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REDUCTION OF CONDEMNATIONS AT PROCESSING PLANT THROUGH VACCINATION IN THE HATCHERY

ATCHERY

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INTRODUCTION

Total or partial condemnation of carcasses in the slaughter houses has always been a major concern for the poultry industry as it represents huge economical losses for companies. In the United States of America, losses due to cellulitis, an inflammation of the subcutaneous tissue of broilers (usually contaminated with *Escherichia coli*), exceed 35 million USD per year. Combined with other losses, from carcass downgrades, slowed processing line speeds and further processing expenses, total costs may exceed 70 to 80 million USD annually.

Moreover, the condemnation rates in the processing plants due to some particular causes tend to increase because of more intensive production practices adopted by the modern broiler producers. This is evident in a survey carried out in Canada, where, in 1986, 0.048% of broilers slaughtered in that country were condemned for cellulitis. Ten years later, in 1996, the level of condemnation due to the same problem had reached 0.586% of the carcasses. In 2004, these levels grew to 0.8% which means that approximately 4.7 million birds were lost to the marketplace due to cellulitis. Undoubtedly, cellulitis has become a leading condemnation category and therefore a major concern for broiler producers in recent years.

Because of these enormous losses, the broiler industry has constantly tried to improve the facilities, optimized the stock densities and even improved some management techniques. Furthermore, broiler producers seek continuously for new ways of reducing the condemnation rates at the slaughter house.

Recently, some trials have demonstrated that concentrating the vaccination in the hatchery and therefore reducing the number of vaccines applied in the farms can contribute to reduce the condemnation at the processing plant and consequently improve the profitability of the companies. This article will describe some of these trials and discuss their results.

VACCINATION IN THE HATCHERIES vs CONDEMNATION RATES

The vaccination of the day-old chicks in the hatcheries effectively started in the 70's with the development of the vaccine against Marek's Disease (MD) and over the years it has become an increasingly important practice in poultry industry.

There are several reasons for moving the vaccination from the farm towards the hatchery. It saves costs and improves the logistics of the vaccinations, reduces the stress of the birds while avoiding problems related to massive vaccination in the farm and stops the risk of spreading diseases through the vaccination crews. Furthermore, in a production structure of any integrated company, it is much easier to provide more uniform vaccination to all chicks when it is carried out in one hatchery instead of doing it in hundreds of farms.

Recently, some field trials have demonstrated one additional benefit to the ones aforementioned. Flocks vaccinated in the hatchery have shown less rates of condemnation in comparison to ones vaccinated in the farms.



Trial 1:

In a company located in the Southern part of Brazil, a comprehensive comparative trial involving nearly 600,000 broilers in two consecutive cycles was carried out in a region considered of low IBD challenge. In these trials, 188,000 birds were vaccinated against IBD in the hatcheries (Cevac[®] Transmune IBD) while the other 388,000 were vaccinated twice in the field with intermediate IBD vaccine as summarized in the following table:

AGE	HATCHERY GROUP	ROUTE	FARM GROUP	ROUTE
Dav-old	Cevac [®] Transmune IBD	SC	Marek's vaccine associated with	SC
chicks	s Marek's vaccine SC conventional int		conventional intermediate IBD live vaccine	
	ND/IB live vaccine	Spray	ND/IB live vaccine	Spray
Day 06			Conventional IBD Intermediate strain	DW
Day 15			Conventional IBD Intermediate strain	DW

Vaccination programs of the two different groups:

The first observation was a significant improvement of the field performance of those flocks vaccinated in the hatcheries with reduction of mortality, reduction of FCR and consequently improvement of the efficiency index.

Field performance of broiler flocks:

	BW	Age	Mortality	FCR	PEI
Cevac [®] Transmune IBD in the hatchery	2.64	45	3.36	1.69	335
IBD intermediate plus strain in the farms	2.68	45	4.89	1.77	320

However, the most interesting findings came from the processing plant. Flocks vaccinated in the hatchery had 2.73 points less overall condemnation as compared to the group receiving the IBD vaccines in the farm.

BREAKDOWN OF CONDEMNATION CAUSES



Going into more details, those flocks vaccinated with Cevac[®] Transmune IBD in the hatcheries had significantly lower condemnation rates due to airsaculitis, cellulitis and other pathologies, as illustrated by the graphic here above.

Trial 2:

Another large field comparative trial, involving nearly 1 million male broilers, was carried out in Brazil. One group of 600,000 chickens was vaccinated with Cevac[®] Transmune IBD in the hatchery and the other group, of 388,000 chickens, was vaccinated against IBD in the field with intermediate plus IBD vaccine. All the other vaccines were the same for both groups.



The broilers were slaughtered, in average, at 42 days of age and the field performance is summarized in the table here below:

Field performance of broiler flocks:

	Bodyweight	Mortality	FCR	PEI
Cevac [®] Transmune IBD in the hatchery	2.43	3.51	1.84	304
IBD intermediate plus strain in the farms	2.42	3.49	1.85	300

In the same way as the trial described previously, the comparison was extended to the slaughter house. The results are shown in the following graphic:



BREAKDOWN OF CONDEMNATION CAUSES

These results show a reduction in the overall condemnation rates, being noticeable the decrease of condemnation due to unthriftness (development problems – decreased body weight gain, lack of uniformity – of domestic animals commercially raised) and cellulitis.

Trial 3:

In a comparative trial conducted in United Kingdom, 22 broiler flocks were vaccinated against IBD using conventional IBD vaccines in the farms and 4 flocks were vaccinated with Cevac[®] Transmune IBD in the hatcheries. The total condemnation rates of these two groups were evaluated and are shown in the graphic here below:



TOTAL CONDEMNATION RATES

These results clearly show that flocks which received IBD vaccine in the hatcheries had significantly less (1.95 percentual points) condemnation rate as compared to those flocks vaccinated with conventional IBD vaccine at the farm.



Trial 4:

In France, in a trial involving almost 1.3 million broilers was performed in an area considered as of strong IBD virus pressure. One group of broilers (400,000 birds) was vaccinated with Cevac[®] Transmune IBD at day-old in the hatchery while the other group (870,000 birds) was vaccinated twice with an IBD intermediate vaccine through drinking water.

The following table summarizes the field performance of both groups:

Field performance of broiler flocks:

	Mort	BW	Age	FCR	PEI
Cevac [®] Transmune IBD in the hatchery	4.96	2.019	42.02	1.839	249
IBD intermediate strain in the farms (2 X)	6.04	1.968	42.21	1.866	238

In this trial, a reduction in the overall condemnation rates, as shown in the graphic here below, was also observed:



CONDEMNATION RATES

Trial 5:

In South Africa, large comparative trial involving approximately 5 million broilers was carried out to evaluate the field performance and the condemnation rates of flocks vaccinated against IBD in the hatchery and flocks receiving the vaccine at the farm. Six hundred and thirty thousand (630,000) day-old chicks were vaccinated, through subcutaneous route, with Cevac[®] Transmune IBD and their field performance was compared to 4.4 million broiler vaccinated at the farms on day 18 of age with an IBD hot vaccine strain.

The field results are summarized in the following table:

Field performance of broiler flocks:

	Mort	BW	Age	FCR	PEI	Kg/m ²
Cevac [®] Transmune IBD in the hatchery	5.02	1.8	36	1.72	267	30.3
IBD hot strain in the farms	5.48	1.78	36	1.72	264	29.8

When the comparison was done at the processing plant, again a sharp reduction in total condemnation rate was observed:



CONDEMNATION RATES



Trial 6:

In a major integrated company in Thailand, three consecutives trials, involving approximately 430,000 broilers, were carried out with the objective to evaluate the field performance and the condemnation at the processing plant. One group of broilers had the vaccination program concentrated in the hatcheries and hence reducing the number of vaccines applied at the farm. The other group had the vaccination program spread between the hatchery and the farm as detailed in to the following table.

Vaccination programs of the two different groups:

AGE	HATCHERY GROUP	ROUTE	FARM GROUP	ROUTE
Day-old	Cevac [®] Transmune IBD	SC	ND inactivated vaccine	SC
chicks	ND inactivated vaccine	SC	IB live vaccine	Spray
	IB live vaccine	Spray		
Day 06	ND live vaccine (HB1 strain)	DW	ND live vaccine (HB1 strain)	DW
Day 15			IBD Intermediate plus strain	DW

By comparing these two vaccination programs, it is possible to note that the major difference is the vaccination against IBD in the hatcheries using Cevac[®] Transmune IBD and therefore skipping one vaccination against this disease at the farms.

The field performance of those flocks rather similar as it can be seen in the following table:

Field performance of broiler flocks:

	Mort	BW	Age	FCR	PEI
Cevac [®] Transmune IBD in the hatchery	5.54	2.569	40	1.80	337.7
IBD intermediate plus strain in the farms	5.50	2.570	40	1.79	338.6



BREAKDOWN OF CONDEMNATION CAUSES

However, the condemnation rates observed at the slaughter plant was nearly 0.5 point lower for the hatchery group than for those flocks vaccinated against IBD at the farm. Moreover, there was a reduction in the three main criteria evaluated by this company: cellulitis, CRD and skin lesions.



DISCUSSION

It is clear that different companies adopt different criteria to evaluate their condemnation rates at the slaughter plant. Nevertheless, in all these six aforementioned trials, carried out in different parts of the world, there was a reduction in the condemnation rates when the vaccination was concentrated in the hatcheries. As these findings do not seem to be just a coincidence, it is necessary to speculate what would be the reasons for such an improvement in the condemnation rate at the processing plant and consequently increasing the meat yield.

Undoubtedly, production practices at the farms have a major influence on the quality of carcasses in slaughter house. Investigations into the predisposing factors that lead to the development of cellulitis due to the loss of the skin integrity have resulted in a fairly lengthy list of conditions and management factors that appear to have positive correlation with the development of this condition. Stock density, quality of the litter, ventilation, downtime between flocks, feed space, lighting programs, temperature and others seem to have a positive correlation with the condemnations due to cellulitis. In fact, it is also necessary to consider that some other predisposing factors associated with cellulitis are related to the chicken itself like feathering, growth rate, sex, breed, behavior and others.

Moreover, the possibility of increasing problems with scratches when birds rapidly move either to feeders or drinkers was already documented. Therefore, the reduction of occurrence of cellulitis in the flocks vaccinated in the hatcheries can be attributed to the reduction of the frantic movement of the broilers during the drinking water vaccination at the farms. During this process, it is a common practice to withdraw the water supply in order to make the broilers thirsty. Consequently, after making the vaccine solution available, the birds tend to rush to the drinkers, contributing to increase the scratches on their skin which may become contaminated and therefore leading to cellulitis.

Another possibility has also been raised to explain the reduction in the condemnations at processing plant. In those six aforementioned trials, even though no clinical IBD outbreak was reported in the flocks vaccinated at the farms, there could have been a sub-clinical disease and therefore some of the condemnations were related to it. After introducing Cevac[®] Transmune IBD in the hatcheries, this sub-clinical disease was efficiently controlled and hence the condemnations dropped down.

Even the stress associated with the farm vaccination may also be considered, to certain extent, as a cause of the increase of the condemnation rates in the processing plants. By reducing the stress, a positive impact may be seen on the reduction of those losses. However, even though it is clear that there is some level of stress associated with vaccination at the farms, it is not very easy to demonstrate.



CONCLUSION

The causes leading to carcass condemnation in the processing plant are complex and multi-factorial. Hence, their reduction through improvement of production practices is not a simple task and the poultry industry has to keep enhancing the conditions which allow the growers to achieve good field performance without increasing the condemnation rates at the processing plant.

The adoption of hatchery vaccination, and therefore reducing the number of the vaccination at the farms, seems to have a positive impact on the reduction of condemnation due to cellulitis. Moreover, in an industry where the margins are so narrow, small details can make the difference between economical losses or profits. By moving the vaccination from the farms to the hatcheries and eventually reducing the condemnation rates can be one step further towards profitability.

And last but not least, although all the results from the aforementioned field trials show very promising results, it is necessary to consider that any consistent analysis related to variation in condemnation rates at slaughter should involve large number of broilers for each production system. The more flocks evaluated, the more accurate and reliable the results will be.

COUNTRY	NO. BROILER	IS TYPE OF IBD VACCINATION	PRODUCTIVE INDEX	TOTAL CONDEM. RATE	REDUCTION WITH TRANSMUNE
BRAZIL	188,000	CEVAC® TRANSMUNE IBD	335	1.45	CE0/
(Southern Part)	388,000	2 doses of IBD intermediate strain in the farms	320	4.18	- 05%
00.171	600,000	CEVAC® TRANSMUNE IBD	304	1.73	40/
BRAZIL	388,000	1 dose of IBD int. + strain in the farms	300	1.80	- 470
UNITED	22 flocks	CEVAC® TRANSMUNE IBD	AC® TRANSMUNE IBD NA		
KINGDOM	3 flocks	1 dose of IBD int. + strain in the farms	NA	3.65	- 47%
FRANCE	400,000	CEVAC® TRANSMUNE IBD	249	0.66	220/
FRANCE	870,000	2 doses of IBD intermediate strain in the farms	238	0.98	- 33%
SOUTH	630,000	CEVAC® TRANSMUNE IBD	267	1.20	500/
AFRICA	4,400,000	1 dose of IBD hot strain in the farms	264	2.40	- 50%
THAILAND	216,000	CEVAC® TRANSMUNE IBD	338	3.39	100
	216,000	1 dose of IBD int. + strain in the farms	339	3.78	- 10%

Table 1: Comparative Results of the Impact of Vaccination on the Productive Performances and Condemnation Rates



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