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SAFETY AND QUALITY OF MARINATED DEBONED CHICKEN THIGHS MEAT

Thesis Presented By
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Hygiene and Control of Meat and Its Products

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Abstract

Key Words **(**marinated chicken shish, immersion, mixing, ginger and cardamom oleoresins**)**

The objectives of the current study were to evaluate the quality of marinated chicken shish present in Cairo markets and to study the effect of addition of ginger and cardamom oleoresins (natural antioxidants) to commercial marinades and marination techniques on the quality and safety of chicken thigh fillet. For the 1st objective, a total of 33 marinated chicken shish (15 raw chilled marinated chicken shish "RCCS", 10 raw frozen marinated chicken shish "RFCS" and 8 half cooked frozen chicken shish "HCFCS") were examined for their sensory attributes, deterioration criteria (pH, Thiobarbituric acid value "TBA" and Total volatile basic nitrogen "TVBN") and bacterial load. The results revealed that all marketed chicken shish samples were of low sensorial scores especially for the odour (raw samples) and flavour (cooked samples)).The TBA values of all examined samples were higher than the acceptable values for meat products (0.9 mg mal/ kg). The pH values of RCCS and the TVBN values of all samples were in borderline. The bacterial examination revealed that the count of all bacteria of chilled marinated chicken shish were significantly ($P<0.05$) higher than those of raw and half cooked marinated chicken shish. For the 2nd objective, deboned chicken thighs were purchased from local dressed chicken plant in Cairo, Egypt. Two marinades were used for marination of the chicken thigh fillets; the 1st marinade consisted of common salt, polyphosphates, white pepper, citric acid, however, the 2nd marinade consisted of the same as 1st marinade plus ginger and cardamom oleoresins. Then two experiments were applied , experiment A to detect the effect of marinades by using immersion only for five hours three groups was designed (Control; immersion in water, Marinade 1 group; immersion in marinade 1; Marinade 2 group; immersion in marinade 2). While, experiment B was applied to detect the effect of marination by different techniques (immersion, mixing and combination of them) chicken thigh fillet CTF were divided into five groups: the I group was marinated by immersion in the marinade solution for 5h, the M1h group was marinated by mixing in blunt paddle mixer for 1h, the M2h group was marinated by mixing in blunt paddle mixer for 2h, M1h+I group was prepared by mixing in paddle mixer for 1h then immersion until 5h, the M2h+I group was marinated by mixing for 2h then immersion until 5 h. All groups were kept at 4°C for ten days. Samples were examined immediately after marination and every other day until the objective signs of deterioration appeared or the values of incipient decomposition exceeded the permissible limit. Mixing was superior to immersion for improving the marinated chicken quality. Addition of ginger and cardamom oleoresins to the marinade significantly improve sensory attributes and reduce deterioration criteria and microbial load of marinated deboned chicken thigh meat. Combining mixing with immersion marination techniques resulted extension of shelf life and significant improvement of the chicken thigh quality. Therefore, combining mixing with immersion can be recommended for food industry to improve the quality of marinated deboned chicken thigh meat.

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RCCS	**Raw Chilled Chicken Shish**
RFCS	**Raw Frozen Chicken Shish**
HCFCS	**Half Cooked Frozen Chicken Shish**
pH	**Hydrogen ion concentration**
TBA	**Thiobarbituric Acid Value**
TVBN	**Total Volatile Base Nitrogen**
APC	**Aerobic Plate Count**
PSC	**Psychrotrophes Count**
CFU	**Colony Forming Unit**
CTF	**Chicken Thigh Fillet**
I	**Immersion**
M1h	**Mixing 1 hour**
M2h	**Mixing 2 hour**
M1h+I	**Mixing 1hour plus Immersion**
M2h+I	**Mixing 2hour plus Immersion**

1-Introduction

Poultry meat constitutes 30 % of the Egyptian meat consumption and 38 % of the world meat consumption *(**Chouliara et al., 2007; FAOSTAT, 2009**)*and this could be referred to low production cost, easy digestibility, low fat content with high concentrations of polyunsaturated fatty acids, and high protein content ***(Barbut,2002)***. The higher production rate attracted the attention of researchers and producers to ensure the safety, palatability and attractiveness of poultry meat to satisfy the consumer's needs. Marination is one of the techniques that have been used to improve tenderness, juiciness, flavor, color and cooking yield ***(Yang and Chen, 1993).***

The natural antioxidants found in plants have gained considerable interest for their role in preventing auto-oxidation of fats and oils products ***(Reddy et al., 2005).***The antioxidant properties of herbs, spices, plant and other food extracts are apparently related to their phenolic content, suggesting that antioxidant action is similar to that of synthetic phenolic antioxidants ***(Lai et al., 1991).***Since the worldwide trend towards the use of natural additives in food ***(Yanishlieva and Marinova, 2001)***; natural plants are considered an important target to investigation in order to provide a new source of natural antioxidants and/or antimicrobial agents from a safety view point.

Nowadays, marinated chicken products have been consumed by huge quantities by all Egyptian consumer categories, therefore, the commercial production of these products have been increased. Several methods have been used to marinate meat including immersing meat in marinade, injection of marinade into meat and vacuum tumbling of meat with a marinade or combination of injection and tumbling ***(Bauermeister and MacKee, 2005; Smith and Young, 2007).***Commercial marination usually involves a more complex solution of water, salt, polyphosphate, flavorings and other ingredients ***(Smith and Acton, 2001;***