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## Quality analysis and popularization on *Turbo brunneus* meat pickle

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**Abstract**

Mollusks have been recognized as a seafood of high nutritive value and good delicacy. A pickle was prepared from *Turbo brunneus*. This study designed to prepare pickle from two different oils using underutilized mollusks resource. The study was conducted for a period of 7 days. Results indicated that pickle prepared from groundnut oil showed better quality compared to pickle prepared from mustard oil. The present work also demonstrated to popularize the *T. brunneus* pickle using small amounts of ingredients.

**Keywords:** Gastropods, groundnut oil, pickle, quality, turbo

**1. Introduction**

Pickling is one of the traditional age old practice of food preservation. It is one of the easy and safe method of putting up fish and shellfish for preservation. Pickled products are considered as a good appetizer and important side dish. Pickling protects the food from spoiling due to reduced pH or acidic environment and also helps to retain its wholesomeness and nutritive value for a longer period of time <sup>[1]</sup>. Total marine fish landings of India in 2018 was 3.49 million tonnes, Out of which 6.5% was contributed by mollusks landings which included 2,773 tonnes of gastropods landings <sup>[2]</sup>. Number of mollusks species have been used for preparation of pickle by different authors such as clams, green mussel, blood clams, oyster, chunk, gastropods *Chicoreus ramosus* and *Babylonia spirata* <sup>[3-8]</sup>. But so far none of the studies have been carried out on preparation of turbo pickle. Edibility of *Turbo intercostalis* in India was earlier mentioned by Chari and Unny (1947) <sup>[9]</sup>. Thus the aim of this study was to prepare pickle from *Turbo brunneus* meat using different oils and its effect on chemical and sensorial quality.

**2. Materials and Methods****2.1 Sample collection and experimental condition**

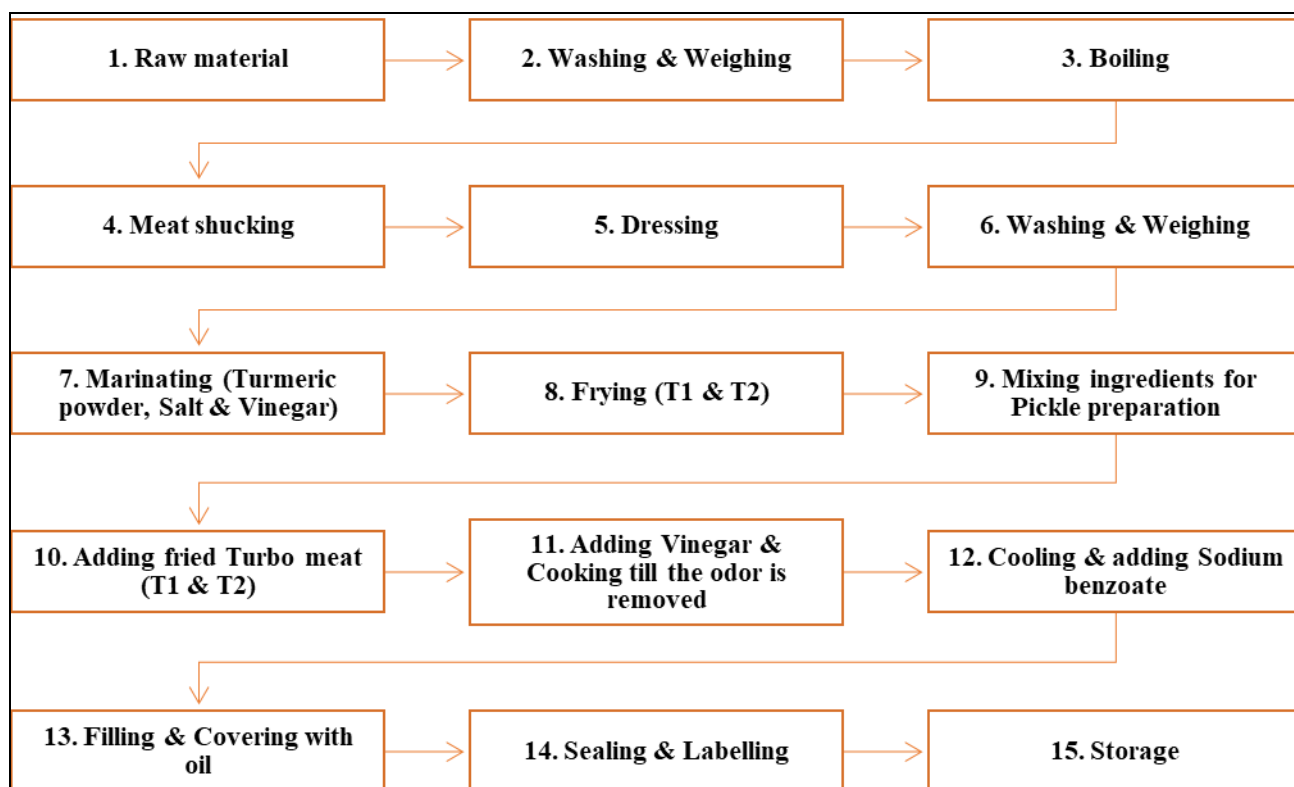
Initially 6 Kg live *T. brunneus* were collected from Jaleshwar sea coast, Veraval during low tide condition. *T. brunneus* samples were packed in icebox and transported to the laboratory at College of Fisheries Science, Veraval.

**2.2 Pickle preparation**

Firstly the samples were washed thoroughly with tap water. Afterwards the samples were boiled for 30 minutes for easy removal of meat from hard shell. Once after removal of meat from the shell dressing was done to remove the intestine and other unwanted organs and washed thrice with potable water and weighed. The washed meat was then marinated with turmeric powder, salt and vinegar for 1 hour to enhance the texture of the Turbo meat. After weighing Turbo meat were divided into 2 groups, one group was fried using groundnut oil and second group was fried using mustard oil and were named as T1 and T2 respectively. The fried meat was used for the preparation of pickle using the ingredients listed in Table 1.

Once after preparation of pickle it was allowed to cool and extra oil, vinegar and masala were added based on taste. It was then packed in plastic bottle and sealed and kept at room temperature for further analysis.

## 2.3 Process flow chart



Process flow chart

**Table 1:** Ingredients for *Turbo brunneus* meat pickle (per 1 Kg)

Sl. No.	Ingredients	Quantity (grams)
1.	Fresh Turbo meat	1000
2.	Ginger	120
3.	Green chilies	80
4.	Garlic	120
5.	Chili powder	120
6.	Cumin seeds	25
7.	Roasted Masala	10
8.	Fenugreek	10
9.	Asafetida	15
10.	Mustard	25
11.	Turmeric powder	10
12.	Curry leaves	10
13.	Vinegar	300 ml
14.	Salt	80
15.	Citric acid	10 ml
16.	Refined oil	400 ml
17.	Sodium benzoate	0.5

## 2.4 Analytical methods

Yield (%) was calculated for the Turbo meat processing by weight differences at each step of processing. Peroxide value (PV) was determined at 0 and 7 days of storage for T1 and T2 according to the method described by Nielsen (2003) <sup>[10]</sup>. pH of the pickle was also measured at 0 and 7 days of storage using digital pH meter. Sensorial quality was analyzed only after 7 days of storage based on the organoleptic test by scoring taste, odor, color and overall acceptability of T1 and T2 pickles. The evaluation of Turbo pickles were based on 9-point hedonic scale when 1, extremely dislike; 2, very much dislike; 3, moderately dislike; 4, slightly dislike; 5, neither like nor dislike; 6, slightly like; 7, moderately like; 8, very much like; 9, extremely like <sup>[11]</sup>.

## 2.5 Statistical analysis

All the statistical analysis were carried out in triplicates and data obtained were compared and analyzed using Microsoft Excel Version 2013 software.

## 3. Results and Discussion

### 3.1 Yield (%)

Referring to Table 2, it could be observed that yield (%) was very less in *T. brunneus* processing because in most of the molluscs the shell forms a huge proportion of body weight <sup>[12]</sup>.

**Table 2:** Yield (%) analysis of *Turbo brunneus* meat pickle production

No.	Particulars	Weight (Kg.)	Yield (%)
1.	Raw material ( <i>Turbo brunneus</i> with shell)	6.00	100.00
2.	Dressed <i>Turbo brunneus</i> meat	0.80	13.33
3.	Meat weight after frying	0.30	5.00

### 3.2 Peroxide value

The changes of PV as primary products of lipid oxidation are shown in Table 3. The PV content significantly increased in both the treatments during the 7 days storage. The highest value ( $2.47 \pm 0.03$  mEq/kg) of peroxide was recorded for the pickle prepared from mustard oil (T2), while the lowest value ( $2.24 \pm 0.13$  mEq/kg) was observed in the pickle prepared from groundnut oil. Since rancidity is inversely proportional to PV, it is inferential that the pickle prepared from groundnut oil was effective in slowing down the primary peroxidation compared to mustard oil <sup>[13]</sup>. Same values were recorded by Gupta and Basu (1985) for the pickle prepared from Blood Clam in which at 0 days of storage no PV was detected and it suddenly increased to 5.34 after 15 days of storage <sup>[4]</sup>.

### 3.3 pH value

The changes in pH value of T1 and T2 pickle are shown in Table 3. After 7 days of storage period it was observed that the pH of the pickle decreased in both the treatments, but it was statistically significant in case of T2, where pH value decreased from  $4.37 \pm 0.06$  (0 days) to  $3.92 \pm 0.10$  (7 days).

**Table 3:** Effect of oil and storage condition on PV and pH value of *Turbo brunneus* pickle

Storage days	Peroxide value (mEq / Kg)		pH value	
	T1	T2	T1	T2
0	Nil	Nil	$4.68 \pm 0.04$	$4.37 \pm 0.06$
7	$2.24 \pm 0.13$	$2.47 \pm 0.03$	$4.32 \pm 0.17$	$3.92 \pm 0.10$

### 3.4 Sensory Evaluation

Organoleptic evaluations of T1 and T2 pickle are shown in Table 4. Sensory qualities of the pickle showed that the pickle prepared from groundnut oil (T1) was having a good characteristic flavor, odor and taste compared to pickle prepared from mustard oil (T2).

**Table 4:** Sensory panel scores of T1 and T2 pickle after 7 days of storage

Treatment	Taste	Color	Odor	Overall acceptability
T1	$8.69 \pm 0.09$	$9.48 \pm 0.03$	$8.31 \pm 0.10$	$8.82 \pm 0.06$
T2	$7.90 \pm 0.10$	$8.23 \pm 0.11$	$7.86 \pm 0.04$	$7.99 \pm 0.08$

### 4. Conclusion

From the results it is apparent that the pickle prepared from groundnut oil showed a very good results in terms of taste, color and odor compared to mustard oil. Also pickle prepared from groundnut oil showed less peroxide value which indicates low level of lipid oxidation and thereby enhancing tenderness of seafood by restricting protein denaturation. However, more studies are still required to optimize the process for longer period of storage.

### 5. Popularization

The present study highlights the *T. brunneus* meat as an important meat pickle source that can be utilized just like other seafood and indicates the potential of underutilized fishery resources.

### 6. Acknowledgement

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