

# EFFECT OF DELAYED ICING ON THE QUALITY OF WHITE SHRIMP (*LITOPENAEUS VANNAMEI*) DURING CHILLED STORAGE

JEYAKUMARI ANNAMALAI<sup>1</sup>, REMYA SASIKALA, JESMI DEBBARMA, RAVISHANKAR CHANDRAGIRI NAGARAJARAO, ZYNUDHEEN ABUBACKER ALIYAMVEETIL, GEORGE NINAN, VENKATESHWARLU RONDA and LALITHA KUTTANAPILLY VELAYUDHANELAYADOM

Fish Processing Division, Central Institute of Fisheries Technology, Cochin 682 029, India

<sup>1</sup>Corresponding author.  
TEL: +91-96058-73642;  
FAX: +91-484-2668212;  
EMAIL: jeyat31@gmail.com

Received for Publication January 20, 2015  
Accepted for Publication July 5, 2015

doi:10.1111/jfpp.12539

## ABSTRACT

The effect of delayed icing on the quality of *Litopenaeus vannamei* was assessed by chemical, microbiological and sensory evaluation. Shrimps were divided into three lots. One lot was immediately iced and the other two lots were subjected to delayed icing after keeping in ambient conditions (30 ± 2°C) for 2 and 4 h, respectively. White shrimp had a moisture content of 77.21%, protein 18.80%, ash 1.47% and fat 1.30% on wet weight basis. Total volatile basic nitrogen, trimethylamine, thiobarbituric acid and K value showed increasing trend during chilled storage. It was observed that there is a significant ( $P < 0.05$ ) decrease in the hardness of shrimp meat during storage. Sensory evaluation indicated that the shelf life of white shrimp iced immediately after catch and 2 h delayed iced was approximately 9 days, whereas 4 h delayed iced sample had shortened shelf life of 6 days.

## PRACTICAL APPLICATIONS

Shrimp is one of the most traded and consumed aquatic product worldwide. Shrimps are rich in protein, containing very little fat and have significant cholesterol content. Shrimp is more prone to deterioration because of its high content of free amino acids and other soluble nonprotein nitrogenous substances that can serve as easily digestible nutrients for microbial growth. Chilled or iced preservation helps in delaying or reducing the bacterial growth, preventing browning and prolonging the shelf life of shrimp. Delayed icing of the catch at the site results in downgrading of the shrimp. The present study provides information about a baseline investigation of the shelf life and quality of Pacific white shrimp due to delayed icing. It can be useful to quantify the quality and shelf life of fresh shrimp prior to the application of preservative treatments to extend the shelf life.

## INTRODUCTION

Shrimps are extremely good source of protein, and are very low in fat and calories, making them a very healthy choice of food. Although it has high cholesterol, it is low in saturated fat (Ravichandran *et al.* 2009). Indian shrimp industry remains as one of the major players in the Indian economy. The country's marine product exports crossed USD 5 billion during 2013–2014 with a major contribution of 64.12% from the frozen shrimp and the export has also grown with the major contribution of 73.31% from the cul-

tured shrimp in the total shrimp exports. The present dramatic growth in the cultured shrimp production is due to the introduction of *Litopenaeus vannamei* in India. The *L. vannamei* shrimp production has increased from 91,171 MT in 2012–2013 to 175,071 MT in 2013–2014 (MPEDA 2014). Freshness of shrimp is an important factor that determines its commercial value and potential for export. One of the main preoccupations of seafood industry is to improve or maintain the quality of perishable foods to reach a final product with optimal quality. Among various methods currently used, the most important are those based