



**MEZINÁRODNÍ TESTOVÁNÍ DRŮBEŽE
ÚSTRAŠICE**

státní podnik

390 02 Tábor 2

Česká republika

BROILER FEEDING TEST No. 4/2024

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13 February – 19 March 2024

**Study Investigator:
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Aim of the project

Ionophores are routinely added to broiler feeds to prevent the serious intestinal disease coccidiosis, and no veterinary prescription is required. Concerns about the overuse of coccidiostats is starting to raise, and it's legitimate to wonder if they should ultimately be phased out. Ionophores also help control another serious intestinal disease, necrotic enteritis, which was previously partly controlled by higher use of medically important antibiotics. In the case of phasing out ionophores, new solutions should be found to control both coccidia and *Clostridium perfringens*.

Basic tests information

The basic dates

Beginning of the test: 13 February 2024

End of the test: 19 March 2024

Location of the test

Mezinárodní testování drůbeže s.p., Ústrašice

Material and methods

Material

In total there were 840 day old chicks (males) of xxxxx. Day old chicks were randomly distributed into 4 treatments (10 pens for sample).

Experimental treatments

Treat. No.	Treatment	xxxxx	xxxxx	xxxxx	xxxxx
1	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
2	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
3	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
4	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx

Origin of hatching eggs: xxxxx, age of the breeding flock was 41 weeks.

Housing system

Chickens were kept in the windowless chicken house with full climatic control, on deep litter. Drinking water was supplied ad libitum by nipple drinkers. Each pen was equipped with manually filled tube feeders. Bedding material was wood shaving.

Lighting programme

Day 1 - 7	23 hours of light + 1 hour of darkness
Day 8 - 32	18 hours of light + 6 hours of darkness
Day 33 – 35	23 hours of light + 1 hour of darkness

Veterinary precautions

The chicken house was disinfected by xxxxx before the chick placement. On days 1 and 12 chickens were vaccinated with xxxxx.

Feed

Feed was produced in Mezinárodní testování drůbeže, s.p.

Day 1 – 14	Starter (BR1)
Day 15 – 28	Grower (BR2)
Day 29 – 35	Finisher (BR3)

Diet formulas

Components (%)	Starter BR1	Grower BR2	Finisher BR3
Soybean meal	37.00	33.00	31.00
Wheat	35.00	38.00	39.00
Maize	20.85	21.00	21.00
Soybean oil	3.10	4.30	5.50
Limestone	1.42	1.08	0.86
MCP	1.10	1.10	1.10
Salt	0.30	0.30	0.30
Na ₂ CO ₃	0.15	0.15	0.15
L-lysine HCl	0.30	0.28	0.26
L-threonine	0.20	0.15	0.20
DL-methionine	0.068	0.136	0.126
Premix AMVBR1 Plus	0.50	-	-
Premix AMVBR2 Plus	-	0.50	-
Premix AMVBR3 Plus	-	-	0.50
Nutrient content			
Crude protein (g/kg)	215.73	201.08	192.80
ME (MJ/kg)	12.37	12.78	13.11
Lysine (g/kg)	14.39	13.20	12.51
Methionine (g/kg)	6.16	6.25	5.74
Met.+Cys. (g/kg)	10.04	9.92	9.30
Ca (g/kg)	9.50	7.89	6.90
P (g/kg)	3.23	3.21	3.20
Na (g/kg)	2.18	2.12	2.09

Parameters recorded and methods applied

Live weight

Live weight was measured on days 1 (all the birds in each pen were weighed altogether). On day 3 each chicken was marked with a wing mark. Chick were individual weighed on days 3, 14, 21, 24, 28 and 35.

Weight gain

Weight gain per phase and average daily weight gains were calculated for the periods 3 – 14 days, 15 – 21 days, 22 – 24 days, 25 – 28 days, 29 – 35 days and for the overall experiment (3 – 35 days).

Feed conversion ratio

Feed consumption and feed conversion ratio to gain ratio were calculated for the periods 1 – 14 days, 15 – 21 days, 22 – 24 days, 25 – 28 days, 29 – 35 days and for the overall experiment (1 – 35 days). The calculation was included weight of deaths.

Feed consumption

Feed consumption was measured per pen for the feed – starter (1 – 14 days), grower (15 – 21 days, 22 – 24 days and 25 – 28 days) and finisher (29 – 35 days).

Mortality

All pens were checked twice a day to see if there were any dead or ill birds. Dead chickens were registered by date and reason of mortality on the day of death. Mortality was recorded for the periods 1 – 14 days, 15 – 21 days, 22 – 24 days, 25 – 28 days, 29 – 35 days and 1 – 35 days.

Statistical analyses

Performance results of live weight (on days 1, 3, 14, 21, 24, 28 and 35), daily weight gain and feed conversion ratio were statistically evaluated using the ANOVA single-factor model (Duncan test, Scheffe test) or nonparametric method Kruskal-Wallis test.

Results

Tab. No. **1 Hatchability**

2 Performance results:

2a Body weight

2b Weight gain

2c Feed conversion ratio per 1 kg of live weight

2d Feed consumption per 1 kg of weight gain

2e Feed consumption

3 Mortality

4 Statistical analysis of body weight at the age of 35 days

(average body weight, standard deviation, coefficient of variation)

5 - 8 Statistical analyses of performance results

9 Performance results per pen:

9a Body weight

9b Weight gain

9c Feed conversion ratio per 1 kg of live weight

9d Feed consumption per 1 kg of weight gain

9e Feed consumption

Results of incubation and hatching

Tab. No. 1

Treatment	Tr. No.	Fertility	Hatchability		Birds housed	Average weight	
			Set eggs	Fertile eggs		Hatching eggs	Day old chicks
		%	%	%		g	g
T1	1	87.03	81.98	94.20	210	62.43	42.48
T2	2				210		42.95
T3	3				210		42.76
T4	4				210		42.67

Body weight per phases

Tab. No. 2a

Treatment	Tr. No.	Day 1		Day 3		Day 14		Day 21		Day 24		Day 28		Day 35	
		Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
			g		g		g		g		g		g		
T1	1	210	42.48	210	69.88	210	538.33	168	1051.89	127	1303.02	125	1721.84	123	2319.61
T2	2	210	42.95	210	70.70	210	557.22	169	1099.14	128	1362.02	126	1774.80	122	2366.70
T3	3	210	42.76	210	70.76	210	543.98	168	1054.14	127	1303.06	127	1707.10	121	2302.23
T4	4	210	42.67	210	70.50	210	564.56	170	1093.73	128	1344.96	127	1752.71	118	2374.81

Weight gain per phases**Tab. No. 2b**

Treatment	Tr. No.	Day 3 - 14	Day 15 - 21	Day 22 - 24	Day 25 - 28	Day 29 - 35	Day 3 - 35
		Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase
		g	g		g	g	g
T1	1	468.46	514.56	263.24	413.58	595.18	2250.00
T2	2	486.53	545.66	270.85	411.23	581.88	2296.53
T3	3	473.22	514.70	255.65	404.05	594.71	2231.82
T4	4	494.06	529.82	261.05	405.35	607.79	2304.61

Feed conversion ratio (Feed consumption per 1 kg of live weight)**Tab. No. 2c**

Treatment	Tr. No.	Feed conversion ratio				
		Day 14	Day 21	Day 24	Day 28	Day 35
		g/kg LW	g/kg LW	g/kg LW	g/kg LW	g/kg LW
T1	1	1251.22	1362.32	1399.30	1378.74	1524.32
T2	2	1169.49	1273.24	1329.25	1332.97	1478.67
T3	3	1182.20	1268.71	1342.30	1342.53	1498.85
T4	4	1179.60	1273.52	1313.13	1328.50	1505.38

Feed consumption per 1 kg of weight gain (WG)**Tab. No. 2d**

Treatment	Tr. No.	Feed consumption per 1 kg of weight gain					
		1-14 days	15-21 days	22-24 days	25-28 days	29-35 days	1-35 days
		g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG
T1	1	1358.40	1491.03	1573.27	1276.19	2138.58	1561.03
T2	2	1267.16	1390.40	1599.52	1352.22	2124.41	1513.71
T3	3	1283.06	1370.52	1701.98	1343.69	2173.61	1535.45
T4	4	1276.04	1384.66	1509.79	1407.08	2306.57	1541.39

Feed consumption per phases**Tab. No. 2e**

Treatment	Tr. No.	Feed consumption					
		Starter (1-14 days)	Grower (15-21 days)	Grower (22-24 days)	Grower (25-28 days)	Finisher (29-35 days)	Total
		kg	kg	kg	kg	kg	kg
T1	1	141.45	145.51	70.44	65.35	155.40	578.15
T2	2	136.85	144.09	73.13	69.68	152.38	576.13
T3	3	135.05	133.02	73.58	68.95	154.00	564.60
T4	4	139.85	138.73	66.52	72.30	160.00	577.40

Mortality

Tab. No. 3

Treatment	Tr. No.	Mortality in the period													Mortality according causes																	
		Day 1 – 14		Day 15 - 21		Day 22 - 24		Day 25- 28		Day 29 - 35		Day 1 - 35			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
		birds	g	birds	g	birds	g	birds	g	birds	g	birds	g	%																		
T1	1	0	0	2	1454	1	846	2	1461	2	2583	7	6344	3.33														7				80
T2	2	0	0	1	551	1	605	2	2243	4	6615	8	10014	3.81														8				80
T3	3	0	0	2	1034	1	613	0	0	6	9082	9	10729	4.29														9				80
T4	4	0	0	0	0	2	1157	1	944	9	11733	12	13834	5.71														12				80

- Causes:
- | | | |
|-------------------------|------------------------------------|---|
| 1 – Viral diseases | 6 – Wounds | 11 – Sudden death syndrome |
| 2 – Bacterial diseases | 7 – Digestive track diseases | 12 – Cannibalism |
| 3 – Moulds diseases | 8 – Respiratory tract diseases | 13 – Yolk sac. infam. |
| 4 – Parasitary diseases | 9 – Reproduction tract diseases | 14 – Culling and other causes |
| 5 – Tumors | 10 – Locomotion apparatus diseases | 15 – Sampling (excluded of calculation) |

Statistical analysis - Body weight at 35 days of age**Tab. No. 4**

Treatment	Tr. No.	Cocks			
		Number of birds	Average body weight	Standard deviation	Coefficient of variation
			g/birds	g/birds	%
T1	1	123	2319.61	362.43	15.62
T2	2	122	2366.70	271.22	11.46
T3	3	121	2302.23	333.00	14.46
T4	4	118	2374.81	332.68	14.01

Statistical analyses of performance results

Performance results were statistically evaluated using the ANOVA single-factor model (Duncan test, Scheffe test) or nonparametric method Kruskal-Wallis test.

The following symbols are used for levels of significance:

- $p \leq 0,001$ * * * - differences are very high significant
- $p \leq 0,01$ * * - differences are high significant
- $p \leq 0,05$ * - differences are significant
- $p > 0,05$ o - differences are not significant

Body weight - day 1

Tab. No. 5a

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	42.48	0.67		o	o	o
T2	2	10	42.95	0.54	0.155174		o	o
T3	3	10	42.76	0.83	0.375728	0.528937		o
T4	4	10	42.67	0.60	0.528937	0.375728	0.752453	

Body weight - day 3

Tab. No. 5b

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	210	69.88	5.32		o	o	o
T2	2	210	70.70	5.16	0.142790		o	o
T3	3	210	70.76	5.86	0.128466	0.906423		o
T4	4	210	70.50	5.21	0.236145	0.710815	0.649081	

Body weight - day 14**Tab. No. 5c**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	210	538.33	47.23		***	o	***
T2	2	210	557.22	49.20	0.000144		**	o
T3	3	210	543.98	52.95	0.242399	0.006137		***
T4	4	210	564.56	48.44	0.000003	0.129035	0.000040	

Body weight - day 21**Tab. No. 5d**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	168	1051.89	130.40		**	o	*
T2	2	169	1099.14	114.55	0.007238		*	o
T3	3	168	1054.14	127.71	0.998799	0.012098		*
T4	4	170	1093.73	124.64	0.023463	0.983715	0.036719	

Body weight - day 24**Tab. No. 5e**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	127	1303.02	181.91		*	o	o
T2	2	128	1362.02	148.65	0.039307		*	o
T3	3	127	1303.06	155.97	1.000000	0.039464		o
T4	4	128	1344.96	161.33	0.236976	0.871803	0.237602	

Body weight - day 28**Tab. No. 5f**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	125	1721.84	231.57		o	o	o
T2	2	126	1774.80	204.73	0.311507		o	o
T3	3	127	1707.10	213.39	0.963998	0.118107		o
T4	4	127	1752.71	235.62	0.747926	0.889895	0.443118	

Body weight - day 35**Tab. No. 5g**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	123	2319.61	362.43		o	o	o
T2	2	122	2366.70	271.22	0.735393		o	o
T3	3	121	2302.23	333.00	0.981839	0.500198		o
T4	4	118	2374.81	332.68	0.632509	0.998126	0.400081	

Statistical analyses of performance results

Performance results were statistically evaluated using the ANOVA single-factor model (Duncan test, Scheffe test) or nonparametric method Kruskal-Wallis test.

The following symbols are used for levels of significance:

$p \leq 0,001$ * * * - differences are very high significant

$p \leq 0,01$ * * - differences are high significant

$p \leq 0,05$ * - differences are significant

$p > 0,05$ o - differences are not significant

Average weight gain (day 3-14)

Tab. No. 6a

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	210	468.46	44.59		***	o	***
T2	2	210	486.53	45.99	0.000124		**	o
T3	3	210	473.22	50.36	0.297562	0.003646		***
T4	4	210	494.06	46.42	0.000003	0.099930	0.000018	

Average weight gain (day 15-21)

Tab. No. 6b

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	168	514.56	95.78		*	o	o
T2	2	169	545.66	81.61	0.015176		*	o
T3	3	168	514.70	85.20	0.999999	0.015824		o
T4	4	170	529.82	88.94	0.468893	0.433452	0.477032	

Average weight gain (day 22-24)

Tab. No. 6c

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	127	263.24	70.91		o	o	o
T2	2	128	270.85	64.14	0.828522		o	o
T3	3	127	255.65	56.35	0.830303	0.316692		o
T4	4	128	261.05	65.71	0.994811	0.687765	0.930288	

Average weight gain (day 25-28)

Tab. No. 6d

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	125	413.58	81.23		o	o	o
T2	2	126	411.23	101.59	0.998298		o	o
T3	3	127	404.05	98.88	0.902234	0.954705		o
T4	4	127	405.35	114.42	0.934270	0.974296	0.999704	

Average weight gain (day 29-35)

Tab. No. 6e

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	123	595.18	189.04		o	o	o
T2	2	122	581.88	152.02	0.947651		o	o
T3	3	121	594.71	175.04	0.999997	0.953176		o
T4	4	118	607.79	172.53	0.955976	0.717334	0.951787	

Average weight gain (day 3-35)**Tab. No. 6f**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	123	2250.00	360.72		o	o	o
T2	2	122	2296.53	269.82	0.739810		o	o
T3	3	121	2231.82	330.72	0.979022	0.492718		o
T4	4	118	2304.61	331.99	0.637154	0.998122	0.393106	

FCR 14**Tab. No. 7a**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1252.52	62.70		o	o	o
T2	2	10	1171.28	116.67	0.063576		o	o
T3	3	10	1183.71	103.00	0.086623	0.767248		o
T4	4	10	1180.62	48.38	0.089393	0.812473	0.937343	

FCR 21**Tab. No. 7b**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1370.30	132.89		o	o	o
T2	2	10	1274.42	83.46	0.067311		o	o
T3	3	10	1270.68	103.89	0.065634	0.938744		o
T4	4	10	1276.30	105.62	0.059361	0.969245	0.914139	

FCR 24**Tab. No. 7c**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1407.43	112.71		o	o	o
T2	2	10	1333.28	105.36	0.136876		o	o
T3	3	10	1348.41	108.68	0.208596	0.744667		o
T4	4	10	1318.02	82.80	0.083371	0.742583	0.539899	

FCR 28**Tab. No. 7d**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1384.87	80.11		o	o	o
T2	2	10	1335.87	78.95	0.171088		o	o
T3	3	10	1346.45	74.86	0.253964	0.751443		o
T4	4	10	1332.29	60.84	0.155972	0.914700	0.691087	

FCR 35**Tab. No. 7e**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1532.73	92.57		o	o	o
T2	2	10	1481.91	75.30	0.230812		o	o
T3	3	10	1504.03	83.81	0.482176	0.563859		o
T4	4	10	1512.48	86.87	0.597058	0.454253	0.825078	

FCR weight gain - day 1-14

Tab. No. 8a

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1360.08	70.73		o	o	o
T2	2	10	1269.38	128.21	0.061788		o	o
T3	3	10	1285.00	113.87	0.091560	0.737198		o
T4	4	10	1277.34	55.46	0.078173	0.855178	0.860627	

FCR weight gain - day 15-21

Tab. No. 8b

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1518.01	279.12		o	o	o
T2	2	10	1394.71	110.65	0.188469		o	o
T3	3	10	1373.97	189.03	0.161345	0.834009		o
T4	4	10	1394.03	207.90	0.211640	0.994189	0.828699	

FCR weight gain - day 22-24

Tab. No. 8c

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	10	1565.61	221.68		o	o	o
T2	2	10	1654.47	402.89	1.000000		o	o
T3	3	10	1736.10	524.64	1.000000	1.000000		o
T4	4	10	1535.01	355.31	1.000000	1.000000	1.000000	

FCR weight gain - day 25-28

Tab. No. 8d

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1274.57	207.33		o	o	o
T2	2	10	1357.88	140.33	0.326344		o	o
T3	3	10	1337.06	191.18	0.432936	0.793191		o
T4	4	10	1413.00	157.68	0.116431	0.488717	0.370741	

FCR weight gain - day 29-35

Tab. No. 8e

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	2203.89	335.25		o	o	o
T2	2	10	2078.10	193.70	0.487549		o	o
T3	3	10	2226.17	398.04	0.901903	0.442918		o
T4	4	10	2442.39	578.36	0.217756	0.069945	0.235786	

FCR weight gain - day 1-35

Tab. No. 8f

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1570.48	100.24		o	o	o
T2	2	10	1517.26	79.37	0.240072		o	o
T3	3	10	1541.10	88.38	0.500736	0.560262		o
T4	4	10	1549.41	93.39	0.606505	0.461318	0.839014	

Body weight (BW) per box

Tab. No. 9a (page 1)

Treatment	Tr. No.	Box No.	Day 1		Day 3		Day 14		Day 21		Day 24		Day 28		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g		g		g		
T1	1	1	21	41.90	21	67.86	21	549.57	16	1030.81	12	1264.50	12	1664.58	12	2351.58
		2	21	41.90	21	65.48	21	490.90	17	854.53	12	956.58	11	1294.55	11	1634.09
		9	21	42.86	21	72.14	21	562.19	16	1109.88	12	1412.33	12	1866.42	12	2520.25
		10	21	42.86	21	70.81	21	546.67	17	1048.76	13	1318.77	13	1711.31	12	2177.08
		17	21	42.86	21	70.19	21	547.00	17	1089.71	13	1396.54	13	1842.31	13	2560.00
		18	21	42.86	21	69.52	21	518.33	17	1018.41	13	1247.38	13	1657.92	13	2311.00
		25	21	41.90	21	67.48	21	545.05	17	1101.53	13	1369.62	13	1836.00	13	2398.23
		26	21	41.90	21	69.00	21	541.33	17	1076.94	13	1329.77	13	1752.92	12	2375.08
		33	21	43.81	21	73.76	21	554.76	17	1120.82	13	1369.92	12	1784.83	12	2382.42
		34	21	41.90	21	72.52	21	527.52	17	1069.71	13	1343.62	13	1753.38	13	2396.92
T2	2	3	21	42.86	21	68.62	21	548.62	17	1104.59	13	1388.38	13	1823.77	12	2451.50
		4	21	43.81	21	66.57	21	535.10	17	1039.35	13	1238.92	13	1610.31	12	2291.25
		11	21	42.86	21	69.86	21	561.00	17	1103.47	13	1391.23	13	1833.54	13	2393.08
		12	21	43.81	21	70.71	21	562.00	17	1103.47	13	1310.38	13	1733.62	13	2283.54
		19	21	42.86	21	71.05	21	575.57	17	1130.65	13	1411.31	13	1889.15	13	2507.31
		20	21	42.86	21	70.71	21	568.86	17	1058.06	12	1282.08	11	1697.55	10	2249.40
		27	21	41.90	21	72.33	21	562.29	17	1127.18	13	1411.00	12	1851.33	12	2436.50
		28	21	42.86	21	70.24	21	538.52	17	1137.06	13	1426.92	13	1768.08	12	2313.08
		35	21	42.86	21	70.95	21	542.57	17	1064.71	13	1360.08	13	1744.92	13	2338.54
		36	21	42.86	21	75.90	21	577.71	16	1124.38	12	1396.33	12	1791.00	12	2378.67

Body weight (BW) per box

Tab. No. 9a (page 2)

Treatment	Tr. No.	Box No.	Day 1		Day 3		Day 14		Day 21		Day 24		Day 28		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g		g		g		
T3	3	5	21	43.81	21	67.95	21	562.48	17	1074.88	13	1336.77	13	1683.38	13	2241.62
		6	21	41.90	21	68.10	21	523.14	17	942.47	13	1127.00	13	1479.08	11	2036.73
		13	21	41.90	21	66.10	21	526.71	17	1028.47	13	1258.92	13	1605.23	13	2104.00
		14	21	41.90	21	70.90	21	559.24	17	1060.47	13	1279.77	13	1649.31	11	2062.00
		21	21	42.86	21	70.38	21	546.43	17	1089.06	13	1349.00	13	1775.15	13	2405.69
		22	21	43.81	21	71.76	21	501.52	15	978.53	11	1270.73	11	1695.18	11	2341.64
		29	21	41.90	21	70.81	21	548.76	17	1080.47	13	1328.77	13	1755.62	13	2369.00
		30	21	43.81	21	74.48	21	572.00	17	1077.12	12	1327.92	12	1780.17	11	2495.91
		37	21	42.86	21	71.48	21	556.05	17	1104.59	13	1391.77	13	1849.08	12	2515.42
		38	21	42.86	21	75.62	21	543.48	17	1096.47	13	1356.85	13	1802.62	13	2424.77
T4	4	7	21	42.86	21	68.33	21	589.57	17	1148.41	13	1421.62	13	1873.15	12	2626.83
		8	21	42.86	21	66.29	21	535.90	17	958.29	12	1139.17	12	1476.58	9	1876.22
		15	21	42.86	21	71.19	21	563.24	17	1152.47	13	1443.77	13	1918.92	11	2549.91
		16	21	43.81	21	69.62	21	562.86	17	1035.94	13	1230.85	13	1593.92	11	2000.36
		23	21	41.90	21	69.67	21	574.43	17	1133.24	13	1413.31	13	1798.92	13	2497.08
		24	21	42.86	21	71.86	21	573.57	17	1111.24	13	1368.08	13	1762.31	13	2338.54
		31	21	41.90	21	71.43	21	573.00	17	1110.65	13	1370.46	13	1773.15	13	2345.23
		32	21	42.86	21	69.10	21	545.81	17	1089.71	12	1393.83	12	1813.67	12	2473.08
		39	21	42.86	21	72.57	21	577.38	17	1117.29	13	1336.23	12	1733.50	11	2503.00
		40	21	41.90	21	74.95	21	549.81	17	1080.06	13	1320.23	13	1764.92	13	2400.46

Weight gain per phases per box

Tab. No. 9b (page 1)

Treatment	Tr. No.	Box No.	Day 3 - 14	Day 15 - 21	Day 22 - 24	Day 25 - 28	Day 29 - 35	Day 3 - 35
			Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase
			g	g	g	g	g	g
T1	1	1	481.71	485.31	265.75	400.08	687.00	2284.75
		2	425.43	364.00	132.50	332.91	339.55	1569.55
		9	490.05	552.13	294.17	454.08	653.83	2447.67
		10	475.86	502.76	264.92	392.54	471.58	2106.67
		17	476.81	539.29	303.38	445.77	717.69	2490.92
		18	448.81	499.71	240.77	410.54	653.08	2241.38
		25	477.57	554.06	284.38	466.38	562.23	2329.85
		26	472.33	528.53	267.62	423.15	588.08	2305.33
		33	481.00	570.12	279.00	388.25	597.58	2310.08
		34	455.00	550.18	292.46	409.77	643.54	2324.85
T2	2	3	480.00	560.65	281.62	435.38	629.50	2383.42
		4	468.52	503.65	193.00	371.38	629.42	2224.00
		11	491.14	546.71	304.69	442.31	559.54	2324.08
		12	491.29	551.00	232.31	423.23	549.92	2213.38
		19	504.52	563.94	267.00	477.85	618.15	2436.38
		20	498.14	489.65	216.00	402.27	502.10	2179.90
		27	489.95	564.65	293.54	438.67	585.17	2364.25
		28	468.29	596.94	306.92	341.15	550.92	2243.58
		35	471.62	526.24	303.31	384.85	593.62	2268.08
		36	501.81	553.63	308.83	394.67	587.67	2304.17

Weight gain per phases per box

Tab. No. 9b (page 2)

Treatment	Tr. No.	Box No.	Day 3 - 14	Day 15 - 21	Day 22 - 24	Day 25 - 28	Day 29 - 35	Day 3 - 35
			Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase
			g	g	g	g	g	g
T3	3	5	494.52	517.24	268.92	346.62	558.23	2172.77
		6	455.05	426.47	195.46	352.08	555.45	1970.09
		13	460.62	510.18	276.38	346.31	498.77	2039.31
		14	488.33	499.88	203.54	369.54	454.09	1991.64
		21	476.05	554.76	261.77	426.15	630.54	2335.38
		22	429.76	486.60	250.36	424.45	646.45	2268.64
		29	477.95	535.18	285.31	426.85	613.38	2299.31
		30	497.52	513.24	244.42	452.25	696.36	2422.73
		37	484.57	548.41	292.92	457.31	673.67	2443.00
		38	467.86	551.71	275.77	445.77	622.15	2349.38
T4	4	7	521.24	563.29	287.38	451.54	701.25	2558.83
		8	469.62	428.94	193.58	337.42	442.67	1811.78
		15	492.05	582.53	286.00	475.15	648.00	2479.09
		16	493.24	473.59	180.92	363.08	423.45	1929.91
		23	504.76	562.41	296.62	385.62	698.15	2427.46
		24	501.71	536.82	271.54	394.23	576.23	2266.38
		31	501.57	541.12	276.69	402.69	572.08	2273.69
		32	476.71	544.35	290.00	419.83	659.42	2403.58
		39	504.81	540.47	255.77	372.58	668.64	2432.00
		40	474.86	524.65	269.08	444.69	635.54	2327.69

Feed conversion ratio (Feed consumption per 1 kg of live weight) per box

Tab. No. 9c (page 1)

Treatment	Tr. No.	Box No.	Feed conversion ratio				
			Day 14	Day 21	Day 24	Day 28	Day 35
			g/kg LW	g/kg LW	g/kg LW	g/kg LW	
T1	1	1	1226.06	1335.63	1332.93	1369.84	1494.02
		2	1324.09	1707.05	1665.98	1574.08	1747.35
		9	1228.19	1294.55	1304.94	1307.69	1439.05
		10	1267.42	1377.61	1451.44	1418.46	1618.36
		17	1275.35	1296.02	1324.70	1350.02	1498.76
		18	1350.48	1426.52	1487.55	1444.15	1560.90
		25	1301.76	1418.46	1430.69	1398.21	1552.23
		26	1178.75	1282.77	1409.74	1324.35	1481.47
		33	1154.51	1235.51	1284.97	1319.69	1469.79
		34	1218.63	1328.92	1381.33	1342.19	1465.38
T2	2	3	1258.57	1342.64	1348.96	1346.37	1483.26
		4	1254.78	1434.25	1555.09	1495.74	1577.32
		11	1162.89	1253.99	1279.75	1290.08	1450.64
		12	1254.02	1302.67	1361.80	1358.88	1498.86
		19	1125.18	1252.79	1315.40	1296.88	1443.07
		20	1163.57	1293.80	1454.77	1429.77	1641.56
		27	1232.22	1265.67	1284.18	1294.49	1439.71
		28	1189.32	1206.52	1240.61	1300.73	1438.94
		35	1206.78	1277.84	1298.58	1330.24	1462.07
		36	865.48	1114.02	1193.63	1215.50	1383.69

Feed conversion ratio (Feed consumption per 1 kg of live weight) per box

Tab. No. 9c (page 2)

Treatment	Tr. No.	Box No.	Feed conversion ratio				
			Day 14	Day 21	Day 24	Day 28	Day 35
			g/kg LW	g/kg LW	g/kg LW	g/kg LW	
T3	3	5	1181.00	1271.81	1283.55	1319.52	1450.73
		6	1292.55	1405.29	1546.14	1504.44	1644.44
		13	1197.90	1045.87	1357.48	1340.47	1503.78
		14	1217.64	1322.63	1434.85	1402.74	1651.36
		21	1189.54	1273.04	1305.02	1322.74	1472.81
		22	1310.29	1361.95	1478.92	1383.33	1506.23
		29	1184.48	1270.49	1238.29	1301.22	1439.58
		30	1148.85	1321.41	1341.35	1366.02	1509.18
		37	1186.09	1284.76	1297.67	1300.25	1470.75
		38	928.77	1149.52	1200.83	1223.73	1391.42
T4	4	7	1134.80	1244.51	1264.42	1281.48	1435.31
		8	1244.00	1397.86	1465.89	1435.97	1640.94
		15	1204.77	1246.61	1269.66	1278.72	1456.13
		16	1197.12	1416.45	1456.15	1430.91	1643.68
		23	1148.14	1235.71	1249.51	1281.07	1409.79
		24	1129.10	1292.75	1264.15	1308.59	1475.73
		31	1113.60	1030.35	1249.91	1279.70	1475.45
		32	1256.33	1293.87	1278.32	1332.57	1463.82
		39	1191.75	1301.46	1322.76	1369.40	1514.39
		40	1186.56	1303.41	1359.43	1324.46	1609.59

Feed consumption per 1 kg of weight gain (WG) per box

Tab. No. 9d (page 1)

Treatment	Tr. No.	Box No.	Feed consumption per 1 kg of weight gain					
			1-14 days	15-21 days	22-24 days	25-28 days	29-35 days	1-35 days
			g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG
T1	1	1	1327.27	1475.27	1320.37	1562.17	1943.23	1529.38
		2	1447.66	2279.05	1362.27	1045.35	2811.24	1806.97
		9	1329.54	1369.37	1353.45	1321.34	1983.18	1471.89
		10	1375.24	1511.31	1796.47	1254.16	2802.80	1660.24
		17	1383.77	1319.45	1446.21	1466.78	2017.15	1531.70
		18	1472.21	1515.28	1784.08	1246.02	1969.38	1598.56
		25	1410.18	1544.56	1484.83	1253.50	2249.28	1586.81
		26	1277.65	1400.66	1978.64	918.01	2190.26	1515.94
		33	1253.49	1321.70	1523.83	1533.26	2133.59	1505.41
		34	1323.79	1443.43	1605.91	1145.11	1938.80	1497.92
		T2	2	3	1365.22	1432.00	1378.38	1333.92
4	1366.68			1643.34	2295.95	1197.18	1868.56	1617.24
11	1259.08			1356.52	1393.01	1339.13	2180.37	1483.74
12	1360.04			1357.67	1689.51	1344.97	2120.58	1535.16
19	1215.70			1395.63	1637.80	1215.39	2053.26	1475.00
20	1258.37			1462.31	2468.77	1280.18	2492.36	1687.03
27	1331.44			1302.37	1365.95	1348.29	1762.90	1472.09
28	1292.15			1223.66	1385.86	1679.82	2079.52	1472.58
35	1310.27			1357.93	1384.70	1499.10	2003.37	1496.25
36	934.83			1415.71	1544.75	1340.79	2144.07	1416.44

Feed consumption per 1 kg of weight gain (WG) per box

Tab. No. 9d (page 2)

Treatment	Tr. No.	Box No.	Feed consumption per 1 kg of weight gain					
			1-14 days	15-21 days	22-24 days	25-28 days	29-35 days	1-35 days
			g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG
T3	3	5	1280.76	1379.41	1337.41	1531.29	2011.85	1486.45
		6	1405.11	1559.43	2329.05	1299.98	2285.91	1689.61
		13	1301.44	871.59	2687.55	1243.89	2260.95	1540.88
		14	1316.27	1454.18	2121.74	1238.55	3317.36	1695.56
		21	1290.78	1361.99	1467.37	1407.94	2061.73	1506.40
		22	1435.71	1427.03	2077.46	920.97	1977.22	1547.66
		29	1282.41	1367.74	1097.71	1603.89	1999.00	1471.79
		30	1244.14	1530.69	1453.98	1483.32	2103.44	1545.88
		37	1285.14	1395.17	1354.19	1312.03	2181.91	1503.72
		38	1008.28	1392.48	1434.55	1328.73	2062.31	1423.08
T4	4	7	1223.76	1372.36	1356.17	1362.86	2096.45	1466.94
		8	1352.13	1609.28	1944.95	1271.92	3733.96	1693.82
		15	1303.99	1291.43	1378.24	1319.41	2262.13	1488.52
		16	1298.17	1706.80	1714.82	1302.97	3099.33	1691.05
		23	1238.49	1334.58	1311.48	1456.21	1875.28	1440.03
		24	1220.28	1487.60	1129.10	1541.46	2189.29	1510.16
		31	1201.47	930.92	2266.92	1432.66	2320.83	1509.02
		32	1363.38	1334.92	1203.17	1617.71	1986.60	1498.01
		39	1287.31	1430.94	1426.70	1657.14	2156.06	1550.69
		40	1284.46	1441.43	1618.57	1167.62	2703.95	1645.82

Feed consumption per box

Tab. No. 9e (page 1)

Treatment	Tr. No.	Box No.	Feed consumption					
			Starter (1-14 days)	Grower (15-21 days)	Grower (21-24 days)	Grower (25-28 days)	Finisher (29-35 days)	Total
			kg	kg	kg	kg	kg	kg
T1	1	1	14.15	13.36	5.84	7.50	16.02	56.87
		2	13.65	15.73	3.17	3.55	10.50	46.60
		9	14.50	14.34	6.46	7.20	15.56	58.06
		10	14.55	14.30	8.05	6.40	14.44	57.74
		17	14.65	13.37	7.38	8.50	18.82	62.72
		18	14.70	14.13	7.42	6.65	16.72	59.62
		25	14.90	16.36	7.39	7.60	16.44	62.69
		26	13.40	14.05	9.45	5.05	15.38	57.33
		33	13.45	14.47	7.13	6.80	15.30	57.15
		34	13.50	15.40	8.15	6.10	16.22	59.37
T2	2	3	14.50	15.52	6.63	7.55	15.74	59.94
		4	14.10	15.85	7.82	5.78	15.24	58.79
		11	13.70	14.20	7.05	7.70	15.86	58.51
		12	14.80	14.17	6.78	7.40	15.16	58.31
		19	13.60	15.07	7.28	7.55	16.50	60.00
		20	13.90	13.50	8.30	5.25	13.86	54.81
		27	14.55	14.02	6.98	7.15	14.90	57.60
		28	13.45	13.88	7.37	7.45	14.54	56.69
		35	13.75	13.73	7.17	7.50	15.46	57.61
		36	10.50	14.15	7.75	6.35	15.12	53.87

Feed consumption per box

Tab. No. 9e (page 2)

Treatment	Tr. No.	Box No.	Feed consumption					
			Starter (1-14 days)	Grower (15-21 days)	Grower (21-24 days)	Grower (25-28 days)	Finisher (29-35 days)	Total
			kg	kg	kg	kg	kg	kg
T3	3	5	13.95	13.75	6.35	6.90	14.60	55.55
		6	14.20	12.53	7.97	5.95	13.48	54.13
		13	13.25	8.41	13.04	5.60	14.66	54.96
		14	14.30	13.63	7.32	5.95	14.54	55.74
		21	13.65	14.67	6.43	7.80	16.90	59.45
		22	13.80	11.93	7.67	4.30	14.06	51.76
		29	13.65	13.94	5.46	8.90	15.94	57.89
		30	13.80	15.16	5.64	8.05	15.82	58.47
		37	13.85	14.56	6.84	7.80	17.32	60.37
		38	10.60	14.44	6.86	7.70	16.68	56.28
T4	4	7	14.05	14.58	6.77	8.00	16.52	59.92
		8	14.00	13.18	5.37	5.15	9.60	47.30
		15	14.25	14.26	6.69	8.15	16.88	60.23
		16	14.15	15.24	5.46	6.15	12.98	53.98
		23	13.85	14.26	6.64	7.30	17.02	59.07
		24	13.60	15.05	5.30	7.90	16.40	58.25
		31	13.40	9.38	10.82	7.50	17.26	58.36
		32	14.40	13.99	5.46	8.15	15.72	57.72
		39	14.45	14.70	6.55	7.25	15.28	58.23
		40	13.70	14.09	7.46	6.75	22.34	64.34