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ANTIBACTERIAL AND ANTIOXIDANT EFFECT OF BLACK SEED OIL AND BLACK SEED POWDER ON BEEF MINCED MEAT

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ABSTRACT

The aim of this study is to determine the effect of the addition of different levels of black seed oil and black seed powder to beef meat ball on the quality and shelf life of beef patties. During the studies lipid oxidation, number of aerobic bacteria, psychrotrophes and entero bactriacea of raw minced beef stored under refrigeration conditions for 24days were determinated. Results showed that the addition of BSO, BSP have significant decrease in APC for 10 days after that no significant decrease in count, treatment of meat balls with black seed oil (at concentrations 1, 2, 3%) induce significant decrease in enterobacteriaceae count at different period of storage, however a ddition of black seed powder (at concentrations 2, 4, 6%) induced significant increase in psychrotrophs count at different period of storage. The outcomes of this research is that addition of black seed oil and black seed powder to beef meat does not increase shelf life of meat. However, This addition has antioxidant effect

Keywords: Black seed, Antibacterial, Antioxidant, minced beef meat

INTRODUCTION

Meat represents appreciated source of high biological value for the major food components such as protein, iron, vitamins, zinc, essential fatty acids, selenium and phosphorus (**Pereira et al., 2012**). Meat is extremely susceptible to microbial contaminations, which results in its food borne infections and spoilage in human causing economic and health losses **(Komba et al., 2012).**

The most used preservatives nowadays are artificial rather than natural. It was proved that artificial preservatives such as benzoates, nitrates, formaldehyde, sorbates, sulfites, parabens, BHT, BHA cause serious health threats such as asthma, hypersensitivity, neurological damage hyperactivity and cancer (**Anand et al., 2015).** Hence, recently natural antioxidants and antimicrobials are preferable via consumers, so they are added by food producers when possible (**Castro-Rosas et al., 2016; Stratakos & Koidis, 2015**). Also, attention has been done for natural substances to be represented as antimicrobials and antioxidant substitutes (**Ponce et al., 2008).**

The seeds of *Nigella Sativa* termed black seed or black cumin have been utilized for medicinal actions as herb and hard-pressed into oil in different regions (**Batheeb; Zohary and Hopf, 2000**). Traditionally, it has been successfully used for treatment of various diseases concerned with respiratory health, intestinal, stomach, liver and kidney function, general well-being and immune and circulatory system up keeping (**Khan et al., 2003**). Black

cumin seeds have protein (26 %), carbohydrates (25 %), ash (4.8 %) and crude fiber (8.4 %). Seeds contain better amount of precursor of vitamin A and essential elements like Cu, Fe, P and Zn (**Ahmad et al., 2013**). Moreover, seeds contain approximately 36– 38 % fixed oil, saponins and alkaloids (**Lautenbacher 1997; Burits and Bucar 2000; Singh et al., 2005**).

Concerning essential oil ingredients, Nigella Sativa seeds contain about 0.4–2.5 %. The oil used in many purposes such as folk medicine like a bread or cheese flavouring agent and as a spice for improving taste in different meals (**Wajs et al., 2008**). In recent years, many studies applied on the pharmacological effects of Nigella Sativa seeds and its applications in different experimental and clinical fields. Moreover, the study of the constituents and active components of Nigella Sativa that interpret such pharmacological activities has been investigated. The most important active constituents are Thymoquinone as volatile oil and Melanin as fixed oil (**Roy et al., 2006; Adel, 2006**). Black cumin seed has various bioactive properties as antimicrobial effect as antibacterial (**Akgul, 1989; Hanafy and Hatem, 1991; Farrag et al., 2000**) and antifungal (**Akgul, 1989; Khan et al., 2003**) and antioxidant activities (**Ahmad et al., 2013; Burtis & Bucar, 2000**). These properties attributed to its essential oil constituent.

The aim of this study was to determine the impact of the addition of different concentrations of Nigella sativa oil and powder on different bacteria (Aerobic plate, Enterobacteriaceae and psychrotrophs) growth, as well as lipid oxidation in minced beef meat stored under refrigeration conditions (4± 1^{o}C) for 21 days.

MATERIAL AND METHODS

I Collection of samples:

Nigella sativa L. oil (freshly cold-pressed) and powder were obtained from Amazon. Fresh 7 kg meat was obtained from the local market. The meat was minced under complete a septic conditions and divided equally into 7groups; the control group was minced meat, the second group (O10) was mixed with 10ml Nigella sative oil (1%), the third group (O20) was mixed with 20 ml Nigella sativa oil (2%), the fourth group (O30) was mixed with 30 ml Nigella sative oil (3%), the fifth group (P20) was mixed with 20 gm Nigella sativa powder (2%), the sixth group(P40) was mixed with 40 gm Nigella sativa powder (4%) and the last group was (P60) was mixed with 60 gm Nigella sativa powder (6%) Raw meat was vacuum packed in polythene bags and stored at 4^{o}C.

II- Preparation of sample (ICMSF, 1986):

10 gm of muscle portion was homogenized with 90 ml of 0.1% sterile peptone water (Oxoid CM0009) in a laboratory blender (Type: Moulinex-made in France)/one minute for obtaining an original dilution of 1:10. One ml from each of the original dilutions was transferred to sterile test tubes containing 9 ml of the same diluent to be diluted in a sequential manner preparing a tenfold serial dilutions up to 10^{6}, to cover the expected range of sample contamination then aimed for bacterial enumeration of aerobic mesophiles, psychrotrophs and enterobacteriaceae.

III-Bacteriological Analysis:

1- Aerobic plate count (ICMSF, 1978):

0.1ml from each prepared serial dilution was transferred and evenly spread over a dry surface of duplicated previously prepared sterile plate count agar medium (oxide CM0325B). The surface of inoculated plates was allowed to dry for 15 minutes before being placed inverted with control plates in the incubator adjusted at 37°C for 24h. The bacterial colonies were enumerated and the aerobic plate count per each cm of examined samples was calculated and recorded.

2- Total psychrotrophic count (Cousin et al., 1992):

The same procedures were taken place as for counting APCs with the exception of incubation temperature/time were 5°C/7 days.

3- Enterobacteriaceae count (ISO, 1993):

Duplicated sets of sterile Petri dishes were inoculated with 1ml amounts of the chosen range of prepared dilutions. A quantity of about 15 ml of violet red bile glucose agar (oxoid CM485B), melted and cooled to 45 °C was added to each inoculated Petri dish, then mixed well 3 times clockwise and 3 times anti-clockwise. After medium has solidified, overlay with 10 ml of the same medium to ensure anaerobic conditions which suppress the growth of non-fermentative Gram negative bacteria. It also encourages the fermentation of glucose which favors the formation of -clearly visible purple colonies, surrounded by purple halo. Then, time is allowed to be solidified, incubated "inverted" at 32 °C for 24-48 hours. Typical colonies of Enterobacteriaceae (round and purple 1-2 mm surrounded by precipitation of bile salts in the medium) were enumerated and the Enterobacteriacea count per cm^2 of the examined sample was calculated and recorded.

IV- Antioxidant analysis:

1- Lipid peroxidation (malondialdehyde, MDA) analysis

The extent of lipid oxidation in frozen meat samples was determined. Meat samples were thawed, accurately homogenized using a morter then a sample of 1 gm was taken into a test tube. Nine ml of phosphate buffered saline was added to each sample. Samples were homogenized by vortex then centrifuged at 4000 rpm for 15 min. the supernatant was taken for lipid peroxidation value using the malondialdehyde (MDA) test as indicator in meat extract by calorimetric enzymes using kits (Biodiagnostic, Egypt) according to **Ohkawa et al., (1979)**.

2- Determination of antioxidant enzymes activities

Antioxidant activities of catalase in meat samples were measured using calorimetric method. The samples were thawed; accurately homogenized using a morter then 1 gm of each sample was taken into a test tube. Nine ml of phosphate buffer saline was added to each sample. Samples were homogenized by vortex then centrifuged at 4000 rpm for 15 min. the supernatant was taken for determination of antioxidant enzymes activity incubated at 37 C for 10 min, read samples against sample blank and standard against standard blank at 510 nm. Color stable for hr **(Aebi, 1984)**

V- Statistical analysis:

The data obtained in this study were statistically analyzed according to methods described by **SPSS (2004).**

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Table 1: Effect of treatment of meat balls with BSO and BSP on aerobic plate count during cold storage at 4± 1 ^{0}C

Day	C	O 10	O 20	O 30	P 20	P 40	P 60
zero	5.38^{d}	$5.56^{a,b}$	5.53^{b}	5.59^{a}	5.29^{e}	5.54^{b}	5.49^{c}
3	5.93^{a}	5.53^{f}	5.56^{e}	5.85^{b}	5.62^{d}	5.76^{b}	5.69^{c}
6	6.48^{a}	5.54^{c}	$5.80^{b,c}$	$6.07^{a,b}$	$6.27^{a,b}$	$6.20^{a,b}$	$6.06^{a,b}$
10	6.38^{d}	6.32^{d}	6^{f}	6.50^{c}	7.13^{a}	6.17^{e}	7^{b}
14	6.84^{c}	6.81^{c}	6.82^{c}	6.83^{c}	7.40^{a}	6.88^{b}	7.41^{a}
17	7.11^{f}	7.81^{c}	7.32^{e}	7.89^{b}	8.20^{a}	7.75^{d}	7.74^{d}
20	7.04^{f}	7.04^{f}	7.34^{e}	7.41^{d}	8.13^{b}	8.17^{a}	8.04^{c}
24	8.04^{f}	8.14^{e}	8.53^{c}	8.27^{d}	8.54^{c}	8.71^{b}	9.20^{a}

Values with different superscript letter are significantly different at P<0.05

Table 2: Effect of storage time on APC (log10 cfu/g) in meat balls treated with BSO and BSP.

Day	C	O 10	O 20	O 30	P 20	P 40	P 60
zero	5.38^{f}	5.56^{f}	5.53^{f}	5.59^{h}	5.29^{h}	5.54^{h}	5.49^{h}
3	5.93^{e}	5.53^{f}	5.56^{f}	5.85^{g}	5.62^{g}	5.76^{g}	5.69^{g}
6	6.48^{d}	5.54^{f}	5.80^{e}	6.07^{f}	6.27^{f}	6.20^{e}	6.06^{f}
10	6.38^{d}	6.32^{e}	6^{d}	6.50^{e}	7.13^{e}	6.17^{f}	7^{e}
14	6.84^{c}	6.81^{d}	6.82^{c}	6.83^{d}	7.40^{d}	6.88^{d}	7.41^{d}
17	7.11^{b}	7.81^{c}	7.32^{b}	7.89^{b}	8.20^{c}	7.75^{c}	7.74^{c}
20	7.04^{bc}	7.04^{b}	7.34^{b}	7.41^{c}	8.13^{b}	8.17^{b}	8.04^{b}
24	8.04^{a}	8.14^{a}	8.53^{a}	8.27^{a}	8.54^{a}	8.71^{a}	9.20^{a}

Values with different superscript letter are significantly different at P<0.05

Table 3: Effect of treatment of meat balls with BSO and BSP on Enterobacteriacae count during cold storage at 4± 1 ^{0}C

Day	C	O 10	O 20	O 30	P 20	P 40	P 60
zero	3^{f}	3.60^{e}	3.84^{c}	3.90^{b}	3.69^{d}	4^{a}	3^{f}
3	3.93^{a}	3.50^{c}	3.81^{b}	3.75^{bc}	3.73^{bc}	3.70^{bc}	3.78^{bc}
6	4.39^{a}	3.47^{e}	3.77^{c}	3.60^{d}	3.77^{c}	3.47^{e}	4.17^{b}
10	3.69^{b}	3.60^{c}	3.47^{d}	3.47^{d}	3.69^{b}	3.77^{a}	3.69^{b}
14	5.62^{a}	4.60^{c}	4.47^{d}	4.47^{d}	4.57^{c}	4.30^{e}	5.07^{b}
17	4.77^{e}	5.69^{b}	4.77^{e}	5.74^{a}	4.90^{d}	4.90^{d}	5.25^{c}
20	5.90^{a}	5.77^{b}	5.90^{a}	5.60^{c}	5.60^{c}	4^{e}	5.23^{d}
24	6.07^{a}	5.84^{b}	5.30^{e}	5.77^{c}	5.69^{d}	5.30^{e}	5.30^{e}

Values with different superscript letter are significantly different at P<0.05

Table 4: Effect of storage time on Enterobacteriacae count (log10 cfu/g) in meat balls treated with BSO and BSP.

Day	C	O 10	O 20	O 30	P 20	P 40	P 60
zero	3^{h}	3.60^{e}	3.84^{e}	3.90^{d}	3.69^{d}	4^{d}	3^{g}
3	3.93^{f}	3.50^{f}	3.81^{e}	3.75^{e}	3.73^{d}	3.70^{f}	3.78^{e}
6	4.39^{e}	3.47^{f}	3.77^{f}	3.60^{f}	3.77^{d}	3.47^{g}	4.17^{d}
10	3.69^{g}	3.60^{e}	3.47^{g}	3.47^{g}	3.69^{d}	3.77^{e}	3.69^{f}
14	5.62^{c}	4.60^{d}	4.47^{d}	4.47^{c}	4.47^{c}	4.30^{c}	5.07^{c}
17	4.77^{d}	5.69^{c}	4.77^{c}	5.74^{a}	4.90^{b}	4.90^{b}	5.25^{b}
20	5.90^{b}	5.77^{b}	5.90^{a}	5.60^{b}	5.60^{a}	4^{d}	5.23^{b}
24	6.07^{a}	5.84^{a}	5.30^{b}	5.77^{a}	5.69^{a}	5.30^{a}	5.30^{a}

Values with different superscript letter are significantly different at $P<0.05$

Table 5: Effect of treatment of meat balls with BSO and BSP on psychrotrophs count during cold storage at 4± 1 ^{0}C

Day	C	O 10	O 20	O 30	P 20	P 40	P 60	Mean
zero	5.56^{a}	5.36^{b}	5.17^{c}	4.30^{e}	5.20^{c}	5.07^{d}	5.59^{a}	5.23^{f}
3	5.86^{b}	5.65^{d}	5.54^{e}	5.48^{f}	5.79^{c}	5.66^{d}	5.92^{a}	5.72^{e}
6	6.85^{d}	6.60^{f}	6.90^{c}	6.97^{b}	6.84^{d}	6.74^{e}	7.07^{a}	6.85^{d}
10	6.11^{g}	6.96^{f}	7.05^{e}	7.13^{d}	7.34^{a}	7.25^{e}	7.30^{b}	6.91^{d}
14	7.05^{d}	7.30^{c}	7.07^{d}	7.38^{b}	7.47^{a}	7.38^{b}	7.50^{a}	7.28^{c}
17	8^{c}	7.70^{f}	7.84^{e}	7.90^{d}	8.05^{b}	8.07^{b}	8.17^{a}	7.97^{b}
20	8.54^{d}	8.30^{e}	8.60^{c}	8.70^{a}	8.65^{b}	8.53^{d}	8.60^{c}	8.56^{a}
24	8.31^{a}	8.49^{a}	8.17^{a}	8.69^{a}	8.77^{a}	8.56^{a}	8.81^{a}	8.52^{a}

Table 6: Effect of storage time on Psychrotrophs count (log10 cfu/g) in meat balls treated with BSO and BSP

Day	C	O 10	O 20	O 30	P 20	P 40	P 60
zero	5.56^{e}	5.36^{h}	5.17^{g}	4.30^{g}	5.20^{h}	5.07^{g}	5.59^{h}
3	$5.86^{e,d}$	5.65^{g}	5.54^{f}	5.48^{f}	5.79^{g}	5.66^{f}	5.92^{g}
6	6.85^{c}	6.60^{f}	6.90^{f}	6.97^{e}	6.84^{f}	6.74^{e}	7.07^{f}
10	6.11^{d}	6.96^{e}	7.05^{d}	7.13^{d}	7.34^{e}	7.25^{d}	7.30^{e}
14	7.05^{c}	7.30^{d}	7.07^{d}	7.38^{c}	7.47^{d}	7.38^{c}	7.50^{d}
17	8^{b}	7.70^{c}	7.84^{c}	7.90^{b}	8.05^{c}	8.07^{b}	8.17^{c}
20	8.54^{a}	8.30^{b}	8.60^{a}	8.70^{a}	8.65^{b}	8.53^{a}	8.60^{b}
24	$8.31^{a,b}$	8.49^{a}	8.17^{b}	8.69^{a}	8.77^{a}	8.56^{a}	8.81^{a}

Table 7: Effect BSO and BSP on the lipid peroxidase activity in of meat balls during cold storage at 4± 1 ^{0}C

Day	C	O 10	O 20	O 30	P 20	P 40	P 60
zero	8.50^{f}	20.50^{b}	19^{c}	16.80^{d}	15.30^{e}	19^{c}	31^{a}
3	19^{f}	23.50^{c}	20.30^{e}	17.50^{g}	27^{a}	21.80^{d}	26^{b}
6	23^{b}	20^{d}	22.20^{c}	19.50^{e}	16.30^{g}	17^{f}	23.20^{a}
10	27.5^{a}	22^{c}	25^{b}	21^{d}	18^{f}	17^{g}	19^{e}
14	31.2^{a}	25.50^{b}	19.70^{d}	21.40^{c}	16.30^{f}	17.30^{e}	16^{g}
17	42.7^{a}	31.50^{b}	25.20^{c}	22.30^{d}	20^{e}	13.50^{f}	7.80^{g}

Table 8: Effect of storage time on lipid peroxidase activity in meat balls treated with BSO and BSP.

Day	C	O 10	O 20	O 30	P 20	P 40	P 60
zero	8.50^{f}	20.50^{e}	19^{f}	16.80^{f}	15.30^{e}	19^{b}	31^{a}
3	19^{e}	23.50^{c}	20.30^{d}	17.50^{e}	27^{a}	21.80^{a}	26^{b}
6	23^{d}	20^{f}	22.20^{c}	19.50^{d}	16.30^{d}	17^{d}	23.20^{c}
10	27.5^{c}	22^{d}	25^{b}	21^{c}	18^{c}	17^{d}	19^{d}
14	31.2^{b}	25.50^{b}	19.70^{e}	21.40^{b}	16.30^{d}	17.30^{c}	16^{e}
17	42.7^{a}	31.50^{a}	25.20^{a}	22.30^{a}	20^{b}	13.50^{e}	7.80^{f}

Values with different superscript letter are significantly different at P<0.05

Table 9: Effect BSO and BSP on the catalase activity in of meat balls during cold storage at 4± 1 ^{0}C

Day	C	O 10	O 20	O 30	P 20	P 40	P 60
zero	0.5^{c}	0.44^{d}	0.48^{e}	0.60^{b}	0.52^{c}	0.50^{c}	0.65^{a}
3	0.63^{c}	0.60^{c}	0.52^{d}	0.53^{d}	0.70^{b}	0.77^{a}	0.77^{a}
6	0.65^{e}	0.72^{c}	0.65^{e}	0.69^{d}	0.84^{b}	0.96^{a}	0.82^{b}
10	0.65^{e}	0.81^{c}	0.65^{e}	0.69^{d}	0.85^{b}	0.96^{a}	0.80^{c}
14	0.70^{d}	0.80^{c}	0.80^{c}	0.80^{c}	0.85^{b}	0.96^{a}	0.80^{c}
17	0.70^{e}	0.78^{d}	0.83^{c}	0.95^{ab}	0.93^{b}	0.97^{a}	0.86^{c}

Values with different superscript letter are significantly different at P<0.05

Table 10: Effect of storage time on catalase activity in meat balls treated with BSO and BSP.

Day	C	O 10	O 20	O 30	P 20	P 40	P 60
zero	0.5^{c}	0.44^{d}	0.27^{d}	0.60^{d}	0.52^{d}	0.50^{c}	0.65^{d}
3	0.63^{b}	0.60^{c}	0.52^{c}	0.53^{e}	0.70^{c}	0.77^{b}	0.77^{c}
6	0.65^{b}	0.72^{b}	0.65^{b}	0.69^{c}	0.84^{b}	0.96^{a}	0.82^{b}
10	0.65^{b}	0.81^{a}	0.65^{b}	0.69^{c}	0.85^{b}	0.96^{a}	$0.80^{b,c}$
14	0.70^{a}	0.80^{a}	0.80^{a}	0.80^{b}	0.85^{b}	0.96^{a}	$0.80^{b,c}$
17	0.70^{a}	0.78^{a}	0.83^{a}	0.95^{a}	0.93^{a}	0.97^{a}	0.86^{a}

Values with different superscript letter are significantly different at $P<0.05$

RESULTS & DISCUSSION

Meat bacterial spoilage and deterioration relied on different factors such as the early microorganism number, storage conditions time/temperature and meat physicochemical characters (**Doulgeraki et al., 2012**). Contamination occurs due to septic conditions carried out in slaughterhouses (**Schlegelova et al., 2004**). Also, the attachment characters and the bacterial surface biofilm formation enhance cross-contamination (**Koo et al. 2013**). Pre-slaughter conditions hasten contaminations spread from feces and skin, digestion system content, and unhygienic water. The latter conditions considered main sources of different harmful bacteria like E.coli, Staphylococcus, and Bacillus cereus **(Schlegelova et al. 2010).**

In this context, that treatment of meat balls with black seed oil (at concentrations 1, 2, 3% (W/W) and black seed powder (at concentrations 2, 4, 6% (W/W) induced significant decrease in APC up to 6 day of storage; then the count was significantly increased.

Treatment of meat balls with black seed oil (at concentrations 1, 2, 3% (W/W) and black seed powder, addition of black seed powder (at concentrations 2, 4, 6% (W/W) induced significant decrease in enterobacteriaceae count at different period of storage except for 17 day of storage.

Treatment of meat balls with black seed oil (at concentrations 1, 2, 3% (W/W) and black seed powder (at concentrations 2, 4, 6% (W/W) induced significant increase in psychrotrophs count at all different period of storage except at 3 day of storage.

Comparison the effect of BSO with BSP one revealed that, addition of black seed powder induce significant increase in APC and Psychrtorphs in meat balls compared with meat balls treated with black seed oil. However, addition of black seed oil induced significant decrease in enterobacteriaceae count in meat balls compared with meat balls treated with black seed powder in all periods of storage except at 17 day of storage till the end of storage period.

The effect of treatment of beef meat balls with black seed powder and black seed oil is scare. **Kalinowska et al., 2016** investigated the addition of different concentrations of Nigella sativa oil effect onto minced pork shelf life and quality. Results showed that the oil have no effect on the growth of aerobic bacteria. However, **Raeisi et al., 2015** reported Nigella Sativa effect on microbiological [total viable count (TVC) and psychrophilic bacterial counts (PTC)], of rainbow trout fillets stored at 4°C±1. There was a significant delay in fish samples spoilage in treated samples with

Nigella Sativa extract compared with the control samples ($P < 0.05$).Also, OZPOLAT et al., 2016 found that black cumin oil treated fresh fish stored at 2 ± 1 °C lengthen shelf-life and improves sensory quality than control group.

Regarding antioxidant effect of Nigella sativa, revealed that treatment of meat balls with black seed oil (at concentrations 1, 2, 3% (W/W) and black seed powder (at concentrations 2, 4, 6% (W/W) induced significant decrease in lipid peroxidase activity at all different periods of storage except at 3 day of storage.

Treatment of meat balls with black seed oil (at concentrations 1, 2, 3% (W/W) induced significant increase in catalase activity at all different periods of storage except at 3 day of storage. In contrast, at the latter day addition of black seed oil at concentration 3% induced significant decrease in catalase activity. However, addition of black seed powder (at concentrations 2, 4, 6% (W/W) induced significant induced significant increase in catalase activity at all different periods of storage

Comparison of the effect of BSO with BSP one revealed that, addition of black seed powder induce significant increase in catalase activity in meat balls compared with meat balls treated with black seed oil. Several studies indicated that Nigella Sativa has a potent antioxidant activity

CONCLUSION

Nigella Sativa increase APC and Psychrotophs count and decrease Enterobacteriaceae count till certain period of storage in beef meat balls. Also, it has a potent antioxidant effect through decreasing lipid peroxidase activity and increasing catalase activity.

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الملخص العربي

التأثير المضاد للبكتيريا والمضاد للاكسده لزيت وبودرة حبه البركه علي اللحم المفروم

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تم دراسة التأثير المضاد للبكتيريا والمضاد للاكسده لزيت وبودرة حبه البركه علي اللحم المفروم . تم أخذ عينات لحوم من احد المحلات الخاصة تحت ظروف معقمة مناسبة وتم فرم اللحوم وأضافه عليها كل من زيت وبودرة حبة البركة بتركيزات مختلفة. لمعرفة التأثير وأثبتت النتائج ان حبة البركة ليس لها تأثير مضاد للبكتريا فى حالة البكتريا المحبة للهواء فى العدد وكذلك البكتريا المحبة للبرودة. أما فى حالة البكتريا القوقعية أثبتت النتائج ان حبة البركة لها تأثير مضاد لها.

بالنسبة للتأثير المضاد للأكسدة أثبتت حبه البركة أن لها تأثير مضاد للأكسدة فى اللحم المفروم .