Miracle Everyday L44-F Shelf-Life Trials on Prawns

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ABSTRACT:

This study investigates the effect of Miracle Everyday L-44 F on the shelf life of White Prawns. Prawns, sourced from a Pune-based retail shop, were treated with L-44 F at concentrations of 1.5 ml/litre and stored at 4°C. Sensory evaluation and microbial analysis were conducted over a period of 6 days. Results indicate that L-44 F significantly improved sensory attributes (Smell, Colour and Texture), and enabled shelf stability of Prawns up to 6 days.

BACKGROUND:

The shelf life of prawns is a significant concern for the seafood Industry and Trade. Current handling and storage practices can lead to microbial contamination, spoilage, poor quality and shorter shelf life. When prawns arrive at the processing facility, they are washed with chilled water and iced with flaked ice or crushed block ice for storage and distribution as well as processing of value-added products. Microbial growth and enzymatic activity are common causes of spoilage in prawns during storage. Currently, both raw and cooked prawns have limited shelf life when stored in the fridge for up to three days at a temperature of 0°C to 4°C.

These prawns 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 prawn preservation at 4°C storage temperature.

OBJECTIVE:

1. To improve the shelf life of raw prawns treated with L44-F by controlling microbial loads and their growth.
2. To investigate how treatment with L44-F affects the sensory characteristics of raw prawns.

EXPERIMENT DETAILS:

Materials

- Food Product: Prawns
- Scientific name: *Dendrobranchiata*
- Variety and Source: White Prawns, sourced from Pune based Seafood Retail Shop. Supplies are received from Mumbai coastal fishermen.
- Treatment solution: Miracle Everyday L44-F in RO Water
- Storage conditions: 4°C temperature in plastic containers

METHODOLOGY:

1. 1 kg of fresh white prawns were brought from the local market in Pune.
2. Prawns were equally divided into two parts for the study.
    a. Control (C) – 500 g
    b. Treated (T). – 500 g
3. L44-F solution was diluted with RO water to a concentration of 0.15% (1.5 ml/l).
4. The 500 g prawns designated (T) were fully immersed in a 2L solution of 0.15% L44-F and allowed to rest in cold temp. at 4 degrees Celsius.
5. After 2 hours, the prawns dipped solution was drained out and those treated prawns were stored in a sanitized plastic container at a cold temperature of 4°C for observations, designated as (T).

6. For the control sample (C), the prawns were cleaned in RO water and stored in a sanitized plastic container in the refrigerator at 4°C temperature for observations.
7. The initial microbial load was assessed by swab collection immediately after the treatment, i.e., after 2 hours of both the samples – Control (C), and Treated (T).
8. Containers were taken out of the refrigerator every 24 hours for microbial and sensory analysis.
9. Microbial swabs were taken from prawn external surfaces to check microbial count for Total Viable Count, *E.coli, Staphylococcus aureus*, Yeast and Mold by plating on suitable media plates.
10. Changes in colour, smell, and overall appearance were recorded to evaluate sensory analysis. Special attention was given to detecting signs of black rot development around the head region.
11. The experiment was concluded after 6 days as control samples started to smell very foul and were unacceptable compared with the 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 prawns' external surface only.
2. Sensory analysis was performed by the Laboratory team.

OBSERVATIONS:

Table 1: Microbial analysis of control and treated sample

	Prawn sample	Day 0	Day 6
Total viable count	Control (C)	32×10^5	TNTC x 10^5 Dilution
	Treated (T)	<10	49×10^5
Escherichia coli	Control (C)	4×10^3	TNTC x 10^3 Dilution
	Treated (T)	Nil	48×10^3
Staphylococcus aureus	Control (C)	TNTC x 10^3 Dilution	21×10^2
	Treated (T)	22×10^2	1×10^2
Yeast and Mould	Control (C)	TNTC x 10^4 Dilution	TNTC x 10^4 Dilution
	Treated (T)	3×10^3	1×10^3

Note : 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 the treated sample.
- On the 6th 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 prawns showed better retention of the original colour as compared to control samples. The development of black rot in the head region was also delayed in the treated samples compared to the control samples.

RESULT:

- The treated prawns were preserved for 6 days without the development of a foul smell at 0.15% 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 prawns showed better sensory properties than the control samples in terms of smell, colour and texture.

CONCLUSION:

- The L44-F treatment at a concentration of 0.15% by dipping prawns for 2 hours is effective in reducing microbial load and slowing down microbial growth in prawns when stored at a temperature of 4°C.
- The study showed promising results in prawns stored at 4°C, eliminating/reducing the use of ice thus saving energy and cost in processing.
- Thus, L44-F is effective in prolonging the shelf-life of prawns naturally.
- The fact that the Sample of Prawns was drawn from the Pune Market and that these were procured from Mumbai, indicates that these prawns were already of a certain age after their harvest, and yet L 44 – F could enhance their shelflife beyond 6 days at 4 Deg C storage, establishes L 44 F treatment of 0.15 % solution capably can improve the shelf life of refrigerated prawns significantly beyond 6 days, and for superior results, treatment with L 44- F should be carried out immediately upon harvest.

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