Quality Changes of Fresh and Frozen Mussels During Storage

By

Markos . N . Legas

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Supervised by: Dr Evangelos Evmorfopoulos
John Tsaknis MPhil

School of Applied Science and Technology
University of Humberside
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Abstract

Although mussel is an important food commodity , relative little work has been carried out on the quality of frozen mussels in relation to the storage time and quality changes that occur during storage .

This study was carried out to determine the biochemical and quality changes in mussels (*M. edulis* and *M. galloprovinciallis*) during frozen storage .

A domestic freezer was used to freezing the mussels at -15 °C and the mussels analysed at 0 , 30 , 60 , 90 , 120 days .

Better quality , as measured by protein extractability , water holding capacity (WHC) , Total Volatile Basis Nitrogen (TVBN) , pH , Free Fatty Acids (FFA) , TBA number (Standard TBA method and determination by HPLC) , Count of mesophilic , psychrophilic flora and E.coli .

Changes in tocopherols levels and also histological sections to observe the tissue damage during frozen storage .

The chemical composition of mussels found to be :
Moisture : 82% , Crude protein (% wwb) : 14,1% , Total fat (%wwb) : 1,8% and Ash (%wwb) : 1,3%

The histological sections of mussels showed that frozen storage increased the damage to muscle fibre breakage and cracking on connective tissue . Also , granulation of mussels cells was observed .

The microbiological examination showed a decline in mesophilic flora from cfu (fresh mussels) : 840 cells/g to 94 cells/g . The psychrophilic flora increased from 0 cells/g to 110 cells/g.The E. coli test was negative .

The TVBN increased from 19,9 mg/100g flesh (fresh mussels) to 112 mg/100g flesh .
The protein solubility decreased from 65,2% to 22,4% , the pH decreased from 6,55 (fresh mussels) to 5,92 and Water Holding Capacity (WHC) is reduced during frozen storage . WHC expressed as percent moisture loss and for fresh mussels the % moisture loss was 10% and after 120 days of frozen storage was 30,1% .

The percent (%) of free fatty acids (FFA) increased from 0.02% (fresh mussels) to 18,8% and also the TBA number increased from 0.75 10^{-7} mg malonaldehyde/kg flesh to 1.03 10^{-6} mg malonaldehyde/kg flesh (using standard TBA method) and also 0.38 10^{-7}mg malonaldehyde/kg flesh (fresh mussels) to 9.01 10^{-7} mg malonaldehyde/kg flesh (using HPLC).

The tocopherols levels decreased slightly for :

- a- tocopherols : from 3,963 PPM (fresh mussel) to 3,239 PPM
- D- tocopherols : from 7,491 PPM (fresh mussel) to 5,765 PPM

The analytical data showed that the protein denaturation was very high during frozen storage and the mussels are unacceptable to consume using the experimental freezing procedure .

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Markos N. Legas

Dedication

To my parents who gave me life and love

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