

ROLE OF SOME AROMATIC ESSENTIAL OIL ON IMMUNE STATUS AGAINST INFECTIOUS BRONCHITIS VACCINE AND LIPID PROFILE OF BROILER CHICKEN

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ABSTRACT

This study evaluates the role of some aromatic essential oil (AEOs) (Eucalyptus oil, Mint oil, L-Menthol, and Thyme oil) with different methods of administration, antibody titer of infectious bronchitis virus (IBv) vaccine with different routes of vaccination, and value of total lipid profile. The study is designed as follows { T1:Oral method for each them (AEOs) (0.2 ml/L) daily + vaccination against IBv-H120.T2: Spray method for each them (AEOs) (2 ml/L) twice weekly + vaccination against IBv-H120.T3: Spray method (AEOs) (2 ml/L) twice weekly plus oral method (AEOs) (0.2 ml/L) daily with oral vaccination IBv-H120.T4: Spray method (AEOs) (2 ml/L) twice weekly plus oral method (AEOs) (0.2 ml/L) daily with oral vaccination IBv-H120.with spray vaccination against IBv-H120.T5:Oral method (AEOs) (0.2 ml/L) daily without vaccination.T6:Spray method (AEOs) (2 ml/L) twice weekly without vaccination.T7:Control negative (not treated and not vaccinated)}. The result of IBv titer showed that T4 and T2 had a significant difference among groups and in different ages. Also the result of lipid profile showed T3 and T4 had significant difference among groups. In conclusion the spray method of vaccination with different route of administration of (AEOs) was given the best antibody titer against IBv., and the mixing rout of administration of (AEOs) on total lipid profile (Cholesterol, triglyceride, HDL, VLDL and LDL) was the best on the single rate of administration of (AEOs).

Key word: aromax, IB antibody titer, cholesterol.

عليوي

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دور بعض الزيوت العطرية الأساسية على الحالة المناعية للقاح التهاب القصبات المعدي

وملف الدهون في الدجاج اللحم

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مدرس

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المستخلص

تقيم هذه الدراسة دور بعض الزيوت العطرية (AEOs) (زيت الأوكالبتوس وزيت النعناع وزيت المنثول والزعتر) و بطرائق مختلفة للإعطاء ، على معيارية الأضداد للقاح فيروس التهاب الشعب الهوائية المعدي (IBv) مع طرائق مختلفة للتطعيم ، وعلى قيم المجموع الكلي لملف الدهون. تم تصميم الدراسة على النحو التالي : {T1: عن طريق الفم لكل من (0.2) (AEOs) مل / لتر) يوميًا + التلقيح ضد. (T2) (IBv-H120) : طريقة الرش لكل من (2) (AEOs) مل / لتر) مرتين أسبوعيًا + التلقيح ضد (T3) (IBv-H120) : طريقة الرش (2) (AEOs) مل / لتر) مرتين أسبوعيًا بالإضافة إلى طريقة الفم (0.2) (AEOs) مل / لتر) يوميًا و باستخدام التلقيح الفموي T4 ((IBv-H120) : طريقة الرش (2) (AEOs) مل / لتر) مرتين أسبوعيًا بالإضافة إلى طريقة الفم (0.2) (AEOs) مل / لتر) يوميًا و باستخدام التلقيح عن طريق الفم (T5) (IBv-H120) : طريقة الفم (0.2) (AEOs) مل / لتر) يوميًا بدون تلقيح. T6 : طريقة الرش (2) (AEOs) مل / لتر) مرتين أسبوعيًا دون تلقيح. T7 : السيطرة السلبية (غير المعالجة وغير الملقحة)}. أظهرت نتيجة لقاح فايروس التهاب القصبات المعدي (IBv) أن المجاميع T4 و T2 كان لهما فرق معنوي احصائيا على مستوى المجموعات وفي الأعمار المختلفة. وأظهرت نتيجة ملف الدهون ان المجاميع T3 و T4 كان لهما فرق معنوي احصائيا بين المجموعات. تم الأستنتاج ان اعطاء التطعيم بطريقة الرش اعطى افضل معيار لمستوى الأضداد ضد لقاح التهاب القصبات المعدي (IBv) (وأعطى الزيوت العطرية (AEOs) بماء الشرب والرش معا اعطت افضل النتائج لملف الدهون المتضمن كل من (الكولسترول ، الدهون الثلاثية ، HDL ، VLDL و LDL) عن اعطاء بالطرق الفردية من (AEOs).

الكلمات المفتاحية: اروماكس ، عيار الأجسام المضادة IB ، الكلسترول.

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INTRODUCTION

Broiler farms produce high quality of chicken meat protein for human feeding, also represent a good source of profitability for the society in many countries, and had a role in the economic progress of any country (19). One of major obstruction of broiler farms the respiratory diseases which consider the most important economic losses in the poultry manufacture (7). Infectious bronchitis (IB) is a major respiratory disease in poultry farms and produce economic losses (7). Aromatic essential oil (AEOs) one of aim to solved and maintenance of production and health status by reducing respiratory problems (8). The (AEOs) are extracted from plants, mostly situated in lands with moderate to warm climates, like the Middle east and tropical area, are one of the paramount and a classically portion of the pharmacopoeia (5). Various groups of (AEOs) had different structures and chemical characteristics like used (Eucalyptus oil, Mint oil, Thyme oil and L-Menthol) these (AEOs) component act in different mechanism because of having different chemical structure, one of these mechanism has an ameliorative effect on respiration and respiratory system (8,10). The (AEOs) has functioned as antiviral by reducing the clinical signs and mortality as well as decrease the riskiness of respiratory lesions found in the post-mortem chickens (20). Also, the (AEOs) like (Eucalyptus oils, mint and Thyme) play a role to potentiate the anti- viral diseases antibodies in broilers and has a strong immunomodulatory effect on immune response for vaccinated birds (4). The birds treated by (AEOs) show increased antibody response to Newcastle disease (NDV) and (IB) vaccine (6). Additionally the use of essential oil products ameliorate lipid profile value when used normal and high levels fat diet in rats and general health state(12).

MATERIALS AND METHODS

Birds management: The experiment was conducted in the poultry farm /department of pathology and poultry diseases- College of Veterinary Medicine - University of Baghdad. Chicks were supplied by the appropriate lighting system, clean wood shaving as litter and feed and water which were provided (*ad libitum*).

Study design

A total of two hundred and ten (210) one day old broiler mixed sexes chicks (Ross -308) separated randomly into 7 equal groups all groups were kept in divided cages (3 m²) all the experiment for 35 days as follows:

T1: oral method for each them (AEOs) (0.2 ml/L) daily + vaccination against IBv-H120.

T2: spray method for each them (AEOs) (2 ml/L) twice weekly + vaccination against IBv-H120.

T3: spray method (AEOs) (2 ml/L) twice weekly plus oral method (AEOs) (0.2 ml/L) daily with oral vaccination IBv-H120.

T4: spray method (AEOs) (2 ml/L) twice weekly plus oral method (AEOs) (0.2 ml/L) daily with oral vaccination IBv-H120.with spray vaccination against IBv-H120

T5: oral method (AEOs) (0.2 ml/L) daily without vaccination.

T6: spray method (AEOs) (2 ml/L) twice weekly without vaccination.

T7: control negative (not treated and not vaccinated).

Aromatic essential oils (AEOs)

The commercial product under the trade name (Aromax[®]) were used consist of (Eucalyptus oil, Mint oil, L-Menthol, and Thyme oil. Essential volatile oils) by Germany was used. The route of the administration in the groups (1,3,4,5) was orally in the drink water (0.2 ml/Liter) daily for all experiments and in to group (2,3,4,6) a spray (2ml/L /twice weekly).

Vaccination

Live attenuated vaccine (1000 dose) were vaccinated on (15, 25, 35 day -old) (IBv-H120) CEVAC[®].

Sampling

Blood samples were collected (3ml) from the jugular vein or heart randomly from 10 chicks for each group to measure the titer of IBv vaccine at (15,25,35) days old and at (35) days old for lipid profile using disposable syringes (5 ml). Tube containing gel and clot stimulator were used for samples collection. Serum was separated using centrifuge (3000/ RPM for 10 minutes) then stored at -20 °C for analysis.

Detection by ELISA

The antibody against (IBv) vaccine at 15, 25, and 35 days old was used for the humoral

immunity test and detected by ProFLOK[®] NDV ELISA Kit with ELISA Reader (3).

Detection of lipid profile

Lipid profile was applied at 35 days old by the Automatic Biochemical Analyzer system-KENZA 240 TX for detecting on the Cholesterol, triglyceride, HDL, VLDL and LDL. Results appeared regarding to BioLabo company program (3).

Statistical analysis

The statistical analysis programme – SAS, (2012) was used to estimate the different factors in the study parameters. significant difference – LSD test was used to least compare between means in this experiment (17)

RESULTS AND DISCUSSION

Results of IBv- Titer:

Table 1. Effect of groups and period in IB-Titer

The group	Days			LSD value
	15 Days	25 Days	35 Days	
T1	1987 B c	2455 D b	2671 C a	189.52 *
T2	2788 A c	3110 B b	3365 B a	206.30 *
T3	2096 B c	2788 C b	3296 B a	265.46 *
T4	2906 A b	3564 A a	3718 A a	239.74 *
T5	276 B a	0 E b	0 D b	108.55 *
T6	256 B a	0 E b	0 D b	114.37 *
T7	104 B a	0 E c	0 D c	91.75 *
LSD value	267.72 *	309.65 *	283.71 *	---

* (P<0.05).

The differences in capital letters vertical refer to the significant differences (P<0.05).

The differences in small letters horizontally refer to the significant differences (P<0.05).

The result of IBv titer in Table 1. at 15 days old show T4- 2906 and T2- 2788 respectively a high significant difference at P<0.05 than other groups, at 25 days old showed T4-3564 had a high significant difference at P<0.05 among groups T2- 3110, T3-2788, T1-2455 then T5,T6 and T7 respectively, while T5,T6 and T7 had no significant difference between them and at 35 days old showed the T4-3718 had a high significant difference at P<0.05 among groups then T2-3365, T3-3296 and T5, T6 and T7 repectively, but T5,T6 and T7 had no significant difference between them. The result between ages showed T1, T2, T3 and T4 titer were elevated while T5, T6 and T7 were declined. They used different route of administration of AEOs Eucalyptus, carvacol

and thymol were activated the humoral immune response to viral IB and ND vaccines (9), as well as dietary mint supplied improved the humoral immunity system through increasing antibody production (13). Rahimi *et. al.*(15) they observed that AEOs in the broiler`s drinking water increased the antibody titers against general live vaccines when compared to the control group.Popovi *et. al.*(14) who investigated that adding of AEOs in spray and drinking water had a good immunostimulatory effect to humoral immune response and secretory IgA titer. The result showed matching in route of administration of IBv vaccine with having a high significance P<0.01 degrees of correlation among chickens vaccinated with spray and oral method, spray and drinking water method and spray method only respectively (18).

Results of lipid profile

Table 2. Effect of groups in Lipid profile

The group	Lipid profile (mg/dl)				
	T. Chols.	Tri. G.	HDL	VLDL	LDL
T1	121 BC	101 B	77.3 AB	20.2 B	23.5 B
T2	156 AB	133 AB	68.4 B	26.6 AB	61.0 A
T3	119 BC	91 B	87.0 A	18.2 B	13.8 B
T4	116 C	89 B	80.4 AB	17.8 B	17.8 B
T5	169 A	155 A	67.9 BC	31.0 A	70.1 A
T6	162 A	159 A	62.2 B	31.8 A	68.0 A
T7	169 A	167 A	51.9 C	33.4 A	83.7 A
LSD value	38.25 *	44.53 *	16.82 *	9.15 *	24.77 *

* (P<0.05).

The differences in capital letters vertical refer to the significant differences (P<0.05).

The differences in small letters horizontally refer to the significant differences (P<0.05).

The result of **total cholesterol** showed T4-116 least significant difference at P<0.05 among the groups followed by T2- 156, T1-121, T3- 119 respectively, then T5, T6 and T7 had a high significant difference at P<0.05 and no significant difference at P<0.05 between them. The result of **triglyceride** showed T4-89, T3- 91 and T1- 101 had less significant difference at P<0.05 among the groups and no significant difference at P<0.05 between them, followed by T2- 133 then T5, T6 and T7 had no significant difference at P<0.05 between them. The result of **HDL** showed T3- 87, T4-80.4, T1- 77.3, T2- 68.4, T6- 62.2 and T7-51.9 respectively had a highly significant difference at P<0.05. The result of **VLDL** showed T4- 17.8, T3- 18.2 and T1- 20.2 had less significant difference at P<0.05 among the groups, followed by T2- 26.6 and T5, T6 and T7 had a highly significant difference at P<0.05 and no significant difference at P<0.05 among them. The result of **LDL** showed T3-13.8, T4- 17.8 and T1- 23.5 had less significant difference at P<0.05 among the groups, then T1, T5, T6 and T7 had a highly significant difference at P<0.05 and no significant difference at P<0.05 between them. The result agrees with Sanja *et. al.*(16) was investigated that the supplement of AEOs to broilers with 0.1 g/kg had significant effect at P<0.05 on total blood lipid profile when compared with control. Also Ali *et. al.* (1) was studied the adding essential oil to broiler diets was significantly decreased plasma LDL, VLDL, total cholesterol, triglycerides and total lipids while an increased HDL value, and other researchers (11), showed that broilers fed with diets containing AEOs lowered the cholesterol and triglycerides compared to the control

treatment. Also, Lee Jia Ming and Chia yorke Yin (12) showed that the essential oil product ameliorate lipid profile value when used normal and high levels fat diet in rats. Finally, using of aromatic essential oil improves feed intake or change the general health state by improved total lipid profile and immunity (2).

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