

A Comparative Study on the Efficacy of Using Food Streaming and Anticoccidial Vaccination of Replacement Chickens in Algeria

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Abstract. The trial conducted in 2007-2008, assesses the importance of anticoccidial vaccination on groups of future layer chicken (during 64 weeks) compared to the incorporation of Semduramycine in the food. 04 buildings of 8500 subjects each, and taken to the same (02 buildings where vaccinated receiving free food and anticoccidial, 02 buildings have not been vaccinated but fed a supplemented Semduramycine). The zoological technical parameters (Consumed, laying rate and uniformity) and parasitological (lesion score) are more profitable in vaccinees.

Key Words: Coccidiosis / Futures hens / Vaccination / Ionophore / Performance / Algeria.

INTRODUCTION

There are no farms without coccidian which are mostly found where poultry are raised. They can take many forms and exist in the world and in any type of poultry farming [21]. They have an economic impact estimated at two billion dollars per year, including mortality (6-10%), the cons-performance (decreased weight gain, increased feed conversion, decommissioning to the slaughter, poor homogeneity) and the cost of prevention and treatment [12]. The etiologic agents are protozo, a specific parasite of the epithelial cells of the gut, coccidia of the genus *Eimeria* that infect seven species of chickens [21]. Whatever the type of farming (industrial, biological or label), the fight against coccidia is a problem of rearing broiler future layers chicken [1]. The coccidiostats, ionophores or synthetic products added to food (food additives), have enabled the development of poultry farming. After more than 50 years of use, resistance emerged and new concerns emerge such as food safety and consumer safety [12]. The restrictions of the European Union for a generation without antibiotics led to the abandonment of research for new molecules but have stimulated the search for new alternatives, more natural, able to reduce infection, strengthen the defenses of the host by stimulating the immune system, assist in the healing and repair of damage caused by the parasite. Among the new strategies, vaccination is an ideal alternative to chemotherapy. For Vienot [14], thanks to vaccination, not only are protected poultry against coccidiosis, but performance in livestock are equivalent or even superior to those receiving lots of anticoccidial in their diet. This preventive approach is new in Algeria since the emergence of the phenomenon of "wear" met not only with anticoccidial synthesis but also with ionophores.

In order to effectively prevent the occurrence of coccidiosis in poultry farming, the aim of this study is to compare the effects of vaccination with a coccidiostat ionophore widely used in continuous feed, in future layers pullets. This comparison is based on the assessment of animal performance (number of deaths, rate of lay and rate of homogeneity) and the lesion index between the two lots.

MATERIAL AND METHODS

Animals: The chickens are raised in future layers of modern buildings (Tadjenanet-Setif), from chicks born in the hatchery of Orava (Poultry East Regional Office).

Treatment: The total workforce is 34,000 subjects, distributed in 04 buildings of 8500 subjects each, reared strictly under the same conditions and subdivided into 02 lots of 02 buildings:

- Buildings 1 and 2 for unvaccinated animals (NV) and receiving a diet with an anticoccidial continuously (Semduramycine)
- Buildings 3 and 4 for the vaccinated animals (V), receiving a diet without anticoccidial.

The vaccination protocol used Paracoxi-8®, a live attenuated vaccine, based on early stem major species of coccidia. It is deposited in surface water drinking in a single administration, between the 5th and 9th day of age, at a dose of 0.1 ml per chick. The animals are hungry two hours before vaccination. It is prohibited to use anticoccidial drug or anticoccidial effect throughout the life of birds.

Procedures: Two types of comparative parameters have been recorded since the date of inception until the reform of animals:

Zootechnical parameters: Each week for 64 weeks, mortality, the rate of entry into uniformity with the egg⁽¹⁾ and laying rate were recorded.

Parasitological Parameters: Evaluation of lesions of coccidiosis⁽²⁾.

¹**Uniformity (score 0-4):** 0 = Mixed, 1 = little homogeneous, 2 = Moderate homogeneous Homogeneous 3 =, 4 = very homogeneous.

²**lesion scores** (Johnson & Reid): 0 = No lesions, 1 = minor lesions, 2 = extensive lesions, 3 = large lesions, 4 = very significant injuries.

¹ - The rate of homogeneity is calculated by randomly weighing 50-100 subjects each building.

It makes a mark in weight to + and - 10% of average weight. There are animals that fall within that range. Then, we calculate the percentage that these animals are compared to the total. This parameter has two advantages: it ensures a better rate of egg production and increases the value of chickens to reform.

² - The intestines are held in a location with adequate lighting. The severity of lesions of the digestive system is directly related to the intensity of infection by coccidia. These lesions are specific to each species of coccidia. Described by Reid and Johnson [9.6] for the diagnosis of chicken coccidiosis (*E. acervulina*, *E. brunetti*, *E. maxima*, *E. necatrix*, *E. tenella*) are rated from 0-4: zero for no injury and four the highest.

Statistical methods: Statistical analysis was performed by calculating variance (ANOVA) which allows us to deduce the standard deviations (square root of variance).

RESULTS AND DISCUSSION

Prior to entering the laying (S0 to S19): Although there were fewer deaths in the vaccine batch (4.9%) than in the unvaccinated Lot (6.05%), the overall mortality rates remain relatively high. Uniformity looks better for batch vaccinated (81%) than for unvaccinated lot, but small compared to the standard required (95%) (Table 1). The amount of food consumed before the transfer of subjects to buildings lay at the 18th week (Table 2) show an increase of 4.9 quintals Profit lots of animals vaccinated. Subjects who received the food consumed with an anticoccidial 1160.1 1155.2 quintals cons for vaccinated animals.

Global (S0 - S64): The same parameters (Table 1) are recorded in (Tables 3,4) but for the

entire breeding cycle (64 weeks). The differences tend to benefit the lot vaccinated, is confirmed for both mortality rates than the rates of consistency lots, without being significantly different.

Laying rate: The rate of egg weekly show a slight advantage for vaccinated buildings with values respectively of 64.4% (Bt 03) and 62.4% (Bt 04) against 64% (Bt 01) and 62 % (Bt 02), a different way by building the order of 0.4% (Table 5).

Parameter parasitology: lesion score of Johnson and Reid (Day/42): The autopsies were performed on the 42nd day of rearing on samples of three subjects per building. Coccidial lesions are observed only on a few subjects from receiving lots of anticoccidial continuously in the food. The index lesion did not note + 1 an exasperated, and the lesion score means (SLM) are very low (0.08 and 0.16 respectively for buildings 01 and 02. These lesions are due to coccidial species caecal (*E. tenella*) and the posterior intestine (*E. brunetti*). The table recapitulates all registered breeding parameters. Productivity gains are for all these parameters significantly the characteristic of Lots of animals vaccinated.

Economic value of vaccination: Vaccination has benefited the production gains (0.6% on mortality and 0.5% on rates of oviposition). Without the figures, we could not deduce the expenses related to the therapeutic use of anticoccidial preventive and healing.

- Reduction of 0.6% mortality: $45 \times 1.000 = 45\ 000\ AD\ * \ **$

- Gain an egg / hen on egg-laying cycle: $0.5 \times 17\ 000 = 8500\ eggs = 5950\ chicks\ (\ 70\ %\ hatchability) = 5950\ chicks \times 45\ AD = 267.750\ AD$

- Save costs of medical treatment: 20.000 AD

- Global Gains

Gain = $45,000 + 267,750 + 20,000 = 332,750\ AD$

Immunization expenses = $16,000 \times 17 = 272\ 000\ A\ D$

Net earnings * = $332750 - 272000 = 60750\ AD$

(* = Price of a chick = 1.000 AD / * * 1 Euro = 100 AD (Algerian Dinar)

The mortalities recorded during the 64 weeks of rearing, are less severe in vaccinated chickens than among those receiving the anticoccidial continuously in the food. The mortality of 2160 against 2207 makes a difference of 47 animals (0.6%). Virtually, all field studies show a better protection against coccidiosis (low mortality rate and improves the integrity of the intestinal mucosa) at the vaccination than during chemotherapy based anticoccidial (Monensin, salinomycin, Nicarbazin, Halofuginone) in the food [4, 2, 10, 13, 18, 17, 16]. However, although the number of deaths was not statistically significant, it is nevertheless apparent in productivity. Some statistical studies have shown that the financial gain in the adoption of a vaccination program, compared to the continuous integration (or "shuttle") of an anticoccidial in food [8]. Depending Champagne [2], the production costs should include not only the fixed costs (depreciation on investments, fees on loans, insurance and payroll taxes) and variable costs (heating, veterinary expenses and management of disinfection, Water, Electricity, Abductions) but also the cost of feed, chicks and laborers. We have considered in our calculations that the gains in livestock production which we have deduced the cost of vaccination (assuming, with the exception of food, other expenses being equal). The vaccine has an overall net profit of 600 € In addition, lots of animals vaccinated before their transfer to the 18 th week of entry into eggs, consumed less food (Difference = 4.9quintaux). The score of the homogeneity of the batch is different between vaccinated animals (81%) and animals receiving the anticoccidial (80%). The improvement (1%) is particularly noticeable with age. Field research [18, 17, 12] are unanimous in giving greater homogeneity chickens vaccinated phenomenon particularly visible runout. This is a significant capital gain on the sale of chickens to reform. Finally, by monitoring animal weight, there is a difference of 120g

for the benefit of subjects of buildings 01 and 02 (unvaccinated), whereas those of the buildings 03 and 04 (recipients) have a body weight within the standards required by Modern farming techniques. Overweight is proved detrimental to egg production.

Although the lesion score is almost zero (vaccinees) or very low (unvaccinated), the parasite load does not seem great. However, vaccination confers greater protection against the risk of infections that coccidial chemotherapy [4, 3.10, 15,16, 17, 19, 18]. Moreover, some writers are comparable [21, 7, 11]. Vaccination has improved slightly laying rate (0.4%) and hatchability (1%). It is obvious that protected animals against coccidian parasitism, enhance and optimize their metabolism production.

Table 1:

Building	Mortality (%)			Score	Homogeneity	
	Cumulative / Btt	Proportion	Average / Lot	Injury)	Rate	Medium
01 (N.V)	536	6,3	6,05	2,8	77	78,5
02 (N.V)	495	5,8		3	79,9	
03 (V)	470	5,5	4,9	2,9	81	81
04 (V)	369	4,3		3,2	81	

Table 2:

Total quantity of food consumed depending on the batch.

Quantity of Food Consumed	Treatment groups Aviax ®	Lots Vaccinated Paracoxi-8 ®
Before the transfer (18th week)	1160,1 q	1155,2 q
Difference	4,9 q	

* NV = not vaccinated animals (receiving the ATC in the food V = vaccinated animals. Anticoccidial = ATC.).

Table 3 :

FINAL RESULTS S0 to S 64	Building	Mortality		Homogeneity Clutch	
		Number	%	Score (%)	Rate
Animals receiving ATC	01	1210	14.2	2,90 (78.5%)	64%
	02	1096	12.9		62%
Vaccinated	03	1133	13.3	3,05 (81%)	64.4%
	04	1024	12		62.4%

Table 4:

Building	Mortality Cumulative	Percentage Average	Homogeneity	Rate Clutch	Rate Hatching
unvaccinated	2207	26%	2,90 (78.5%)	63%	80%
Vaccinated	2160	25,4%	3,05 (81%)	63.4%	81%
Difference	47	0,6%	0.15 (2.5%)	0.4%	1%

Table 5:

Rate of lay depending on the premises				
Building	UNV-1	UNV-2	V-3	V-4
Medium	64%	62%	64,40%	62,40%

UNV = unvaccinated, V = Vaccinated.

CONCLUSIONS

At the multiplication of 'organic', the ban on additives in feeding animals (Naciri, 2001), globalization and chicken production quality and lowest price vaccination is a prophylactic measure innovative and interesting for the poultry industry. It has, in addition to animal performance, other benefits, such as the absence of residues in carcasses and eggs, lack of chemo resistance [Naciri, 2001; Vienot, 2005] and the presence of the phenomenon of "Recycling" which can reduce the parasite load of litter and reduce the risk of sudden infestation of chickens. Maintaining such a litter provides virtually no risk of development of coccidiosis [Lunden et al, 2003; Waldenstedt et al, 1999; Williams, 1994; 1998]. The use of the vaccine (Paracoxi-8 ®) in protection against avian coccidiosis has shown some advantages compared to livestock continuous use of an anticoccidial ionophore (Senduramycine) in the food. A single vaccine can protect the animal throughout its life. In Algeria, when coccidiosis is still a problem recurring disease of poultry farms, widespread vaccination is facing a "resistance" tough followers of the chemotherapy.

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