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Quality Improvement of Frozen Fish Fillet Using Natural Antioxidants

A Thesis Presented By

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7. SUMMARY

For quality assessment of some frozen fish fillets, Seventy four random samples of marketed frozen fish fillets; 37 each of, local frozen Tilapia fillets and imported frozen Basa fillets, were randomly collected from different fish markets in Tanta city, El-Gharbia governorate, Egypt. The collected samples were identified and separately wrapped in sterile polyethylene bags and directly transferred in an insulated ice box to the laboratory with a minimum delay for further examination.

The collected samples were subjected to chemical analysis (pH, total volatile base nitrogen-TVB-N, thiobarbituric acid reactive substances-TBARS) and bacteriological examination (Aerobic Plate Count, Psychrotrophic count, Coliforms count).

According to chemical analysis, mean values of pH were 6.04 ± 0.03 for local frozen fish fillet samples and 6.28 ± 0.01 for imported frozen fish fillet samples, while mean values of TVB-N were 8.60 ± 0.49 mg% for local frozen fish fillet samples and 13.71 ± 0.71 mg% for imported frozen fish fillet samples, also TBARS mean values were 1.94 ± 0.11 mg/kg for local frozen fish fillet samples and 3.05 ± 0.14 mg/kg for imported frozen fish fillet samples.

The average Aerobic Plate Counts in local and imported frozen fish fillet samples were $4.9 \times 10^7 \pm 1.6 \times 10^7$ and $1.9 \times 10^7 \pm 9 \times 10^6$ cfu/g, respectively, while Psychrotrophic counts were $5.3 \times 10^7 \pm 2 \times 10^7$ and $1.2 \times 10^7 \pm 6 \times 10^6$ cfu/g, respectively. Coliforms mean values in local and imported frozen fish fillet samples were $5.8 \times 10^6 \pm 5 \times 10^6$ and $8.3 \times 10^6 \pm 6 \times 10^6$ cfu/g, respectively.

In order to improve frozen fish fillets quality, eighteen samples of local frozen Tilapia fillets with average weight = 400 – 500 g were purchased from different fish markets in Tanta City, El-Gharbia governorate, Egypt. Then, the samples were wrapped in sterile polyethylene bags and directly transferred to the laboratory in a sterile icebox with a minimum of delay for further preparation.

Collected samples were divided into 6 groups:

Group 1: used as a control (untreated)

Group 2: Treated with BHT 0.02%

Group 3: Treated with Rosemary oil 1% (R1)

Group 4: Treated with Rosemary oil 1.5% (R2)

Group 5: Treated with Thyme oil 1% (T1)

Group 6: Treated with Thyme oil 1.5% (T2)

Each group of treated and control fillets was separately packed. Then, fillets packages were labeled and stored at 4°C on the refrigerator shelf. The treated groups were examined at zero-day (after one hour of treatment) for sensory evaluation, chemical analysis, and bacteriological examination, then periodical examination every two days was done for treated and control fish fillets except sensory evaluation every day up to spoilage of all the examined samples. Three trials were done for all the experiments during different weeks with the same steps in each trial.

According to the results of sensory evaluation in this study, it could be concluded that the high concentration of Thyme and Rosemary oils such as 1.5% offered the best sensory quality. The overall acceptability for all samples decreased gradually with storage time until became the least score at the 6th day of storage due to spoilage of the samples. The control and BHT samples were rejected at the 4th day of storage, while the others spoilage on

the 6th day after the spoilage of control samples by 2 days and this indicated that the used antioxidants increased the shelf life of samples 2 days longer.

pH values reported in the current study were significantly higher ($p < 0.05$) in the control group than other groups. The pH values increased with longer storage period and the lowest pH values were obtained from group T2.

Increasing the mean values of TVB-N was observed with longer storage periods ($P < 0.05$). Highest TVB-N values were observed in the control group and samples treated with T2 had the lowest levels of TVB-N compared to the other samples.

As regards to TBARS values, all samples showed an increased TBARS value in frozen fish fillets when the frozen storage time increased ($P < 0.05$). Results showed that TBARS values of the control sample increased sharply during storage. The lowest TBARS values were obtained from group T2.

A gradual increase in Aerobic Plate Count, Psychrotrophic count and Coliforms count with storage duration increase, significant ($p < 0.05$) difference was found during storage study of fish fillets sample.

The quality of frozen fish fillets was studied, as well as the effect of some treatment methods on fish fillets quality was detected. The recommended methods of treatment to prolong the shelf-life of frozen fish fillets were mentioned.