continued under low flame until the characteristic odor of fried spices emerged. The fried shrimp were then added to the fried spice and frying continued under low flame until characteristic aroma emerged. Then the frying pan was removed from the flame and allowed to cool under the fan. When the temperature was a little higher than the room temperature. Then difference concentration of vinegar-like 10%, 20%, 30%, and 40% and mixed thoroughly and allowed to cool to room temperature.

### FLOW CHART OF SHRIMP PICKLE



**ANALYTICAL PROCEDURES****Proximate Composition**

The moisture, fat, protein and ash content of the fish kachori was estimated using an automatic moisture meter, Socs plus, Kel plus and Muffle furnace, respectively following the method of AOAC (2000).

**Sensory Evaluation**

Nine-member experienced panel of judges including teachers and postgraduate students of Department of Fish Processing Technology evaluated the samples for the sensory attributes viz. appearance, color, odor and overall acceptability using a 9-point hedonic scale according to standard procedure (Peryam and Pilgrim, 1957). Where, 9 = like extremely and 1 = dislike extremely.

**Determination of Peroxide Value (meq/Kg)**

The peroxide value is expressed in terms of mill-equivalent (meq) free iodine per kilogram of fat. It is determined by titrating iodine liberated from Potassium Iodine with Sodium thiosulphate solution. Thus, the determination of the peroxide value of fish fillets was done by chemical method (AOAC, 2006).

$$\text{Peroxide value (meq/1000 g)} = \frac{(S-B) \times N \times 1000}{\text{Weight of sample}}$$

**pH Evaluation**

pH of the control sample (0% oil) and samples was measured by using pH paper. For that, dipping the end of pH strip into the sample and after a few seconds remove the strip to show the color change of the strip.

**TABLE 2: - PHYSICAL DATA**

SR.NO	RAW MATERIAL WEIGHT	WEIGHT OF SHRIMP AFTER THAWING	DRIP LOSS
1	175±0	169±1	3.4±06 %
2	175±0	170.6±1.52	2.8±1.15%
3	175±0	164±1	6.16±056%
4	175±0	160±1.52	8.1±1.04%

**TABLE 3 :- CHEMICAL ANALYSIS**

SR.NO	PERCENTAGE OF VINEGAR CONC. (W/V)	RAW MATERIAL pH	AFTER PICKLING pH	PEROXIDE VALUE (PV)
1	10 (T1)	6.8±0	5.23±0.17	3.46±0.05
2	20 (T2)	6.8±0	4.23±0.15	2.91±0.12
3	30 (T3)	6.8±0	4.76±0.19	3.1±0.1
4	40 (T4)	6.8±0	3.76±0.1	3.33±0.05

**TABLE 4: - PROXIMATE COMPOSITION OF *L. VANNAMEI***

SR.NO	ATTRIBUTES (%)	SHRIMP MEAT (FRESH)
1	Moisture	72.33±2.08
2	Protein	31±0.1
3	Fat	1.2±0.170
4	Carbohydrates	1.28±2.70
5	Ash	2.18±0.07

**TABLE 5: - SENSORY ANALYSIS OF SHRIMP TREATED WITH DIFFERENT VOLUME OF VINEGAR**

Sensory parameters	T1	T2	T3(c)	T4
Appearance	6.83± 0.28	8.5±0.5	7.5± 0.5	6.5± 0.5
Colour	7.5±0.5	8.16±0.28	7.5± 0.5	6.66±0.57
Odour	6.5±0.5	8.66± 0.57	7.5± 0.5	6.5±0.5
Over all Acceptability	6.5±0.5	8.66±0.57	7.5± 0.5	6.5±0.5

### RESULTS AND DISCUSSION

*L.vannamei* is a good nutritional seafood item. Which content high biochemical constitutes. White leg shrimp including moisture, protein, fat, carbohydrates and ash from 72.33±2.08, 31±0.1, 1.2±0.170, 1.28±2.70 and 2.18±0.07 respectively. The concentration of vinegar used in the T1 sample is 10%, T2 in 20 %, T3 in 30% and T4 in 40 %. The advantage of the use of different concentrations of vinegar to improve flavoring and increase the storage condition of shrimp pickle. The average value of the weight of shrimp after thawing is 164±1. In this observation, the T3 sample was under control condition. The 2% salt should be used T1, T2, T3, and T4. Thawing is the process to change the quality of seafood items including physical, chemical and microbiological changes. During the observation lowest drip loss found in the T2 sample including 2.8±1.15%. That's why the T2 sample is low spoilage compared to other T1, T3, and T4. The raw material pH range should be the same as about 6.8±0. The conclusion about this result best pH range is of the T2 sample at about 4.23±0.15 compared to the other three samples. In this pH range, less microbial spoilage occurred. The desired peroxide value obtains from 20% vinegar concentration in shrimp pickle.

In the following preparation of shrimp pickle I have used the different composition of vinegar and after sensory analysis (appearance, color, odor, and taste) of all samples. I have found pickle with 20% (T2 sample) of vinegar is better than the other three percentage of vinegar. (10%, 30%, and 40%).

### CONCLUSION

Pickles are preserved by adding acid which lowers the pH to the point where it restricts the growth of microorganisms or by a combination of low pH and low aw. Vinegar and salt were used to preserve the shrimp pickle against spoilage. Different spices were used to get the desired attractive flavor. The United States

department of agriculture (USDA) recommends that pickles contain at that 0.70 % acetic acid (maximum pH 4.0). Most quick pickle recipes are safe since, to have good pickle flavor, the pH is almost below pH 4.5. So, as per this research, we predict that the volume of vinegar in shrimp pickle was up to 20% can able to achieve the desired pH as well as good overall properties for consumer preference.

#### ACKNOWLEDGEMENTS

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**Fig.1: Process of Manufacture of Shrimp Pickle**

#### REFERENCE

- [1] AOAC. *International Official methods of analysis of AOAC International 17<sup>th</sup> edition*. Gaithersburg, MD, USA, Association of Analytical Communities. 2000
- [2] AOAC. *Official Methods of Analysis, 18<sup>th</sup> edition*, Association of Official Analytical Chemists. Maryland, U.S.A. *Journal of Animal Science*, 79, 2075–2085. 2006
- [3] Jawahar, A.T.; Shetty, T.M.R. *Effect of Sodium Benzoate on the fermentative fish pickle*. *Fishery Technology*. 31 (1), 48 - 51. 1994

- [4] Kumar, S.; Basu, S. *Preparation of prawn pickle and its storage characteristics*. Journal of the Indian Fisheries Association. **28**, 105-111.2001
- [5] Nguyen, P.M.; Le Pha, P.T.; Tham, N.H.; Van Linh, N.T. *Technical Factors Influencing to Production of Galangal-Pickled Shrimp (*Litopenaeus Vannamei*)*. Oriental Journal of Chemistry. 35(1), 442. 2019
- [6] Peryam, D. R.; Pilgrim, F. J. *Hedonic scale method of measuring food preferences*. Food technology. 9-14. 1957
- [7] Saritha, K.; Jeyasanta, K.; Patterson, J. *Physico-chemical and sensorial characteristics of commercial seafood pickles of Tuticorin super markets, Tamil Nadu, India*. International Food Research Journal. 21(2), 2014
- [8] Tanuja, R.; Hameed, M.S. *Preparation and storage studies of squilla pickle*. School of Industrial Fisheries, Cochin University of Science and Technology Fine Arts Avenue, Cochin, India. **3**, 24-28. 1998
- [9] Waghmare, K. M.; Devkate, A. D.; Golandaj, A. A.; Surnar, S. R. *Standardising Smoking Treatments for Improved Organoleptic Quality and Storage Stability of Carp Pickle*. Research Journal of Recent Sciences ISSN. 2277, 2502.