# UTILIZATION OF CRAYFISH IN SOME FISHERY PRODUCTS

By

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B.Sc. Agric. Sc. (Food Science), Al-Azhar University, 2004
M.Sc. Agric. Sc. (Food Sc & Tech), Zagazig University, 2010

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# ABSTRACT

**Mohamed Abd-El-HadeyIbrahiem Mahmoud: Utilization OF Crayfish in Some Fishery Products. Unpublished Ph.D. Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2017.**

The main objective of this study was to take advantage of crayfish found in River Nile, which does not have acceptance from the Egyptian consumers in the fresh state, for manufacturing of certain fish products, which include (canned crayfish - crayfish burger). The study also aims to use the resulting waste in getting some vital compounds such as chitosan and carotenoids, which increases the quality of the product.

The results of chemical analysis, for both of freshwater crayfish and shrimp: - The flesh of crayfish contained 76.81% moisture, 19.18% protein, 1.95% fat, 1.49% ash, 0.57% carbohydrates. For the physicochemical properties 4.06 TVBN, 0.63 TMAN, Microbial content 5.324 Log 10 CFU / g TBC, and pH 6.97. While the shrimp meat contained 76.38% moisture, 19.53% protein, 1.86% fat, 1.55% ash, 0.68% carbohydrates, 4.68 TVBN, 0.79 TMAN, 5.892 Log 10 CFU / g TBC and pH 6.86. Crayfish wastes contained 63.80% moisture, 9.24% protein, 3.25% fat, 11.07% ash, 12.64% carbohydrate.

Chemical composition, physicochemical and functional properties for both extracted and commercial chitosan show higher content of moisture, total nitrogen, ash, DDA, solubility in commercial chitosan when compared with extracted one, while extracted chitosan increased its ability to bind both oil and water compared to commercial one. The antioxidant activity of the extracted chitosan was higher than that of commercial chitosan and carotenoids. By studying the chemical composition, it was observed that there was a gradual decline in moisture ratios, protein and fat in all treatments through the different periods of storage, and the highest rate of decline was in the control sample, followed by treatment of a mixture of spices.

While there was a gradual increase in the ash in all treatments and the highest rate of increase was observed in canned shrimp then in the treatment of carotenoids. All treatments characterized by stable quality standards during the storage period and were within the limits.

While for color, its density decreased gradually in all treatments except for that in the case of the canning treatment using carotenoids where the decline in the color is not noticeable. By studying ranciditystandards, which included: acid value, peroxide value, anisidene value and total oxidation, results indicated an insignificant gradual increase in the all previous parameters of lipids extracted from the samples during different storage periods and that all these measures were below critical levels.

All treatments showed confirmed high degree of stability against rancidity factors during different storage periods and even after the sixth month of storage. The results showed that there is slightly increase in the logarithm of the number of bacteria during storage at room temperature 20 °C for 6 months in all canning treatments. The most increased treatments in the total number of bacteria during storage are canned shrimp then control canned crayfish sample, followed by canned crayfish using a mixture of spices. The highest bacterial spores during storage at room temperature was recorded in canned crayfish using a mixture of spices, then canned shrimp, followed by the control sample.

The obtained results showed that sensory evaluation of the samples of canned shrimp and crayfish by different treatments had high degree of consumer acceptance and that properties of color and quality were improved by adding carotenoids, but the canned smoked crayfish had not had high acceptance degree of consumer. Adding 0.5% chitosan (extracted and commercial) and carotenoids to crayfish burger treatments reduced the rates of loss of moisture, protein, fat and increased content of ash during frozen storage at -18 °C for 3 months, and the highest rates of increase of

ash was recorded in the carotenoids treatment followed by commercial chitosan treatment, than extracted chitosan treatment.

Physiochemical analyses such as pH, TVB-N, TMA-N of burger treatments showed that the addition of 0.5% chitosan (extracted and commercial) and carotenoids led to maintain product quality and reduce the rate of increase of above parameters of the three treatments compared to the control during frozen storage for a period of three months.

Where the low decline rates of color intensity during frozen storage for a period of three months recorded in the carotenoid treatment when compared to other treatments. The addition of 0.5% chitosan (extracted and commercial) and carotenoids improved the efficiency of the correlation with water in the product. Efficiency correlation with water increased better in the treatment of extracted chitosan if compared to the control sample. Loss rate by cooking decreased by adding 0.5% chitosan (extracted and commercial), while increasing the proportion of cooking loss during the freeze storage was seen more in the control treatment and carotenoids.

The results showed that adding 0.5% chitosan (extracted and commercial) and carotenoids improved degree of stability against oxidation and rancidity of lipids extracted from the samples during storage freeze. The addition of 0.5% chitosan (extracted and commercial) and carotenoids to freshwater crayfish burger samples decreased the logarithm of the number of bacteria and coliform bacteria during the period of the freeze storage. The results showed that the addition of 0.5% chitosan (extracted and commercial) and carotenoids resulting in improved sensory characteristics of the cooked crayfish burger samples by grilling method when compared to the control.

**Key words:** Crayfish wastes, chitosan, carotenoids, canned fishery products, fish burger, antioxidant activity, functional properties.

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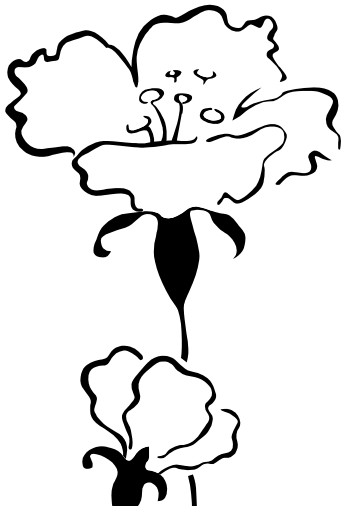

# DEDICATION

*To*

*My Father,*

*My Mother,*

*My wife,*

*& All My Friends*

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