

**THE ANTIMICROBIAL EFFECT OF SOME
AROMATIC PLANT EXTRACTS ON *Campylobacter*
spp. IN CHICKEN MEAT**

By

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B.Sc. Agric. Sci. (Food Industries), Fac. Agric., Baghdad Univ., 2001

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ABSTRACT

This study was conducted to study the antimicrobial effects of garlic, mint, onion and turmeric extracts on *Campylobacter* spp. The presence of *Campylobacter* spp. was assessed from raw chicken at retail level and it was found in whole chicken in leg pieces part and was identified as *Campylobacter jejuni*. The mint essential oil (EO) extract gave the highest antimicrobial activity with inhibition zone (more than 20 mm) against *C. jejuni*. While, onion was giving active inhibition zone ranged between 16 to 19 mm. The lowest Minimal Inhibitory Concentration (MIC) value against *C. jejuni* was (0.01%) and (0.14%) for mint EO and onion extract, respectively. Mint EO was analyzed using a gas chromatography-mass spectrometry technique and Carvone (56.87%) presented the main component. Also quercetin and quercetin7-O- β -D-glucopyranoside were identified from onion ethyl acetate extract using NMR. The effect of Mint EO and onion extracts were tested in chicken leg meat stored at 4°C and -18°C inoculated with *C. jejuni* at a level of 10⁶ cfu/g meat. *C. jejuni* counts of untreated chicken leg meat were 2.14 (log cfu/g) after 7 days of storage. While *C. jejuni* counts of mint EO treated chicken leg meat were not detected after 7 days of storage at 4°C. Also *C. jejuni* counts of onion extract treated chicken leg were 1.3 (log cfu/g) after 7 days of storage at 4°C. Total aerobic and anaerobic microbial counts, yeast and mold as well as *Salmonella* spp. and *Pseudomonas* spp. were enumerated on chicken legs. Also thiobarbituric acid (TBA) value, pH value and total volatile basic nitrogen (TVBN) were measured. The results indicated that, addition of 2% of either mint EO or onion extract reduce *Campylobacter jejuni* counts as well as improve the microbiological and chemical quality that was extended the shelf-life of raw chicken leg meat.

Key words: *Campylobacter jejuni*, Chicken meat, Mint EO, Onion extract, Shelf-life.

DEDICATION

I would like to dedicate this work to my dear beloved parents, which their endless love have supported me and constantly empowered me to overcome difficulties and frustrations in my career. Whenever, I needed them, they were always there to patiently listen to me and give me encouragement, may Allah protect them. I also want to thank my sister, who has always encouraged and inspired me.

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LIST OF ABBREVIATIONS

UV	Ultraviolet
AlCl ₃	Aluminum chloride
MeOH	Methanol
NaOAc	Sodium acetate
HCl	Hydrochloric acid
DMSO	dimethyl sulfoxide
h	hour
°C	Celsius
mm	millimeter
ml	milliliter
μl	microliter
g	Gram
w/v	Weight per volume
v/v	Volume per volume
min	Minute
CFU	Colony Forming Unit
GC/MS	Gas chromatography/ mass spectrometry
TLC	Thin layer chromatography
NMR	Nuclear Magnetic Resonance
EO	Essential oil
ESI-MS	Electrospray Ionization/ Mass Spectrometry
NaOMe	Sodium methoxide
mCCDA	modified Charcoal Deoxycholate Agar
TVC	Total Viable Count

DDW	deionized distilled water
TBA	Thiobarbituric acid
PCA	Plate Count Agar
TCA	trichloroacetic acid
TVBN	Total volatile basic nitrogen
rpm	Revolution per minute
nm	Nanometer
N	Nuclide
MIC	Minimum Inhibitory Concentration
Hz	Hertz
d	doublet
dd	doublet of doublets
J	Indirect dipole dipole coupling
δ	Chemical shift
ppm	Part per million
$+\Delta$	Difference in energy
R_f values	Radio frequency
CoPC	Caffeic acid
HOAc	Acetic acid
BAW	n-butanol-acetic acid-water
H_3BO_3	Boric acid
1H	Hydrogen
^{13}C	Carbon

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