Miracle Everyday L44-F Shelf-Life Trials on King Mackerel (Surmai)

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ABSTRACT :

This study investigates the effect of Miracle Everyday L-44 F on the shelf life of Seer Fish. Whole Fish and steaks sourced from Pune based Retail shop, were treated with L-44 F at concentrations of 2 ml/litre, 2.5 ml/litre and stored at 4°C. Sensory evaluation and microbial analysis were conducted over a period of 48 hours. Results indicate that L-44 F significantly improved sensory attributes (Smell, Colour and Texture), and enabled shelf stability of Seer Fish in 48 hours.

BACKGROUND:

Kingfish, also known as king mackerel, is a popular saltwater fish species found in various parts of the world. Known for its distinctive flavour and firm texture, kingfish is prized in culinary circles and enjoyed by seafood enthusiasts. However, it is highly perishable and can result in financial losses and quality concerns for industry and consumers. One of the main challenges related to seafood spoilage is microbial contamination, which can be controlled by proper handling practices, storage temperature, and packaging methods. Currently, refrigeration and freezing are the most common methods for fish preservation. However, refrigeration alone cannot provide long shelf-life periods for fish and freezing can negatively impact the taste and texture of the product.

Therefore, there is a need for alternative preservation methods that can extend the shelf life of seafood without exposing it to freezing temperatures.

This fishes are also transported to other city markets away from the coastal catchment areas where these are harvested, and are highly perishable.

To address these concerns, lab scale trials were conducted to check the efficacy of L44-F in fish preservation at 4°C storage temperature.

Objective:

1. To determine the shelf life of kingfish (steaks and whole fish) treated with L44-F by inhibiting microbial contamination at 4°C storage.
2. To investigate how treatment with L44-F affects the sensory characteristics of kingfish.

EXPERIMENT DETAILS:

MATERIALS

- Food product: King Mackerel Steaks and Whole Fish
- Scientific name: *Scomberomorus cavalla*
- Variety Source : Seer Fish, sourced from Pune based Seafood Retail Shop. Supplies are received from Mumbai coastal fishermen.
- Treatment Agent: Miracle Everyday L44-F; (0.2% , 0.25%)
- Storage conditions: 4°C temperature in plastic containers

METHODOLOGY

1. Fresh king mackerel steaks (2 kg) and whole fish (2 Pieces) were brought from the local market.
2. Steak samples were equally divided into three parts for the study.

Control (C) – 500 g

Treated (T1). – 500 g

Treated (T2) – 500 g

Whole fish samples were equally divided into two parts for the study

Control (C0) – 1 kg

Treated (T0) – 1 kg

3. L44-F solution was diluted with RO water to a concentration

   T1 - 0.2% (2 ml/litre)

   T2 - 0.25% (2.5 ml/litre)

4. The fish samples were fully immersed in a diluted 2L solution L44-F and allowed to rest in cold temp. at 4 degree celesius.
5. After 2 hours, , the fish dipped solution was drained out and those treated whole fish and steaks were stored in a sanitized plastic container at cold temperature of 4°C for observations, designated as (T0), (T1) and (T2).
6. For the control sample, the fish were cleaned, RO water and stored in a sanitized plastic container in the refrigerator at 4°C temperature for observations, designated at (C0) and (C).
7. The initial microbial load was assessed by swab collection immediately after the treatment, i.e. after 2 hours.
8. Containers were taken out of the refrigerator every 24 hours for microbial and sensory analysis.
9. Microbial swabs were taken from fish' external surfaces to check for microbial load, including total viable count, *E.coli, Staphylococcus aureus*, yeast and mould by plating on suitable media plates.

10. Changes in colour, smell, texture and overall appearance were recorded to evaluate sensory analysis.
11. The experiment was concluded after 48 hours as control samples started to smell very foul and were unacceptable compared with treated which had no foul smell.

NOTE:

1. To collect microbial swabs and perform sensory analysis, the containers were opened on a working bench at room temperature (approximately 35°C) and microbial swabs were collected from the fish' external surface only.
2. Sensory analysis was performed by Laboratory team.

OBSERVATIONS:

Table 1: Microbial load in the samples after 0 hr of treatment

Sr. No	Sample	L44 F Treatment (ml/litre)	Total Viable Count	*Escherichia coli*	*Staphylococcus aureus*	Yeast & Mould
1	Whole Fish	Control	5*10^5	5*10^3	6.9*10^3	6.3*10^4
		2 ml	<10	Nil	Nil	1*10^3
2	Steaks	Control	1*10^5	8*10^2	6*10^2	1*10^4
		2 ml	11*10^4	Nil	Nil	2*10^3
		2.5ml	4*10^4	Nil	Nil	1*10^3

Table 2: Microbial load in the samples after 48 hr of treatment

Sr. No	Sample	L44 Treatment (ml/litre)	Total Viable Count	*Escherichia coli*	*Staphylococcus aureus*	Yeast & Mould
1	Whole Fish	Control	3.6*10^6	1*10^3	2.8*10^3	5.7*10^4
		2 ml	5*10^5	25*10^2	1*10^2	5*10^3
2	Steaks	Control	3.3*10^6	1.8*10^4	1.5*10^3	TNTC*10^3
		2 ml	4*10^5	1.2*10^4	7*10^2	7.9*10^4
		2.5ml	1*10^5	8*10^3	4*10^2	2.8*10^4

(TNTC: Too numerous to count)

SENSORY OBSERVATION:

- Based on the routine sensory analysis, the intensity of foul smell in the untreated control sample increased very fast as compared to both the treated sample. Among the treated, sample treated at 0.25% concentration had more acceptable smell than sample treated at 0.20% concentration.
- On the 3rd day of observations, the smell from the control sample was very unpleasant and unacceptable to consider the sample fit for consumption.
- The colour change in both samples was recorded and it was observed that L44-F treated steaks were slightly off-colour than original colour compared to control samples.

RESULTS:

- The treated fish samples were preserved for 3 days without developing a foul smell at 0.25% concentration.
- The microbial analysis showed lower microbial contamination in the L44-F treated sample compared to the control sample stored at 4°C.
- The treated steaks showed better sensory properties than the control samples regarding smell, and texture but the colour was affected.

CONCLUSION:

- The L44-F treatment at a concentration of 0.25% by dipping fish for 2 hours is effective in reducing microbial load and slowing down microbial growth in fish when stored at a temperature of 4°C.
- The study showed promising results in fish storage at 4°C, eliminating the use of ice thus saving energy and cost in processing and transport.
- The L44-F is effective in prolonging the shelf-life of fish naturally.
- The fact that the Sample of Seer Fish / King Mackerel was drawn from the Pune Market and that these were procured from Mumbai, indicates that these fish were already of a certain age after their harvest, and yet L 44 – F could enhance their shelflife beyond 2 days at 4 Deg C storage, establishes L 44 F treatment of 0.25% solution capably can improve shelf life of refrigerated prawns significantly beyond 2 days, and for superior results, treatment with L 44- F should be carried out immediately upon harvest.

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