

**EVALUATION OF QUALITY AND SAFETY FOR
SOME PROCESSED FOODS IN RELATION
TO ENZYME ACTIVITY**

By

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B.Sc. Agric. Sci. (Food Technology), Ain Shams University, 2008

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ABSTRACT

Eman Kamal Nabih Hanafi : Evaluation of Quality and Safety for some Processed Foods in Relation to Enzyme Activity. Unpublished M.Sc. Thesis, Department of Food Science , Faculty of Agriculture, Ain Shams University, 2014.

The main objective of this work was to follow the quality and safety parameters for frozen blanched green beans during 6 months of frozen storage at $-18\pm 2^{\circ}\text{C}$, refrigerated pasteurized orange juice during 60 days of refrigeration at $4\pm 1^{\circ}\text{C}$ and boliti fish under refrigeration at $4\pm 1^{\circ}\text{C}$ through 12 days. The changes in physicochemical properties, microbiological assessment and assay of activity for some enzymes were studied. Also, the sensory evaluation for all selected food items were undertaken.

Data revealed that, an increasing of ash contents was noticed in blanched green beans presoaked in solution of mixed chemicals before blanching. The green beans samples blanched by microwave had the highest retention of ascorbic acid followed by steam and boiling water, respectively. The loss of total chlorophylls was increased by increasing the blanching time. Also, the blanching of green beans in boiling water gave the best color parameters than other blanching methods used in this investigation. However, the presoaking of green beans in solution of mixed chemicals contained 0.5% potassium metabisulphite, 0.1% magnesium oxide and 0.1% sodium bicarbonate caused to obtain the bright green color as magnesium oxide and sodium bicarbonate present in the blanching media. Consequently, results illustrated that, the blanching in boiling water was more effective than other blanching methods for reduction of total viable bacterial counts, psychrophilic population, yeasts and molds, and coliform group during 6 months of frozen storage at $-18\pm 2^{\circ}\text{C}$, particularly when chemical media is used. While, the

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blanching by microwave had the lowest reduction effect on microbial counts. On the other hand, the activity of selected enzymes under investigation were reduced by increasing the time of blanching and the frozen storage period up to 6 months. The blanching in boiling water was the best treatment to inactivate peroxidase, catalase and ascorbic acid oxidase followed by microwave blanched samples for 60 sec. which presoaked in solution of mixed chemicals. Meanwhile, the reactivation of peroxidase was noticed after 4 months of storage at $-18\pm 2^{\circ}\text{C}$ in some samples. Frozen blanched green beans in boiling water with the mixed chemicals for 2 min. recorded the highest scores of sensory parameters for organoleptic test among other frozen blanched green beans.

Results also showed that, the pasteurization of orange juice led to decrease the moisture and ash contents and, total soluble solids by extending the refrigeration storage at $4\pm 1^{\circ}\text{C}$. However, the loss of ascorbic acid was increased by increasing the refrigeration storage period. Also, the highest retention of ascorbic acid was noticed for orange juices pasteurized by microwave. Moreover, the browning rate was higher for juice pasteurized by heating than that of both the control and pasteurized by microwave, at zero time. Furthermore, pasteurization by heating for 4 min. had the highest reduction of total viable bacterial counts, psychrophilic population and, yeasts and molds counts followed by juice pasteurized with microwave for 60 sec. However, an incremental patterns in microbial populations were observed by increasing the time of refrigeration storage up to 60 days. On the other hand, the pasteurization by heat for 4 min. and microwave for 60 sec. was more effective for inhibiting the activity of pectin-methyl esterase and ascorbic acid oxidase. Also, a gradual loss of enzyme activity was recorded for pasteurized orange juices by extending the shelf-life of orange juices by refrigeration up to 60 days. The highest scores of sensory evaluation was observed for orange juice pasteurized by microwave for 60 sec.

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Consequently, the Nile boliti fish were stored under refrigeration at $4\pm 1^{\circ}\text{C}$ after immersing in aqueous solutions of acetic acid (AA, 1%), citric acid (CA, 3%) and mixing between (1% AA+ 3% CA) for 5 minutes. Results indicated that, the suggested used aqueous solutions for immersing of fish were significantly ($P \leq 0.05$) affected on the chemical composition, particularly for the lipid and protein contents. However, significant ($P \leq 0.05$) reduction in thiobarbituric acid concentration and total volatile nitrogen were assessed for the fish samples that were immersed in the aqueous solutions when compared with the control. Moreover, the aqueous solutions of used acids caused to reduce various categories of spoilage microorganisms. On the other hand, by increasing the storage period of fresh boliti fish at $4\pm 1^{\circ}\text{C}$, the microbial counts and both of catalase and protease activity were gradually increased. Whereas, the combination of the aqueous solution of AA and CA could be the most effective for reducing catalase and protease activity during storage period up to 12 days. A gradual decrease ($P \leq 0.05$) in sensory attributes was observed by extending the shelf-life of refrigerated boliti fish up to 12 days at $4\pm 1^{\circ}\text{C}$. Whereas, the fish that have been immersed in 3% CA solution were more acceptable than other used treatments after 12 days of storage.

Key words: Green beans, Orange juice, Boliti fish, Blanching, Physicochemical, Browning index, Microbiological assessment, Enzymes assay, Peroxidase, Catalase, Ascorbic acid oxidase, Pectin methyl-esterase, Protease, Sensory evaluation.

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