Comparison between Using of Vaccination versus to Application of Anticoccidial Drugs in Prevention of Coccidiosis in Broilers under Field Conditions

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Abstract: Poultry production in Egypt still relies heavily in prevention of coccidiosis on adding anticoccidial drugs to feed. In the present study the efficacy and benefits of coccidiosis prevention in broilers by using of vaccination versus to application of anticoccidial drugs was evaluated under field condition. The study involved twelve broiler flocks reared under field condition and housed in farms its housing capacity ranged from 10,000 to 39,000 birds / farm and all flocks were reared on deep litter system. Six farms (F1 - F6) used anticoccidial vaccine (vaccinated) (live oocysts vaccine of broiler, Coccivac-B®) at three days old by spraying on feed which was free from any feed additives and the other six farms (F7 - F12) used different anticoccidial drugs (medicated) as preventive measure in a regular or irregular programs. Clinical signs, dropping scores, mean lesion scores, mortality %, oocyst counts (totals of all species per gram) and production indices were parameters which investigated at 21th, 28th and day before slaughter (DBSL) for evaluation of performance and the efficacy level of prevention of coccidiosis. Our results revealed that 1- Clinical signs, dropping scores and mean lesion scores in both vaccinated and medicated farms were statistically non-significantly different and reduced in comparing with recorded clinical coccidiosis. 2- The mortality % was 3.9 (vaccinated) and 5.8 (medicated). 3- Oocyst counts of vaccinated farms peaked rapidly at 21th day of age, while the oocyst counts of the medicated farms had a delayed peak at 28 days of age. 4- The production performance expressed in the following parameters, mean live body weight (MBW) was 1.87 (vaccinated) and 1.98 (medicated) (P>0.05), the viability % (V%) was 92.8 (vaccinated) and 92.75 (medicated), feed conversion ratio (FCR) was 1.83 (vaccinated) and 1.90 (medicated) (P>0.05), average slaughter age was 40.33 (vaccinated) and 43.17 (medicated), and the mean of production index (PI) was 235 (vaccinated) and 225 (medicated). The results proved that vaccination with live oocysts elicited significant protection against coccidiosis (naturally acquired coccidial infection), while maintaining good bird flock performance similar to, if not better than, that obtained with conventional anticoccidial medication.

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1. Introduction

Coccidiosis is recognized as the parasitic disease with the greatest economic impact on poultry production ***Allen, et al.,2002***. Infection with coccidian parasites has been calculated to cost the US poultry industry between $450 millions ***Allen, et al.,2002*** and $1.5 billion ***Yun,et al.,2000***. annually, with approximately 80% of these costs attributed to decrease performance in the presence of drug treatment strategies ***Vermeulen,et al.,2001***. Several species (spp.) of *Eimeria* (*E.*) cause coccidiosis in chickens, with the most prevalent *E.tenella*, *E.acervulina* and *E.maxima*. All *E.* spp. parasitize epithelial cells of the intestinal lining, causing pathological changes varying from local destruction of the mucosa to systemic effects such as blood loss, shock, and death ***Vermeulen,et al.,2001***. Infection leads to economic losses resulting from malabsorption of nutrients, which causes decreased MBW gain, poorer FCR, and possibly increased mortality. Historically, poultry industry personnel have prevented and controlled coccidiosis with the inclusion of anticoccidial feed additives. Despite the implementation of rotation and shuttle programs in which anticoccidial feed additives are strategically varied in diets, drug-resistant *E.* spp. strains continue to emerge across the world, forcing considerable interest in development of alternative methods of control ***Williams,2002a***. Live oocyst vaccination is currently a realistic alternative to the use of anticoccidial drugs for prevention of coccidiosis in broilers. Vaccines have been used in the poultry industry for more than 50 years, primarily in broiler breeder and replacement layer flocks ***Chapman,et al.,2002***. The basis for vaccine use in the host is immunity that develops, affording the bird protection against subsequent infections by the same spp. ***Yun,et al.,2000***. Live oocyst vaccination has been shown to be an effective tool for the generation of immunity and protection against subsequent *E.* challenge, as evidenced by increased MBW gain [***Crouch,et al.,2003, Danforth, 1998, Williams,2003***], reduced FCR [9], and reduced lesion development [***Crouch,et al.,2003, Danforth,***

1998, Williams,2003] in vaccinated chickens compared with non-vaccinated chickens. To date, aside from complexes raising broilers for prolonged grow-out periods, there has been a general reluctance to implement vaccination programs in large-scale of broiler production facilities because of reports of reduced performance ***Allen, et al.,2002***. Because live oocyst vaccines are designed to introduce a controlled subclinical infection early during grow-out for immunity development, they have often been shown to decrease MBW gain and increased FCR in broilers when compared with medicated birds during the starter period [***Danforth, 1998***, ***Williams,2002a***]. Other researchers have reported negative effects on cumulative broiler performance when using live oocyst vaccines compared with anticoccidial use, as evidenced mainly by reduced final MBW [***Danforth,et al.,1997, Waldenstedt,et al.,1999***] and increased FCR [31, 38]. Other investigations, however, contradict these cited reports, indicating that vaccinated broilers have performed similarly to, if not better than, medicated broilers [***Danforth, 1998***, ***Williams and Gobbi.,2002***], and that vaccination can lead to significantly lower mortality rates compared with medication ***Williams,et al.,1999***. In Egypt there is a lack of research to date focusing on the real field data of the efficacy and benefits of coccidiosis prevention in broilers by vaccination in comparison to anticoccidial drugs. Therefore the objective of the current field study was to compare performance and the efficacy level of coccidiosis prevention in broilers either medicated with different anticoccidial drugs or vaccinated with Coccivac-B® under field condition.

2. Material and Methods

Samples

Fecal samples, litter samples and birds (freshly dead, slaughtered and live) were collected from the broiler farms under study at 21th, 28th days of age and DBSL to be used for investigation of different parameters required to calculate performance of different flocks and evaluation of the efficacy of each coccidiosis preventive measure.

Chemicals

Saturated sodium chloride solution (flotation fluid) used for detection of *E.* oocysts from droppings.

Glasses, instruments and apparatus

Slides cover slides, screw capped bottles, electric balance, sieve, rakes, centrifuge tubes, beakers, blunt glass rods, Mc- Master slide, centrifuge, refrigerator, light microscope, and hand counter were used for diagnosis of coccidiosis and application of the evaluating parameters.

Anticoccidial drugs

Different anticoccidial drugs were used, in doses recommended by the manufacturers, as a preventive measure in a regular or irregular program in the different examined broiler farms.

Anticoccidial vaccine

Coccivac-B®: A live oocyst vaccine for broiler vaccination comprised four species of the wild type of Eimeria (*E.acervulina*, *E.mivati*, *E.maxima* and *E.tenella*) (Schering Plough Animal health Corp. Millsboro, Delaware, USA).

Clinical signs:

Description of clinical coccidiosis in each house was diagnosed according to the parameters reported by ***Vezey, 1970***.

Dropping scores:

Recording of dropping scores was carried out according to ***Morehouse and Barron, 1970***.

Detection of Eimeria developmental stages:

Four birds from each farm were subjected for direct mucosal wet smears of the upper, middle and cecal portions of intestine which examined by microscopy for the presence of *Eimeria* oocysts, schizonts or merozoits, and concentration flotation techniques were applied for detection of coccidial oocysts after ***Anders Permin and Jorgen, Hansen (FAO hand book),1997***.

Oocyst counts per gram of feces were determined by the McMaster technique according to ***Anders Permin and Jorgen, Hansen (FAO hand book),1997.***

Lesion scores:

Recording of lesion scores was performed for the upper, middle and cecal portions of the intestine according to ***Johnson and Reid, 1970***.

Number of culls and dead birds (Mortality %):

The number of culls and dead birds found in each house during the grow-out period was recorded at the end of the production cycle and calculated as a percent of the total birds.

Performance:

It was carried out according to ***Donal Conway and Elizabeth McKenzie, 2007*** as follow:

- Mean body weight Kg. (MBW) = gross live weight of birds ÷ total number of birds.
- Average weight gain per bird = average final weight of live birds in a pen − average initial weight of all birds in that pen.
- Feed consumption or intake per bird = total feed consumed ÷ total number of birds
- FCR = feed consumption ÷ average weight gain.

Production index (PI):

It was carried out by ***Araújo, et al., 2002; Stringhini, et al., 2003 and Hellmeister Filho, et al., 2003***

$$PI = \frac{MBW \times V\%}{FCR \times \text{slaughter age}} \times 100$$

PI = production index.
MBW = mean body weight at slaughter (kg).
FCR = feed conversion rate (feed consumption (kg) / weight gain (kg).
V% = viability (dividing the number of harvested broilers by the number of live birds arriving at the abattoir, multiplied by 100 and expressed as percentage.

- **Statistical analysis:** ***Steel and Torrie, 1960.***

Experimental design:

Twelve broiler flocks at different governorates (Gharbeya, Dakahlia, Behera, Sharkia, Monofia, Damietta, Giza and Kalyoubya) aging from 3-6 weeks, of farm capacity ranging from 10,000 to 39,000 birds / farm and reared on deep litter system were used throughout this study. On third day of age, six farms (F1-F6) which fed on ration free from any feed additives were vaccinated by spray application of the commercially available live oocyst coccidiosis vaccine Coccivac-B® (full dose) on the feed, using a Spraycox II [Scheiring-Plough Animal health]. The other six farms (F7-F12) were given anticoccidial drugs as a preventive measure in a regular or irregular program. A complete history of farm location, farm capacity, type of ration, different feed additives especially anticoccidial drugs and previous problem of coccidiosis were reported. The evaluated parameters which include clinical signs, dropping score, lesion score, performance and production index were carried out at 21th,28th days of age and day before slaughter in all examined broiler farms either vaccinated or medicated.

3. Results

Flock history as well as criteria adopted for comparison of the efficacy of anticoccidial drugs versus to anticoccidial vaccine as preventive measure against coccidiosis in broilers were clinical signs, dropping scores and mean lesion scores at 21th, 28th days of age and DBSL and mortality%, while the performance of the studied flocks were expressed as MBW, V%, FCR, slaughter age and PI. The results were illustrated in tables {1-5} and figures {1-12}.

Table {2} shows that the clinical signs in the form of depression, ruffling, off food and watery feces were more pronounced in vaccinated farms in the earlier weeks (up to 3rd week) post vaccination figure {12}, after that most of vaccinated birds behave normally and no clinical coccidiosis occurred throughout the rest of the production cycle, meanwhile an opposite result was observed in the medicated farms as most of them had no clinical symptoms during the first three weeks of life, whereas clinical symptoms of coccidiosis (not treated) occurred in most of farms containing medicated birds between the ages of 28 days to DBSL. The dropping scores recorded higher mean values (1 and 1.3) for vaccinated farms if compared with that (0.17 and 0.83) of medicated farms at 21th and 28th days of age respectively, while at DBSL an opposite results were obtained, where the dropping scores recorded a mean value of (0.3) for vaccinated farms compared with (0.5) for medicated farms. All mucosal samples from vaccinated farms at the 21th day of age were positive for the presence of *Eimeria* oocysts, schizonts, or merozoits, table {3} and figures {7,8,9,10,11}, only one medicated farm showed 1 upper and 1 middle positive samples table {3}, indicating that birds in the vaccinated farms were evenly infected due to vaccination but birds in medicated farms were not. Figures {1, 2, 3 and 4} and table {2} clearly illustrating that the overall mean lesion scores of upper, middle and cecal portions were 0.5, 1.4 and 5.1 respectively for vaccinated farms and 0.3, 0.6 and 3 respectively for medicated farms at 21th day of age. At 28 days of age and DBSL, the overall mean lesion scores of the upper and middle portions recorded lower values (1.5 and 0.4 – upper & 1.8 and 2 - middle) for vaccinated farms in comparison with the higher ones (1.7 and 0.8 – upper & 3.6 and 4.4 – middle) for the medicated farms. The overall mean cecal lesion scores at 28th day of age had a nearly an equal values (6.4 and 6.3) for vaccinated and medicated farms respectively, while it was of higher value (6.1) in medicated farms in comparison with that (4.2) of vaccinated farms at DBSL. The previously mentioned results greatly suggesting that the vaccine Coccivac®-B induced a strong, uniform immune response in broiler chickens of vaccinated farms, while broiler chickens of medicated farms were exposed to inconsistent natural infections.

The recorded total losses of birds (birds found dead and culled birds), for the entire grow-out on the farms was 3.9% for vaccinated farms and 5.8% for medicated farms, table {2}.

Table {4} shows the mean oocyst counts (total of all species) obtained from each farm of each preventive measure at 21th, 28th days of age and DBSL; there was wide variation between the different 6 farms of each preventive measure. In figures {5, 7} it is clear that the mean of the total counts for each examination time of each farm either collectively or individually revealed that, in vaccinated farms, there was a relatively rapid build-up of litter oocysts, which peaking at 21days of age. Samples from medicated birds showed a more gradual build-up with delayed peak at 28 days of age, with higher numbers remaining at DBSL than in the vaccinated farms.

The crucial results of the comparative preventive efficacy revealed that, clinical signs, dropping score and mean lesion score of examined birds, at all times of examination, from both vaccinated and medicated farms were generally reduced in comparing with recorded clinical coccidiosis .

The production performance in terms of MBW, V%, FCR, slaughter age and PI of both vaccinated and medicated farms are presented and compared in table {5}. It shows the MBW for vaccinated (1.87Kg) and medicated (1.98Kg) farms; the difference was statistically non-significant. The viability % was numerically higher in most of vaccinated farms in comparison with farms used anti-coccidial drugs table {5}; although the mean percentages of viability were nearly equaled for vaccinated (92.8) and medicated (92.75) farms. The mean total FCR was (1.83) for vaccinated farms and (1.90) for medicated farms; the difference was statistically non-significant. The average slaughter ages was (40.33) for vaccinated farms and (43.17) for medicated farms. Hence the mean body weights, FCRs and slaughter ages were numerically of lower values in most of vaccinated farms than the medicated farms table {5}; the difference was statistically non-significant. The Production indices was numerically higher in most of vaccinated farms in comparison with farms used anti-coccidial drugs figure {6}, meanwhile the mean production index showed non-significant difference between vaccinated and medicated broiler farms table {5}.

Figure (1): Mean intestinal lesion score in vaccinated broiler farms

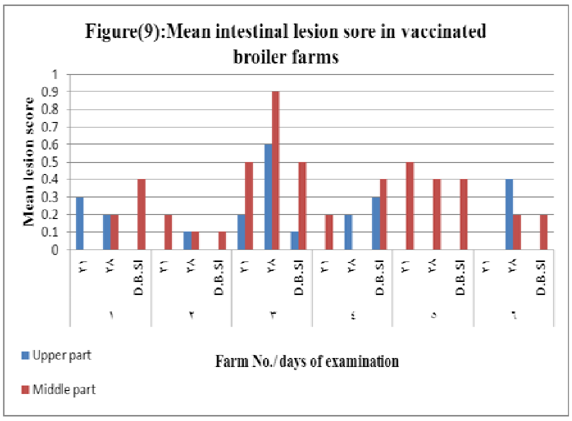


Figure (1): Showing means intestinal lesion score of vaccinated six broiler farms at 21th, 28th days of age and day before days of age and day before slaughter (D.B.SL).

Figure (2): Mean intestinal lesion score in medicated broiler farms

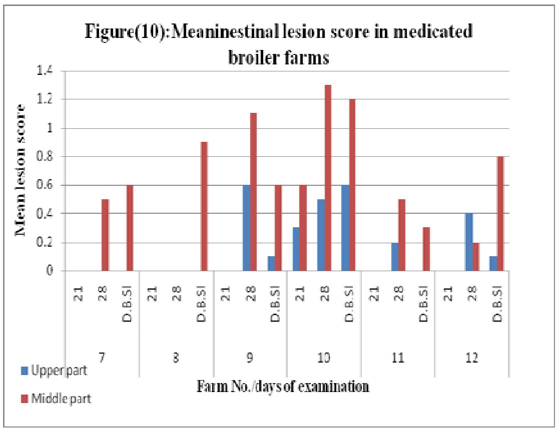


Figure (2): Showing mean intestinal lesions score (in upper and middle parts) of medicated six broiler farms at 21th, 28th slaughter (D.B.SL).

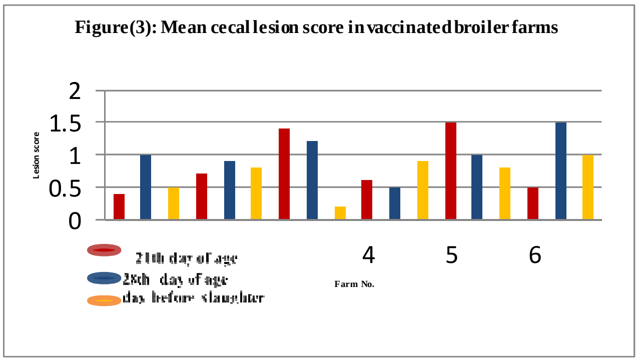


Figure (3): Showing mean cecal lesion score of vaccinated six broiler farms at 21th, 28th days of age and day before Slaughter.

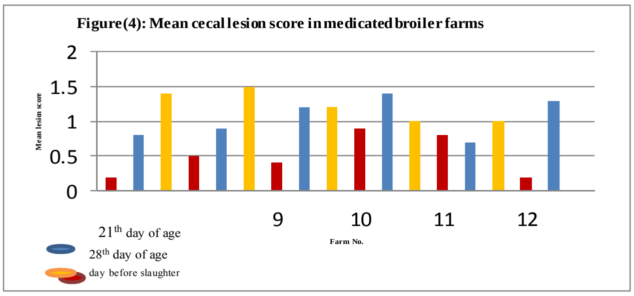


Figure (4): Showing mean cecal lesion score of medicated six broiler farms at 21th, 28th days of age and day before slaughter.

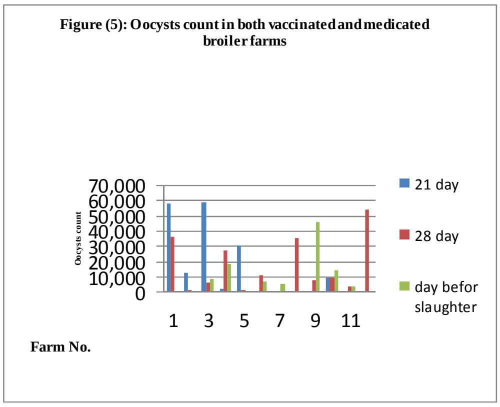


Figure (5): Oocysts count of both vaccinated and medicated farms at 21th.28th days of age and day before slaughter.

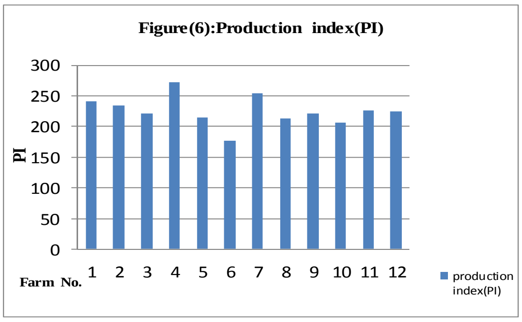
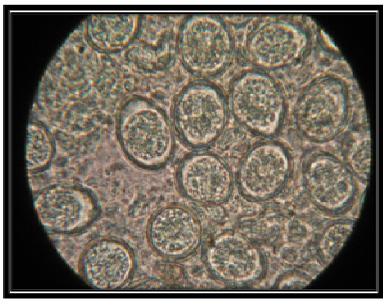
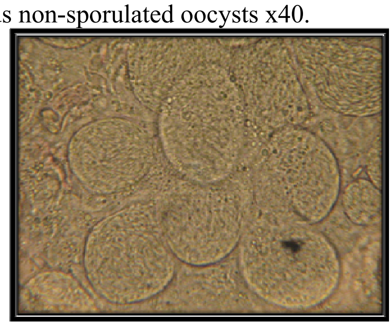


Figure (6): Production index of both vaccinated and medicated broiler farms.



Figure{7}: Direct wet smear of vaccinated bird with numerous non-sporulated oocysts x40.



Figure{8}: Clusters of Schizonts, Trophozoite and Merozoites x40.

Figure{9}: Mucosa of upper intestine with numerous coalesce petechial hemorrhage (2+)

Figure{10}mid intestina with mucosal petechial hemorrhages (2+)

Figure{11}: distended two ceci with coagulated exhibited blood and numerous coalesce petechiae (4+)

Figure{12}: Broiler chickens depression, ruffling and off food.

Table {1}: Flock history of the examined broiler farms reared under floor pen:

Farm No.	Governorate	Preventive measure	House capacity	Ration	Previous problem of coccidiosis
F1	Gharbeya	Vaccinated	25.000	Formulated grower ration without feed additives.	No
F2	Dakahlia	Vaccinated	39.000	Commercial grower ration without feed additives.	No
F3	Behera	Vaccinated	25.000	Commercial grower ration without feed additives.	No
F4	Sharkia	Vaccinated	10.000	Commercial grower ration without feed additives.	Yes
F5	Monofia	Vaccinated	20.000	Commercial grower ration without feed additives.	No
F6	Damietta	Vaccinated	22.000	Commercial grower ration without feed additives.	No
F7	Gharbeya	Medicated	18.000	Formulated grower ration with addition of : - Vitacox at 16-18 days old - ESB3 at 24-28 days old - Amprol at 30-32 days old	No
F8	Behera	Medicated	21.000	Formulated grower ration with addition of : - Salinomycin all over the cycle - Amprol at 18-21 days old - Cobacox at 28-30 days old	No
F9	Giza	Medicated	20.000	Commercial grower ration with addition of: - Salinomycin all over the cycle.	No
F10	Sharkia	Medicated	21.000	Formulated grower ration with addition of : - Salinomycin all over the cycle. - Sulpha mix at 22-24 days old	No
F11	Kalyoubya	Medicated	13.500	Commercial grower ration with addition of: - Salinomycin all over the cycle. - Ucicox + Amprol at 12-15 days old - Coccidiaheal at 21-23 days old - Sulpha Mix + Colipan at 30-33 days old	Yes
F12	Damietta	Medicated	12.000	Commercial grower ration with addition of: - Diclazuril at 25-28 days old then from 33-35 days old	No

Table {2}: Comparison of the efficacy of vaccination versus to anticoccidial drugs as a preventive measure against coccidiosis in broiler farms under field conditions

Farm No.	Preventive measure	Age at time of examination	Clinical signs	Dropping score	Mortalities % (Total culls and dead birds) Farm	Total	Mean ±SD	Mean lesion score of each examined portion Upper	Middle	Cecal
F1	Vaccinated broiler farms	21st	++	2	1500 (6%)	5548 (3.9%)	924.7 ±524.6	0.3	0	0.4
		28th	++	2				0.2	0.2	1
		D.B.SL*	0	0				0	0.4	0.5
F2		21st	+	1	858 (2.2%)			0	0.2	0.7
		28th	+	1				0.1	0.1	0.9
		D.B.SL	0	0				0	0.1	0.8
F3		21st	+	1	1500 (6%)			0.2	0.5	1.4
		28th	+	1				0.6	0.9	1.2
		D.B.SL	0	0				0.1	0.5	0.2
F4		21st	+	1	200 (2%)			0	0.2	0.6
		28th	+	1				0.2	0	0.5
		D.B.SL	+	1				0.3	0.4	0.9
F5		21st	+	1	500 (2.5%)			0	0.5	1.5
		28th	++	2				0	0.4	1
		D.B.SL	0	0				0	0.4	0.8
F6		21st	+	1	990 (4.5%)			0	0	0.5
		28th	+	1				0.4	0.2	1.5
		D.B.SL	0	0				0	0.2	1
F7	Medicated broiler farms	21st	0	0	1080 (6%)	6165 (5.8%)	1027.5 ±452.8	0	0	0.2
		28th	0	0				0	0.5	0.8
		D.B.SL	+	1				0	0.6	1.4
F8		21st	0	0	1197 (5.7%)			0	0	0.5
		28th	+	1				0	0	0.9
		D.B.SL	0	0				0	0.9	1.5
F9		21st	0	0	1200 (6%)			0	0	0.4
		28th	+	1				0.6	1.1	1.2
		D.B.SL	0	0				0.1	0.6	1.2
F10		21st	+	1	1218 (5.8%)			0.3	0.6	0.9
		28th	+	1				0.5	1.3	1.4
		D.B.SL	+	1				0.6	1.2	1
F11		21st	0	0	1350 (10%)			0	0	0.8
		28th	+	1				0.2	0.5	0.7
		D.B.SL	+	1				0	0.3	1
F12		21st	0	0	1200 (10%)			0	0	0.2
		28th	+	1				0.4	0.2	1.3
		D.B.SL	0	0				0.1	0.8	0

- **Clinical signs:** (0): no clinical signs. (+): depression with ruffling. (++): depression, ruffling and off food.
(+++): huddling, chilling and bloody dropping. (++++): off food, bloody diarrhea and death.

- **Dropping score:** (0): Normal droppings. (1): Few droppings were purplish or brownish in color. (2): More reddish droppings, some dropping mixed with flakes of blood. (3): Bloody droppings, absence of normal fecal content *D.B.SL: day before slaughter

Table {3}: Microscopic examination of mucosal smears of upper , middle intestinal and cecal samples from vaccinated and medicated farms

Farm number	**F1**			**F2**			**F3**			**F4**			**F5**			**F6**			**F7**			**F8**			**F9**			**F10**			**F11**			**F12**		
Intestinal portion	U	M	C	U	M	C	U	M	C	U	M	C	U	M	C	U	M	C	U	M	C	U	M	C	U	M	C	U	M	C	U	M	C	U	M	C
21th day of age	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28th day of age	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Day before slaughter	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-

F1-F6: vaccinated farms. F7-F12: medicated farms. U: upper part of the intestine. M: middle part of the intestine. C: cecal part of the intestine. (+) Either oocysts, schizonts, or merozoits present. (-) Neither oocysts, schizonts, or merozoits present

Table {4}: Shedding of oocysts and Litter oocyst counts (totals of all species per gram) at 21th, 28th days of age and day before slaughter from vaccinated and medicated broiler farms

Farm No.	Preventive measure	Age of broilers at time of examination	Shedding of oocysts	* Litter oocyst counts (totals of all species per gram)			
				Farm oocyst counts	Mean oocyst counts±SD at 21th day of age	Mean oocyst counts±SD at 28th day of age	Mean oocyst counts±SD at day before slaughter
F1	Vaccinated broiler farms	21st	+	58150	32590 ± 25701	14066 ± 14363	5858 ± 7097
		28th	+	36050			
		D.B.SL*	+	250			
F2		21st	+	13000			
		28th	+	1700			
		D.B.SL	+	900			
F3		21st	+	58800			
		28th	+	6100			
		D.B.SL	+	8650			
F4		21st	+	2350			
		28th	+	27250			
		D.B.SL	+	18250			
F5		21st	+	30650			
		28th	+	1750			
		D.B.SL	+	100			
F6		21st	+	-			
		28th	+	7000			
		D.B.SL	-	11550			
F7	Medicated broiler farms	21st	-	-	—	22100 ± 21711	11825 ± 17512
		28th	-	-			
		D.B.SL	+	5700			
F8		21st	-	-			
		28th	+	35150			
		D.B.SL	+	800			
F9		21st	-	-			
		28th	+	7950			
		D.B.SL	+	46000			
F10		21st	+	9350			
		28th	+	9700			
		D.B.SL	+	14500			
F11		21st	-	-			
		28th	+	3650			
		D.B.SL	+	3600			
F12		21st	-	-			
		28th	+	54050			
		D.B.SL	+	350			

* Non-significant difference between mean oocyst counts of both vaccinated and medicated broiler farms.

Table {5}: Comparison of production performance between vaccinated and medicated broiler farms under field conditions

Farm No.	Preventive measure	MBW (Kg)	Viability%	FCR	Slaughter age	PI	*Mean PI ±SD
F1	Vaccinated broiler farms	1.8	94	1.8	39	241	226 ± 61
F2		1.9	87.8	1.7	42	234	
F3		1.7	94	1.8	40	221	
F4		1.9	98	1.8	38	272	
F5		2.2	87.5	1.9	47	215	
F6		1.6	95.5	2.0	36	177	
F7	Medicated broiler farms	2	94	1.8	41	254	225 ± 64
F8		2	94.3	1.8	49	213	
F9		1.8	94	1.9	40	222	
F10		1.9	94.2	2.1	41	207	
F11		2	90	1.8	44	227	
F12		2.2	90	2	44	225	

$$PI = \frac{MBW \times V\%}{FCR \times \text{Slaughter age}} \times 100$$

N.B.

Production index is directly proportional to productivity (the higher the production index the higher the productivity and vice versa).

* Non-significant difference between mean production index of vaccinated and medicated broiler farms

4. Discussion

Live anticoccidial vaccines have proved to be an effective alternative to anticoccidial drugs for the prevention and control of chicken coccidiosis (cf. Amal Kumar Sarkar, 2006; Willeams, et al., 1999). A number of live anticoccidial vaccines, such as Coccivac®-B, Coccivac®-D, Immucox®-C1, Immucox®-C2, Paracox®, Paracox®-5, Livacox®-D, Livacox®-T and Livacox®-Q have been available in the world market for several years, and these vaccines have contributed significantly to the prevention and control of chicken coccidiosis (cf. Vermeulen et al., 2001; Williams, 2002a, 2002b). Although they are highly effective against clinical coccidiosis, worldwide usage of these vaccines, in particular live virulent vaccines, have not been widely used for broiler chickens because of the potential problem of transient slight drop in weight gain after vaccination, which in turn may affect broiler producers' confidence in using these vaccines for consideration of economic benefits (Vermeulen et al. 2001). Most epidemiological studies in Egypt showed that *E.tenella*, *E.acervulina* and *E.maxima* were the most prevalent species found in broiler farms in Egypt, and as a result the anticoccidial vaccine Coccivac®-B, a live oocyst vaccine for broiler vaccination comprised four species of the wild type of *Eimeria* (*E.tenella, E.acervulina*, *E.maxima* and *E.mivati*), was under study. The results of the present commercial study confirmed the efficacy of the Coccivac®-B vaccine in inducing protective immunity against natural challenge infections of *Eimeria* in broiler chickens. The study on the use of Coccivac®-B vaccine in broilers revealed that the Coccivac®-B is a safe anticoccidial vaccine (Lee, et al., 2009).

Our results revealed that,

Mean Clinical signs and mean dropping score values were higher in vaccinated broiler farms in comparing with medicated ones at 21th and 28th days of age, meanwhile , clinical signs and dropping score were lesser value in vaccinated in comparing with medicated broiler farms at day before slaughter. That result discussed before may attributed to that vaccination had the advantage of protecting birds against clinical coccidiosis during the period just before slaughter , when an anticoccidial drug would normally have to be withdrawn, leaving any susceptible birds unprotected against disease ***Williams and Gobbi,(2002).***

The results of clinical signs agree with that recorded by *Suo,et al., (2006)*who found that Clinical symptoms of gloomy, crowding, watery feces and/or bloody feces were observed in approximately 10–15% of vaccinated chickens between days 12 and 14 post-immunization with vaccine then they behave normally , whereas no clinical symptoms were observed in medicated control birds during the same time period **and *Olga Zorman Rojs ,et al., (2007)*** who found that no clinical coccidiosis was diagnosed in the vaccinated flocks. **In contrary results disagree with that recorded by *Williams, et al., (1999)*** who found that no clinical diseases of any kind were observed in any houses of vaccinated birds during the nine trials but Coccidiosis occurred in the medicated controls of one trial at 24 day old, ***Williams and Gobbi (2002)*** who found that, no substantial difference between the clinical statuses of the flocks of vaccinated and anticoccidial drug-treated birds and no clinical or subclinical signs of coccidiosis **and *Suo,et al., (2006)*** who found that outbreaks of clinical coccidiosis occurred in all of the containing medicated chickens and these chickens had to be treated with anticoccidial drug treatments (Diclazuril and Toltrazuril) **.**

The results of dropping score, no record about that criterion based on our available literature.

Mean Mortality % at the end of the production cycle were higher value in medicated broiler farms (7.2%) than vaccinated ones (6.2%).

The results of mortality% at the end of production cycle, agree with those recorded by ***Williams, et al., (1999)*** who found that the losses from the vaccinated birds totaled 7.0% and those from the medicated birds 7.6 ***and (Bushell, 1992; Williams and Gobbi ,2002;Bushell et al .,1990,1992 ; shirely et al.,1995)*** who found that vaccinated broilers have significantly lower mortalities than birds treated with anticoccidial drugs.

The results of lesion score, At 21th day of age, Mean lesion score of upper and middle portions were higher in vaccinated broiler farms in comparing with medicated ones, meanwhile, mean lesion score at 28th day of age and day before slaughter of same portions was of higher value in medicated broiler farms in comparing with vaccinated ones (table (2&3) and figures (1, 2, 9&10)). At 21th day of age Mean lesion score of cecal portion was of higher value in vaccinated in comparing with medicated broiler farms while at 28th day of age, it was nearly equal for both vaccinated and medicated broiler farms but at day before slaughter, it was of higher value for medicated broiler farms in comparing with vaccinated ones (tables (2&3) and figures (3,4&11)).The results of lesion score, no literature about that criterion is available literature.

The results of counted oocysts,At 21th day of age, the counted oocysts in the vaccinated farms was higher value in comparing with medicated farms ,on the other hand, at 28th day of age & day before slaughter ,the count in the vaccinated farms was lesser value in comparing with medicated farms numerically but that difference non-significant statistically .So, vaccinated farms showed one large peak at 21days and medicated farms showed one large peak at 28 days and remaining time medicated farms showed increasing in count than vaccinated farms (table (4) and figures (5&7)).The results of counted oocysts agree with that results recorded by ***Williams, et al., (1999)*** who found that the patterns of mean oocysts counts in the litter vaccinated birds produced a rapid build-up of oocysts peaking at 21 days. Medicated birds produced a rather slower build- up with a single peak at 35 days with higher numbers remaining than numbers in the vaccinated crops **and *Suo,et al., (2006)*** who found that a larger peak from days 11 to 20days oocysts production were observed in each house during the experiment in immunized chickens. Samples from medicated birds showed irregular curves with numbers higher than of vaccinated ones after this period, because anticoccidial drugs (Diclazuril and Toltrazuril) were used to control clinical coccidiosis. **In contrary results disagree with that recorded by *Williams and Gobbi (2002)*** who found that in all farms of vaccinated birds there was a major peak of oocysts numbers in litter at 27 days ,with a shoulder at 34 to 36 days , somewhat suggestive of a second surge of oocysts production that had been rapidly brought under control by the birds immunity, indicating that the faster developing precocious lines contributed to at least the earlier portion of the peak in vaccinated birds. The late shoulder on this peak coincident with the maximum oocysts counts in anticoccidial drug treated birds. It is notable that the litter oocysts concentrations for the birds treated with anticoccidial drugs were much lower than those for vaccinated birds.

The results of production indicies ,At the end of production cycle: mean body weight of medicated broiler farms (1.980Kg) were slightly higher in comparing with vaccinated ones (1.850 Kg). F.C.R was equal (1.9) in both vaccinated and medicated farms. Viability was nearly equal in both vaccinated (92.8) and medicated (92.7) broiler farms. Slaughter age was earlier in vaccinated (40thday of age) in comparing with medicated (43th day of age) broiler farms. Production index (PI) was higher value in most of vaccinated broiler farms in comparing with farms used anticoccidial drugs, mean while the mean PI showed non-significant difference between both farms statistically (table (5) and figure (6)). The results of production indices agree with those reported by ***Williams, et al., (1999)*** who found that the final mean weights of the birds closely similar for each house overall 2.743kg (V) and 2.839 kg (M). The slight difference between final mean weights of these birds is not considered to be crucial, ***Williams and Gobbi (2002)*** who found that a smooth growth curves of vaccinated and anti-coccidial drug treated birds of both sexes. Indicating that, neither treatment had produced any growth check. No significant difference in F.C.R between vaccinated and medicated farms. ***Suo,et al., (2006)*** who found that the average survival rate of vaccinated chickens (95.28%) was significantly higher than medicated chickens (91.98%). The average FCR of vaccinated birds was higher than those of medicated birds, although the difference was not significant **and *Olga Zorman Rojs,et al., (2007)*** who found that vaccinated birds had a comparable performance with medicated birds.**On the other hand our results disagree with those recorded by *Williams,et al., (1999)*** who found that F.C.R in medicated farm better than vaccinated farm **and *Volk, et al., (2005)*** who found that body weight at the end of the cycle in medicated farms was higher than vaccinated farms with significant difference.

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