

Author	Fadwa Fathy Mahmud Mohamed
Title	Control of Some Biological and Chemical Hazards in Chicken Meat
Faculty	Veterinary Medicine, Suez Canal University.
Department	Hygiene and Control of Meat, Fish and their Products and Animal by-products
Degree	Doctor of Philosophy in Veterinary Medicine.
Language	English
Supervisory committee	<p>Prof. Dr. Ali Meawad Ahmed Professor of Meat Hygiene Vice Dean Fac. Vet. Med Fac. Vet. Med., Suez Canal University</p> <p>Prof. Dr. Mohamed kamal Moursi Chief Researcher Central Laboratory for Veterinary Quality Control on Poultry Production Ismailia Satellite</p>
English abstract	<p>The study was conducted to control some biological and chemical hazards in chicken meat. A total of 385 fresh chicken carcasses were purchased from different commercial markets in Ismailia governorate. According to The Egyptian Organization for Standardization and Quality Control, 83.33% and 53.33% of the total examined samples were unfit for human consumption and microbiologically rejected based on total aerobic and enterobacteriaceae counts, respectively. E. coli prevalence was 49.41 and 47.06% in breast and thigh samples, respectively. Salmonella spp. prevalence in breast and thigh samples was 9.41 and 7.06%, respectively. Screening of antibiotic residues of ciprofloxacin, oxytetracycline and gentamicin was 100%, 96% and 54%, respectively. Treatment of chicken meat with 5% and 7% TSP and dipping for one minute was a significant factor in reducing the pathogen populations. The cooking processes cannot annihilate the total concentration of the antibiotic residues but it can only decrease their concentrations. Suggestions and recommendations for improving the safety and quality of chicken meat were given.</p>
Keywords	Biological hazards, Chemical hazards, TSP, Cooking, Chicken Meat, HPLC, Boiling, Frying.

Contents

Subject	Page
Introduction	1
Review of Literature	4
1. Biological hazards of chicken meat	4
1.1. Sources of bacterial contamination	4
1.2. Total bacterial counts	10
1.3. <i>E. coli</i>	14
1.4. <i>Salmonella spp.</i>	17
1.5. Public health significance of pathogenic microorganism	21
2. Chemical hazards of chicken meat	24
2.1. Antibiotic residues	24
2.1.1. Ciprofloxacin	26
2.1.2. Oxytetracycline	30
2.1.3. Gentamicin	32
2.2. Significant importance of antibiotic residues	34
3. Control of biological hazards using trisodium phosphate	42
4. Control of chemical hazards using traditional techniques	47
Materials and Methods	50
Results	66
Discussion	81
Conclusion and Recommendations	95
References	100
English Summery	133
Arabic Summery	í

Annex of Materials and Methods

No.	Title	Page
Image 1	Ismailia governorate map.	50
Image 2	Raosoft sample size calculator website.	51
Image 3	Experimental design.	51
Table I	Biochemical characteristics of <i>E. coli</i> .	55
Table II	Polyvalent and Monovalent antisera <i>E. coli</i> .	56
Table III	Biochemical characteristics of <i>Salmonella spp.</i>	58
Table IV	Interpretation of inhibition zones in agar diffusion method for antimicrobial susceptibility testing.	59
Table V	Maximum Residue Limits (MRL) of ciprofloxacin in chicken.	60
Table VI	Maximum Residue Limits (MRL) of oxytetracycline in chicken.	61
Table VII	Maximum Residue Limits (MRL) of gentamicin in chicken.	63

List of Tables

No.	Table title	Page
1	Statistical analytical results of total aerobic count (log cfu/g) for chicken meat samples (n=150).	66
2	Statistical analytical results of enterobacteriaceae count (log cfu/g) for chicken meat samples (n=150).	67
3	Wholesomeness of chicken meat based on Egyptian Standard for total aerobic and enterobacteriaceae counts limits.	68
4	Prevalence of <i>E. coli</i> isolated from chicken meat samples (n=85).	69
5	Frequency distribution of serotyped <i>E. coli</i> . isolates	69
6	Prevalence of <i>Salmonella spp.</i> isolated from chicken meat samples (n=85).	70
7	Frequency distribution of serotyped <i>Salmonella</i> isolates	70
8	Antibiogram of serotyped <i>E. coli</i> isolates from chicken meat samples (n=30).	71
9	Antibiogram of serotyped <i>Salmonella</i> isolates from chicken meat samples (n=5).	71
10	Statistical analytical results of ciprofloxacin residues (ppm) in chicken meat samples (n=50).	72
11	Statistical analytical results of oxytetracycline residues (ppm) in chicken meat samples (n=50).	73
12	Statistical analytical results of gentamicin residues (ppm) in chicken meat samples (n=50).	74
13	Prevalence of antibiotic residues in chicken meat samples.	75

List of Tables

14	Maximum Residue Limits (MRL) for antibiotic residues in chicken meat samples.	76
15	Effect of different concentrations of trisodium phosphate for one minute treatment on samples inoculated with <i>E. coli</i> O169.	77
16	Effect of different concentrations of trisodium phosphate for one minute treatment on samples inoculated with <i>S. edinburg</i> .	78
17	Effect of cooking on antibiotic residue levels in chicken meat	79

List of Figures

No.	Figure title	Page
1	Mean values of total aerobic count of chicken meat samples.	66
2	Mean values of enterobacteriaceae count of chicken meat samples.	67
3	Wholesomeness of chicken meat based on Egyptian Standard for total aerobic and enterobacteriaceae counts limits.	68
4	Mean values of ciprofloxacin residues in chicken meat samples.	72
5	Mean values of oxytetracycline residues in chicken meat samples.	73
6	Mean values of gentamicin residues in chicken meat samples.	74
7	Prevalence of antibiotic residues in chicken meat samples.	75
8	Maximum Residue Limits (MRL) for antibiotic residues in chicken meat samples.	76
9	Effect of different concentrations of trisodium phosphate for one minute treatment on samples inoculated with <i>E. coli</i> O169.	77
10	Effect of different concentrations of trisodium phosphate for one minute treatment on samples inoculated with <i>S. edinburg</i> .	78
11	Effect of cooking on ciprofloxacin residue levels in chicken meat.	79

List of Figures

12	Effect of cooking on oxytetracycline residue levels in chicken meat.	80
13	Effect of cooking on gentamicin residue levels in chicken meat.	80