



# MEZINÁRODNÍ TESTOVÁNÍ DRŮBEŽE ÚSTRAŠICE

státní podnik

390 02 Tábor 2

Česká republika

## BROILER FEEDING TEST No. 6/2024

**XXXXX**

**XXXXX**

**XXXXX**

**16 April – 21 May 2024**

**Study Investigator:**  
**Associate Investigator:**

**Ing. Jan Tyl**  
**Eva Hrušová**  
**Ing. Markéta Krekulová**

**June 2024**

## **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: 16 April 2024

End of the test: 21 May 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**

| <b>Treat. No.</b> | <b>Treatment</b> | 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: Mezinárodní testování drůbeže s.p., Ústrašice

### **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

| <b>Components (%)</b>           | <b>Starter BR1</b> | <b>Grower BR2</b> | <b>Finisher BR3</b> |
|---------------------------------|--------------------|-------------------|---------------------|
| Soybean meal                    | 37.00              | 33.00             | 30.00               |
| Wheat                           | 33.64              | 37.88             | 38.90               |
| Maize                           | 21.00              | 21.00             | 22.00               |
| Soybean oil                     | 3.80               | 4.50              | 5.80                |
| Limestone                       | 1.44               | 1.00              | 0.85                |
| MCP                             | 1.10               | 1.10              | 0.92                |
| Salt                            | 0.30               | 0.30              | 0.30                |
| Na <sub>2</sub> CO <sub>3</sub> | 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                |
| <b>Nutrient content</b>         |                    |                   |                     |
| Crude protein (g/kg)            | 214.84             | 200.31            | 189.53              |
| ME (MJ/kg)                      | 12.23              | 12.59             | 13.01               |
| Lysine (g/kg)                   | 13.99              | 12.75             | 11.84               |
| Methionine (g/kg)               | 6.05               | 6.13              | 5.59                |
| Met.+Cys. (g/kg)                | 9.81               | 9.70              | 9.00                |
| Ca (g/kg)                       | 9.50               | 7.53              | 6.50                |
| P dig. (g/kg)                   | 3.28               | 3.28              | 2.93                |
| Na (g/kg)                       | 2.21               | 2.14              | 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       | 92.62     | 82.38        | 88.95        | 210          | 68.00          | 47.05          |
| T2        | 2       |           |              |              | 210          |                | 46.76          |
| T3        | 3       |           |              |              | 210          |                | 46.86          |
| T4        | 4       |           |              |              | 210          |                | 47.43          |

**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   | 47.05               | 210   | 89.78               | 209    | 560.46              | 166    | 1114.18             | 125    | 1323.66             | 125    | 1710.89             | 125    | 2360.90             |
| T2        | 2       | 210   | 46.76               | 210   | 89.67               | 209    | 569.85              | 166    | 1154.28             | 124    | 1390.02             | 124    | 1823.14             | 124    | 2495.23             |
| T3        | 3       | 210   | 46.86               | 209   | 90.11               | 208    | 579.97              | 166    | 1147.74             | 124    | 1378.40             | 123    | 1779.40             | 122    | 2423.11             |
| T4        | 4       | 210   | 47.43               | 209   | 89.70               | 207    | 572.03              | 165    | 1129.61             | 125    | 1344.70             | 125    | 1739.03             | 123    | 2406.85             |



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

| <b>Treatment</b> | <b>Tr. No.</b> | <b>Day 3 - 14</b>     | <b>Day 15 - 21</b>    | <b>Day 22 - 24</b>    | <b>Day 25 - 28</b>    | <b>Day 29 - 35</b>    | <b>Day 3 - 35</b>     |
|------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                  |                | 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              | 470.64                | 553.32                | 238.30                | 387.22                | 650.01                | 2271.50               |
| T2               | 2              | 480.20                | 580.52                | 254.90                | 433.11                | 672.09                | 2405.47               |
| T3               | 3              | 489.83                | 566.67                | 252.99                | 402.09                | 643.34                | 2333.05               |
| T4               | 4              | 482.26                | 557.35                | 246.40                | 394.34                | 661.91                | 2318.50               |

**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       | 1072.64               | 1288.45 | 1255.98 | 1288.80 | 1411.98 |
| T2        | 2       | 1081.95               | 1310.51 | 1240.20 | 1271.15 | 1401.14 |
| T3        | 3       | 1059.36               | 1293.25 | 1231.38 | 1289.38 | 1442.93 |
| T4        | 4       | 1055.33               | 1292.11 | 1235.82 | 1277.39 | 1425.79 |

**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       | 1171.31                                  | 1534.85    | 1080.52    | 1465.61    | 1880.59    | 1448.64   |
| T2        | 2       | 1179.04                                  | 1565.81    | 866.60     | 1425.91    | 1903.79    | 1435.91   |
| T3        | 3       | 1153.35                                  | 1561.32    | 903.18     | 1605.06    | 2065.14    | 1479.64   |
| T4        | 4       | 1151.91                                  | 1566.30    | 941.94     | 1499.84    | 1998.67    | 1462.75   |

**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       | 125.80              | 157.66              | 43.99               | 70.94               | 152.80                | 551.19 |
| T2        | 2       | 129.02              | 167.16              | 36.86               | 76.58               | 158.66                | 568.28 |
| T3        | 3       | 127.92              | 164.49              | 38.50               | 79.25               | 162.12                | 572.28 |
| T4        | 4       | 125.36              | 160.68              | 39.94               | 73.93               | 162.09                | 562.00 |

**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       | 1                       | 144 | 3           | 1627 | 1           | 428  | 0          | 0    | 0           | 0    | 5          | 2199 | 2.38 |                            |   |   |   |   |   |   |   |   |    |    |    |    | 3  | 2  |  |   |  |  | 80 |
| T2        | 2       | 1                       | 150 | 3           | 1906 | 2           | 2452 | 0          | 0    | 0           | 0    | 6          | 4508 | 2.86 |                            |   |   |   |   |   |   |   |   |    |    |    |    | 2  | 4  |  |   |  |  | 80 |
| T3        | 3       | 2                       | 118 | 2           | 652  | 2           | 2496 | 1          | 1430 | 1           | 1750 | 8          | 6446 | 3.81 |                            |   |   |   |   |   |   |   |   |    |    |    | 1  | 6  |    |  | 1 |  |  | 80 |
| T4        | 4       | 3                       | 378 | 2           | 1281 | 0           | 0    | 0          | 0    | 2           | 2436 | 7          | 4095 | 3.33 |                            |   |   |   |   |   |   |   |   |    |    |    | 1  | 5  |    |  | 1 |  |  | 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       | 125             | 2360.90             | 327.30             | 13.86                    |
| T2        | 2       | 124             | 2495.23             | 214.12             | 8.58                     |
| T3        | 3       | 122             | 2423.11             | 242.81             | 10.02                    |
| T4        | 4       | 123             | 2406.85             | 301.19             | 12.51                    |

### 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         | 47.05       | 0.92               |             | o        | o        | o  |
| T2        | 2          | 10         | 46.76       | 0.54               | 1.000000    |          | o        | o  |
| T3        | 3          | 10         | 46.86       | 0.40               | 1.000000    | 1.000000 |          | o  |
| T4        | 4          | 10         | 47.43       | 0.75               | 1.000000    | 0.389541 | 0.623927 |    |

**Body weight - day 3**

**Tab. No. 5b**

| Treatment | Treat. No. | Birds | Average (g) | Standard deviation | Duncan test |          |          |    |
|-----------|------------|-------|-------------|--------------------|-------------|----------|----------|----|
|           |            |       |             |                    | T1          | T2       | T3       | T4 |
| T1        | 1          | 210   | 89.78       | 6.93               |             | o        | o        | o  |
| T2        | 2          | 210   | 89.67       | 7.84               | 0.999098    |          | o        | o  |
| T3        | 3          | 209   | 90.11       | 7.95               | 0.979569    | 0.952250 |          | o  |
| T4        | 4          | 209   | 89.70       | 8.33               | 0.999662    | 0.999980 | 0.961426 |    |

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

| Treatment | Treat. No. | Birds | Average (g) | Standard deviation | Duncan test |          |          |    |
|-----------|------------|-------|-------------|--------------------|-------------|----------|----------|----|
|           |            |       |             |                    | T1          | T2       | T3       | T4 |
| T1        | 1          | 209   | 560.46      | 56.36              |             | o        | **       | o  |
| T2        | 2          | 209   | 569.85      | 62.16              | 0.425574    |          | o        | o  |
| T3        | 3          | 208   | 579.97      | 51.52              | 0.007546    | 0.356546 |          | o  |
| T4        | 4          | 207   | 572.03      | 59.09              | 0.239591    | 0.985187 | 0.575775 |    |

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

| Treatment | Treat. No. | Birds | Average (g) | Standard deviation | Scheffe test |          |          |    |
|-----------|------------|-------|-------------|--------------------|--------------|----------|----------|----|
|           |            |       |             |                    | T1           | T2       | T3       | T4 |
| T1        | 1          | 166   | 1114.18     | 141.56             |              | o        | o        | o  |
| T2        | 2          | 166   | 1154.28     | 95.55              | 0.151720     |          | o        | o  |
| T3        | 3          | 166   | 1147.74     | 107.24             | 0.342889     | 1.000000 |          | o  |
| T4        | 4          | 165   | 1129.61     | 129.06             | 1.000000     | 0.437315 | 0.869518 |    |

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

| Treatment | Treat. No. | Birds | Average (g) | Standard deviation | Scheffe test |          |          |    |
|-----------|------------|-------|-------------|--------------------|--------------|----------|----------|----|
|           |            |       |             |                    | T1           | T2       | T3       | T4 |
| T1        | 1          | 125   | 1323.66     | 156.59             |              | **       | *        | o  |
| T2        | 2          | 124   | 1390.02     | 115.65             | 0.002950     |          | o        | o  |
| T3        | 3          | 124   | 1378.40     | 133.24             | 0.022872     | 0.933321 |          | o  |
| T4        | 4          | 125   | 1344.70     | 147.54             | 0.699296     | 0.087101 | 0.303076 |    |



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

| Treatment | Treat. No. | Birds | Average (g) | Standard deviation | Scheffe test |          |          |    |
|-----------|------------|-------|-------------|--------------------|--------------|----------|----------|----|
|           |            |       |             |                    | T1           | T2       | T3       | T4 |
| T1        | 1          | 125   | 1710.89     | 217.30             |              | ***      | *        | o  |
| T2        | 2          | 124   | 1823.14     | 155.62             | 0.000111     |          | o        | ** |
| T3        | 3          | 123   | 1779.40     | 179.49             | 0.049103     | 0.361233 |          | o  |
| T4        | 4          | 125   | 1739.03     | 208.13             | 0.718421     | 0.007958 | 0.433279 |    |

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

| Treatment | Treat. No. | Birds | Average (g) | Standard deviation | Scheffe test |          |          |    |
|-----------|------------|-------|-------------|--------------------|--------------|----------|----------|----|
|           |            |       |             |                    | T1           | T2       | T3       | T4 |
| T1        | 1          | 125   | 2360.90     | 327.30             |              | **       | o        | o  |
| T2        | 2          | 124   | 2495.23     | 214.12             | 0.002171     |          | o        | o  |
| T3        | 3          | 122   | 2423.11     | 242.81             | 0.369515     | 0.239867 |          | o  |
| T4        | 4          | 123   | 2406.85     | 301.19             | 0.631076     | 0.096542 | 0.975309 |    |

### 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          | 209   | 470.64      | 53.02              |             | o        | **       | o  |
| T2        | 2          | 209   | 480.20      | 57.88              | 0.340238    |          | o        | o  |
| T3        | 3          | 208   | 489.83      | 48.07              | 0.003822    | 0.333670 |          | o  |
| T4        | 4          | 207   | 482.26      | 53.76              | 0.177218    | 0.984444 | 0.553002 |    |

**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          | 166   | 553.32      | 96.45              |              | *        | o        | o  |
| T2        | 2          | 166   | 580.52      | 71.27              | 0.011255     |          | o        | *  |
| T3        | 3          | 166   | 566.67      | 67.09              | 1.000000     | 0.234474 |          | o  |
| T4        | 4          | 165   | 557.35      | 80.92              | 1.000000     | 0.010556 | 1.000000 |    |

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          | 125   | 238.30      | 53.96              |              | o        | o        | o  |
| T2        | 2          | 124   | 254.90      | 41.06              | 0.054519     |          | o        | o  |
| T3        | 3          | 124   | 252.99      | 38.03              | 0.112398     | 0.991770 |          | o  |
| T4        | 4          | 125   | 246.40      | 53.73              | 0.607420     | 0.570830 | 0.750656 |    |

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   | 387.22      | 93.67              |              | ***      | o        | o  |
| T2        | 2          | 124   | 433.11      | 67.86              | 0.000327     |          | *        | ** |
| T3        | 3          | 123   | 402.09      | 85.18              | 0.576712     | 0.036249 |          | o  |
| T4        | 4          | 125   | 394.34      | 83.73              | 0.928138     | 0.003906 | 0.910190 |    |

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          | 125   | 650.01      | 152.92             |              | o        | o        | o  |
| T2        | 2          | 124   | 672.09      | 94.70              | 0.646421     |          | o        | o  |
| T3        | 3          | 122   | 643.34      | 144.54             | 0.985179     | 0.427905 |          | o  |
| T4        | 4          | 123   | 661.91      | 141.30             | 0.923209     | 0.950402 | 0.763898 |    |

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          | 125   | 2271.50     | 326.28             |              | **       | o        | o  |
| T2        | 2          | 124   | 2405.47     | 211.76             | 0.002093     |          | o        | o  |
| T3        | 3          | 122   | 2333.05     | 241.58             | 0.374416     | 0.231907 |          | o  |
| T4        | 4          | 123   | 2318.50     | 299.52             | 0.609471     | 0.102306 | 0.981789 |    |

**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         | 1073.02                    | 45.41              |             | o        | o        | o  |
| T2        | 2          | 10         | 1081.68                    | 39.37              | 0.628099    |          | o        | o  |
| T3        | 3          | 10         | 1059.72                    | 42.99              | 0.458098    | 0.250678 |          | o  |
| T4        | 4          | 10         | 1056.01                    | 28.68              | 0.372857    | 0.195052 | 0.835364 |    |

**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         | 1289.07                    | 49.12              |             | o        | o        | o  |
| T2        | 2          | 10         | 1310.54                    | 35.75              | 0.284681    |          | o        | o  |
| T3        | 3          | 10         | 1293.76                    | 39.32              | 0.808301    | 0.356697 |          | o  |
| T4        | 4          | 10         | 1293.67                    | 34.93              | 0.799359    | 0.383363 | 0.996266 |    |

**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         | 1256.75                    | 55.77              |             | o        | o        | o  |
| T2        | 2          | 10         | 1240.40                    | 48.29              | 0.448381    |          | o        | o  |
| T3        | 3          | 10         | 1231.68                    | 35.58              | 0.292538    | 0.703790 |          | o  |
| T4        | 4          | 10         | 1236.40                    | 48.82              | 0.375518    | 0.852281 | 0.826316 |    |

**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         | 1289.96                    | 68.04              |             | o        | o        | o  |
| T2        | 2          | 10         | 1271.66                    | 31.02              | 0.501453    |          | o        | o  |
| T3        | 3          | 10         | 1290.12                    | 74.91              | 0.995305    | 0.513331 |          | o  |
| T4        | 4          | 10         | 1278.60                    | 39.97              | 0.656024    | 0.785741 | 0.671983 |    |

**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         | 1413.00                    | 54.83              |             | o        | o        | o  |
| T2        | 2          | 10         | 1401.67                    | 37.95              | 0.636327    |          | o        | o  |
| T3        | 3          | 10         | 1443.32                    | 47.31              | 0.237019    | 0.117367 |          | o  |
| T4        | 4          | 10         | 1427.36                    | 67.90              | 0.549630    | 0.315697 | 0.506285 |    |

**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         | 1171.89                    | 49.73              |             | o        | o        | o  |
| T2        | 2          | 10         | 1178.94                    | 41.98              | 0.720565    |          | o        | o  |
| T3        | 3          | 10         | 1153.85                    | 47.92              | 0.362816    | 0.234518 |          | o  |
| T4        | 4          | 10         | 1152.82                    | 33.55              | 0.365646    | 0.232171 | 0.958573 |    |

**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         | 1537.80                    | 103.64             |             | o        | o        | o  |
| T2        | 2          | 10         | 1571.34                    | 102.37             | 0.423998    |          | o        | o  |
| T3        | 3          | 10         | 1562.86                    | 60.81              | 0.524340    | 0.829101 |          | o  |
| T4        | 4          | 10         | 1571.75                    | 73.78              | 0.435054    | 0.991828 | 0.832220 |    |

**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         | 1104.62                    | 400.50             |                     | o        | o        | o  |
| T2        | 2          | 10         | 875.11                     | 189.59             | 0.112474            |          | o        | o  |
| T3        | 3          | 10         | 904.06                     | 225.92             | 0.150946            | 0.824061 |          | o  |
| T4        | 4          | 10         | 939.66                     | 293.75             | 0.209833            | 0.642191 | 0.784550 |    |

**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         | 1475.41                    | 407.44             |             | o        | o        | o  |
| T2        | 2          | 10         | 1432.85                    | 177.14             | 1.000000    |          | o        | o  |
| T3        | 3          | 10         | 1625.36                    | 546.13             | 1.000000    | 1.000000 |          | o  |
| T4        | 4          | 10         | 1499.90                    | 159.48             | 1.000000    | 1.000000 | 1.000000 |    |

**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         | 1881.35                    | 106.93             |             | o        | *        | o  |
| T2        | 2          | 10         | 1907.30                    | 145.45             | 0.757936    |          | o        | o  |
| T3        | 3          | 10         | 2065.49                    | 220.31             | 0.049492    | 0.080760 |          | o  |
| T4        | 4          | 10         | 2007.25                    | 241.52             | 0.162988    | 0.239224 | 0.490181 |    |

**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         | 1449.75                    | 56.85              |             | o        | o        | o  |
| T2        | 2          | 10         | 1436.50                    | 39.55              | 0.594819    |          | o        | o  |
| T3        | 3          | 10         | 1480.08                    | 49.01              | 0.254745    | 0.114827 |          | o  |
| T4        | 4          | 10         | 1464.49                    | 70.68              | 0.554405    | 0.292913 | 0.531882 |    |



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       | 7       | 21    | 47.62               | 21    | 88.62               | 21     | 563.52              | 17     | 1138.94             | 13     | 1368.08             | 13     | 1765.62             | 13     | 2427.77             |
|           |         | 8       | 21    | 47.62               | 21    | 90.05               | 20     | 545.75              | 16     | 1099.81             | 12     | 1318.58             | 12     | 1708.25             | 12     | 2458.33             |
|           |         | 15      | 21    | 47.62               | 21    | 85.95               | 21     | 523.95              | 17     | 1068.47             | 13     | 1270.08             | 13     | 1648.77             | 13     | 2305.15             |
|           |         | 16      | 21    | 47.62               | 21    | 88.57               | 21     | 574.57              | 17     | 1133.47             | 13     | 1325.77             | 13     | 1703.31             | 13     | 2328.23             |
|           |         | 23      | 21    | 45.71               | 21    | 88.62               | 21     | 538.57              | 17     | 1130.24             | 13     | 1273.69             | 13     | 1652.38             | 13     | 2247.08             |
|           |         | 24      | 21    | 47.62               | 21    | 90.24               | 21     | 574.48              | 16     | 1125.38             | 12     | 1357.83             | 12     | 1794.17             | 12     | 2459.67             |
|           |         | 31      | 21    | 47.62               | 21    | 92.29               | 21     | 584.76              | 16     | 1188.94             | 12     | 1398.08             | 12     | 1808.17             | 12     | 2470.08             |
|           |         | 32      | 21    | 47.62               | 21    | 94.05               | 21     | 586.19              | 17     | 1102.71             | 13     | 1325.69             | 13     | 1704.69             | 13     | 2364.23             |
|           |         | 39      | 21    | 45.71               | 21    | 90.00               | 21     | 563.86              | 16     | 1132.00             | 12     | 1349.50             | 12     | 1762.83             | 12     | 2450.58             |
|           |         | 40      | 21    | 45.71               | 21    | 89.43               | 21     | 548.29              | 17     | 1027.12             | 12     | 1253.92             | 12     | 1567.33             | 12     | 2108.83             |
| T2        | 2       | 5       | 21    | 47.62               | 21    | 82.29               | 21     | 509.05              | 17     | 1106.47             | 13     | 1334.15             | 13     | 1780.62             | 13     | 2450.08             |
|           |         | 6       | 21    | 46.67               | 21    | 90.57               | 21     | 583.10              | 16     | 1162.56             | 12     | 1403.25             | 12     | 1789.42             | 12     | 2484.75             |
|           |         | 13      | 21    | 46.67               | 21    | 93.57               | 21     | 554.62              | 17     | 1139.82             | 13     | 1395.00             | 13     | 1814.77             | 13     | 2446.08             |
|           |         | 14      | 21    | 47.62               | 21    | 91.62               | 21     | 589.38              | 17     | 1191.35             | 12     | 1418.42             | 12     | 1795.42             | 12     | 2438.08             |
|           |         | 21      | 21    | 46.67               | 21    | 87.00               | 21     | 559.95              | 17     | 1162.94             | 12     | 1429.33             | 12     | 1856.83             | 12     | 2557.92             |
|           |         | 22      | 21    | 46.67               | 21    | 88.67               | 21     | 565.95              | 15     | 1144.00             | 11     | 1417.45             | 11     | 1865.00             | 11     | 2534.73             |
|           |         | 29      | 21    | 46.67               | 21    | 94.24               | 20     | 621.60              | 16     | 1137.19             | 12     | 1363.75             | 12     | 1787.08             | 12     | 2479.58             |
|           |         | 30      | 21    | 46.67               | 21    | 89.52               | 21     | 572.05              | 17     | 1180.06             | 13     | 1430.31             | 13     | 1878.92             | 13     | 2551.69             |
|           |         | 37      | 21    | 46.67               | 21    | 90.76               | 21     | 585.90              | 17     | 1177.00             | 13     | 1359.38             | 13     | 1869.00             | 13     | 2594.38             |
|           |         | 38      | 21    | 45.71               | 21    | 88.43               | 21     | 559.33              | 17     | 1139.71             | 13     | 1357.62             | 13     | 1795.85             | 13     | 2419.46             |

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       | 3       | 21    | 47.62               | 21    | 90.71               | 21     | 558.86              | 17     | 1143.18             | 13     | 1362.69             | 13     | 1714.85             | 13     | 2415.54             |
|           |         | 4       | 21    | 47.62               | 21    | 91.90               | 21     | 573.81              | 17     | 1126.41             | 13     | 1365.31             | 13     | 1773.92             | 12     | 2419.50             |
|           |         | 11      | 21    | 46.67               | 21    | 89.29               | 21     | 585.76              | 17     | 1150.82             | 13     | 1350.31             | 13     | 1750.38             | 13     | 2309.15             |
|           |         | 12      | 21    | 46.67               | 21    | 94.29               | 21     | 597.43              | 17     | 1130.65             | 12     | 1356.42             | 12     | 1718.25             | 12     | 2367.50             |
|           |         | 19      | 21    | 46.67               | 21    | 86.05               | 21     | 573.33              | 16     | 1166.75             | 12     | 1375.67             | 12     | 1767.08             | 12     | 2462.75             |
|           |         | 20      | 21    | 46.67               | 21    | 87.71               | 21     | 567.24              | 16     | 1143.81             | 12     | 1375.58             | 11     | 1764.73             | 11     | 2429.45             |
|           |         | 27      | 21    | 46.67               | 21    | 90.19               | 21     | 581.05              | 17     | 1174.00             | 13     | 1432.00             | 13     | 1854.46             | 13     | 2476.15             |
|           |         | 28      | 21    | 46.67               | 21    | 86.71               | 21     | 566.33              | 17     | 1091.18             | 13     | 1327.31             | 13     | 1734.15             | 13     | 2355.54             |
|           |         | 35      | 21    | 46.67               | 21    | 92.48               | 21     | 594.48              | 17     | 1177.00             | 12     | 1411.50             | 12     | 1857.75             | 12     | 2456.50             |
|           |         | 36      | 21    | 46.67               | 20    | 91.85               | 19     | 603.68              | 15     | 1178.07             | 11     | 1436.55             | 11     | 1870.55             | 11     | 2562.45             |
| T4        | 4       | 1       | 21    | 46.67               | 21    | 89.33               | 21     | 539.38              | 17     | 984.29              | 13     | 1177.38             | 13     | 1537.69             | 13     | 2231.85             |
|           |         | 2       | 21    | 47.62               | 21    | 88.33               | 21     | 550.10              | 17     | 1085.06             | 13     | 1283.69             | 13     | 1626.92             | 11     | 2384.00             |
|           |         | 9       | 21    | 46.67               | 21    | 89.43               | 21     | 587.38              | 17     | 1206.88             | 13     | 1430.31             | 13     | 1828.54             | 13     | 2446.15             |
|           |         | 10      | 21    | 48.57               | 21    | 89.00               | 21     | 581.38              | 17     | 1151.29             | 13     | 1339.62             | 13     | 1721.00             | 13     | 2373.08             |
|           |         | 17      | 21    | 47.62               | 21    | 88.00               | 21     | 539.67              | 17     | 1079.06             | 13     | 1283.77             | 13     | 1650.46             | 13     | 2204.54             |
|           |         | 18      | 21    | 46.67               | 21    | 87.43               | 20     | 562.15              | 16     | 1081.31             | 12     | 1279.00             | 12     | 1627.00             | 12     | 2221.75             |
|           |         | 25      | 21    | 46.67               | 21    | 90.33               | 21     | 566.48              | 16     | 1133.88             | 12     | 1377.17             | 12     | 1818.33             | 12     | 2544.67             |
|           |         | 26      | 21    | 47.62               | 21    | 90.71               | 21     | 596.29              | 17     | 1179.47             | 13     | 1424.77             | 13     | 1851.08             | 13     | 2512.54             |
|           |         | 33      | 21    | 47.62               | 21    | 92.76               | 20     | 596.00              | 16     | 1192.44             | 12     | 1382.75             | 12     | 1834.08             | 12     | 2516.17             |
|           |         | 34      | 21    | 48.57               | 20    | 91.75               | 20     | 603.65              | 15     | 1213.33             | 11     | 1491.45             | 11     | 1929.27             | 11     | 2676.45             |

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       | 7       | 474.90                | 564.59                | 259.08                | 397.54                | 662.15                | 2337.69               |
|           |         | 8       | 455.25                | 556.81                | 263.17                | 389.67                | 750.08                | 2368.08               |
|           |         | 15      | 438.00                | 541.76                | 241.23                | 378.69                | 656.38                | 2221.15               |
|           |         | 16      | 486.00                | 556.82                | 223.92                | 377.54                | 624.92                | 2240.31               |
|           |         | 23      | 449.95                | 592.76                | 178.92                | 378.69                | 594.69                | 2161.46               |
|           |         | 24      | 484.24                | 554.88                | 259.58                | 436.33                | 665.50                | 2369.08               |
|           |         | 31      | 492.48                | 601.50                | 241.75                | 410.08                | 661.92                | 2377.17               |
|           |         | 32      | 492.14                | 518.47                | 235.62                | 379.00                | 659.54                | 2269.38               |
|           |         | 39      | 473.86                | 559.69                | 252.50                | 413.33                | 687.75                | 2361.00               |
|           |         | 40      | 458.86                | 489.41                | 231.58                | 313.42                | 541.50                | 2020.33               |
| T2        | 2       | 5       | 426.76                | 588.06                | 244.85                | 446.46                | 669.46                | 2369.00               |
|           |         | 6       | 492.52                | 576.81                | 257.58                | 386.17                | 695.33                | 2394.92               |
|           |         | 13      | 461.05                | 572.88                | 269.77                | 419.77                | 631.31                | 2350.69               |
|           |         | 14      | 497.76                | 600.06                | 266.00                | 377.00                | 642.67                | 2348.08               |
|           |         | 21      | 472.95                | 599.47                | 276.25                | 427.50                | 701.08                | 2470.00               |
|           |         | 22      | 477.29                | 575.53                | 295.73                | 447.55                | 669.73                | 2444.45               |
|           |         | 29      | 527.30                | 521.44                | 248.67                | 423.33                | 692.50                | 2386.75               |
|           |         | 30      | 482.52                | 608.59                | 262.38                | 448.62                | 672.77                | 2461.15               |
|           |         | 37      | 495.14                | 579.53                | 200.46                | 509.62                | 725.38                | 2503.77               |
|           |         | 38      | 470.90                | 578.59                | 235.77                | 438.23                | 623.62                | 2330.15               |

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       | 3       | 468.14                | 586.18                | 236.08                | 352.15                | 700.69                | 2324.69               |
|           |         | 4       | 481.90                | 545.29                | 258.31                | 408.62                | 642.25                | 2326.92               |
|           |         | 11      | 496.48                | 569.12                | 239.85                | 400.08                | 558.77                | 2219.92               |
|           |         | 12      | 503.14                | 537.18                | 242.00                | 361.83                | 649.25                | 2272.50               |
|           |         | 19      | 487.29                | 594.81                | 247.08                | 391.42                | 695.67                | 2378.25               |
|           |         | 20      | 479.52                | 567.75                | 255.33                | 401.55                | 664.73                | 2341.27               |
|           |         | 27      | 490.86                | 587.94                | 272.15                | 422.46                | 621.69                | 2385.62               |
|           |         | 28      | 479.62                | 529.06                | 254.77                | 406.85                | 621.38                | 2269.92               |
|           |         | 35      | 502.00                | 578.88                | 259.00                | 446.25                | 598.75                | 2364.50               |
|           |         | 36      | 511.42                | 572.93                | 266.82                | 434.00                | 691.91                | 2470.00               |
| T4        | 4       | 1       | 450.05                | 453.06                | 239.31                | 360.31                | 694.15                | 2145.15               |
|           |         | 2       | 461.76                | 531.41                | 237.15                | 343.23                | 711.45                | 2297.73               |
|           |         | 9       | 497.95                | 615.76                | 250.92                | 398.23                | 617.62                | 2356.92               |
|           |         | 10      | 492.38                | 576.24                | 234.38                | 381.38                | 652.08                | 2287.38               |
|           |         | 17      | 451.67                | 539.59                | 233.62                | 366.69                | 554.08                | 2116.38               |
|           |         | 18      | 474.55                | 516.56                | 229.33                | 348.00                | 594.75                | 2136.00               |
|           |         | 25      | 476.14                | 582.38                | 254.25                | 441.17                | 726.33                | 2454.67               |
|           |         | 26      | 505.57                | 574.53                | 264.77                | 426.31                | 661.46                | 2422.23               |
|           |         | 33      | 502.60                | 587.38                | 226.08                | 451.33                | 682.08                | 2426.17               |
|           |         | 34      | 511.90                | 602.73                | 300.18                | 437.82                | 747.18                | 2584.82               |

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       | 7       | 1002.20               | 1279.94 | 1229.97 | 1222.60 | 1359.67 |
|           |         | 8       | 1032.64               | 1258.31 | 1274.98 | 1210.78 | 1324.98 |
|           |         | 15      | 1106.97               | 1292.36 | 1241.08 | 1279.88 | 1392.04 |
|           |         | 16      | 1102.27               | 1215.68 | 1273.45 | 1281.07 | 1440.55 |
|           |         | 23      | 1096.37               | 1255.10 | 1332.29 | 1263.98 | 1417.42 |
|           |         | 24      | 1029.51               | 1278.57 | 1163.44 | 1248.46 | 1378.62 |
|           |         | 31      | 1063.52               | 1315.32 | 1249.12 | 1295.75 | 1410.17 |
|           |         | 32      | 1072.30               | 1316.24 | 1258.99 | 1372.61 | 1493.52 |
|           |         | 39      | 1065.79               | 1278.33 | 1196.36 | 1288.20 | 1413.03 |
|           |         | 40      | 1158.59               | 1400.81 | 1347.83 | 1436.31 | 1500.04 |
| T2        | 2       | 5       | 1029.00               | 1265.33 | 1214.42 | 1241.60 | 1373.90 |
|           |         | 6       | 1086.16               | 1371.99 | 1277.07 | 1288.32 | 1414.76 |
|           |         | 13      | 1057.78               | 1253.95 | 1133.53 | 1225.90 | 1377.12 |
|           |         | 14      | 1123.05               | 1329.67 | 1282.18 | 1281.86 | 1413.27 |
|           |         | 21      | 1144.66               | 1296.77 | 1197.26 | 1254.87 | 1375.63 |
|           |         | 22      | 1093.82               | 1346.02 | 1251.25 | 1324.49 | 1480.71 |
|           |         | 29      | 1017.33               | 1326.33 | 1288.27 | 1311.75 | 1414.48 |
|           |         | 30      | 1092.15               | 1298.23 | 1234.92 | 1260.56 | 1438.40 |
|           |         | 37      | 1071.20               | 1297.28 | 1278.62 | 1250.45 | 1368.34 |
|           |         | 38      | 1101.65               | 1319.81 | 1246.52 | 1276.83 | 1360.05 |

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       | 3       | 1082.14               | 1293.48 | 1250.74 | 1277.53 | 1485.66 |
|           |         | 4       | 1037.34               | 1311.99 | 1209.93 | 1188.89 | 1460.05 |
|           |         | 11      | 1022.68               | 1233.15 | 1270.54 | 1242.27 | 1403.56 |
|           |         | 12      | 1071.26               | 1326.28 | 1261.89 | 1321.13 | 1435.30 |
|           |         | 19      | 1009.97               | 1249.28 | 1177.24 | 1366.38 | 1451.01 |
|           |         | 20      | 1136.67               | 1356.85 | 1257.14 | 1450.61 | 1552.24 |
|           |         | 27      | 1045.73               | 1255.11 | 1176.75 | 1272.05 | 1407.95 |
|           |         | 28      | 1014.04               | 1278.01 | 1217.91 | 1249.45 | 1405.64 |
|           |         | 35      | 1058.96               | 1309.66 | 1227.06 | 1299.39 | 1428.78 |
|           |         | 36      | 1118.40               | 1323.75 | 1267.64 | 1233.49 | 1403.04 |
| T4        | 4       | 1       | 1091.20               | 1361.76 | 1255.76 | 1338.68 | 1462.92 |
|           |         | 2       | 1092.45               | 1342.03 | 1274.50 | 1329.81 | 1595.02 |
|           |         | 9       | 1015.00               | 1249.16 | 1275.09 | 1276.25 | 1396.56 |
|           |         | 10      | 1033.66               | 1275.57 | 1267.27 | 1299.37 | 1436.53 |
|           |         | 17      | 1046.50               | 1268.53 | 1194.47 | 1263.98 | 1405.96 |
|           |         | 18      | 1067.36               | 1309.83 | 1316.48 | 1307.21 | 1454.17 |
|           |         | 25      | 1079.35               | 1276.08 | 1157.71 | 1221.42 | 1364.88 |
|           |         | 26      | 1022.20               | 1272.36 | 1209.56 | 1257.50 | 1404.15 |
|           |         | 33      | 1075.48               | 1293.95 | 1219.14 | 1266.15 | 1389.54 |
|           |         | 34      | 1036.84               | 1287.41 | 1194.02 | 1225.60 | 1363.87 |

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       | 7       | 1094.70                                  | 1594.04    | 988.06     | 1184.21    | 1870.35    | 1393.94   |
|           |         | 8       | 1135.30                                  | 1504.34    | 1355.93    | 859.71     | 1708.70    | 1359.62   |
|           |         | 15      | 1217.63                                  | 1491.46    | 984.46     | 1480.80    | 1791.87    | 1428.72   |
|           |         | 16      | 1201.88                                  | 1344.92    | 1609.34    | 1322.33    | 2058.10    | 1477.89   |
|           |         | 23      | 1198.07                                  | 1415.08    | 1889.21    | 907.98     | 2024.32    | 1453.85   |
|           |         | 24      | 1122.56                                  | 1574.18    | 564.27     | 1678.76    | 1895.82    | 1414.22   |
|           |         | 31      | 1157.80                                  | 1607.33    | 871.95     | 1550.50    | 1868.31    | 1446.56   |
|           |         | 32      | 1167.11                                  | 1618.95    | 945.58     | 1978.89    | 1933.75    | 1532.02   |
|           |         | 39      | 1159.82                                  | 1531.20    | 774.50     | 1770.16    | 1881.74    | 1448.46   |
|           |         | 40      | 1263.98                                  | 1696.53    | 1062.90    | 2020.74    | 1780.55    | 1542.22   |
| T2        | 2       | 5       | 1135.19                                  | 1495.09    | 951.70     | 1362.85    | 1855.68    | 1408.77   |
|           |         | 6       | 1180.65                                  | 1712.56    | 758.79     | 1353.04    | 1888.78    | 1450.64   |
|           |         | 13      | 1154.96                                  | 1464.67    | 541.84     | 1684.08    | 1976.36    | 1411.07   |
|           |         | 14      | 1221.76                                  | 1555.73    | 1032.80    | 1279.84    | 1970.95    | 1449.11   |
|           |         | 21      | 1248.72                                  | 1455.74    | 683.86     | 1563.35    | 1843.58    | 1409.30   |
|           |         | 22      | 1192.11                                  | 1653.01    | 787.15     | 1712.37    | 2137.91    | 1519.53   |
|           |         | 29      | 1103.26                                  | 1752.77    | 1088.53    | 1431.10    | 1796.63    | 1450.72   |
|           |         | 30      | 1189.16                                  | 1512.14    | 898.01     | 1383.74    | 2126.69    | 1472.27   |
|           |         | 37      | 1163.90                                  | 1557.30    | 1153.28    | 1138.11    | 1781.55    | 1400.66   |
|           |         | 38      | 1199.70                                  | 1554.38    | 855.12     | 1420.05    | 1694.83    | 1392.89   |

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       | 3       | 1182.94                                  | 1516.60    | 1011.04    | 1435.12    | 2205.51    | 1523.16   |
|           |         | 4       | 1131.22                                  | 1631.00    | 694.16     | 1082.45    | 2589.67    | 1497.58   |
|           |         | 11      | 1111.21                                  | 1468.74    | 1471.40    | 1092.10    | 2132.43    | 1438.73   |
|           |         | 12      | 1162.03                                  | 1636.01    | 896.23     | 1688.16    | 1893.21    | 1472.27   |
|           |         | 19      | 1099.46                                  | 1519.56    | 779.88     | 2446.24    | 1770.48    | 1487.58   |
|           |         | 20      | 1238.57                                  | 1614.04    | 726.66     | 2622.84    | 1977.57    | 1593.43   |
|           |         | 27      | 1137.05                                  | 1486.55    | 781.42     | 1755.28    | 1968.57    | 1442.07   |
|           |         | 28      | 1105.10                                  | 1588.53    | 915.33     | 1406.69    | 2017.83    | 1441.18   |
|           |         | 35      | 1149.17                                  | 1598.52    | 784.94     | 1673.20    | 2023.66    | 1464.47   |
|           |         | 36      | 1221.72                                  | 1569.07    | 979.49     | 1051.53    | 2075.94    | 1440.36   |
| T4        | 4       | 1       | 1194.55                                  | 1742.70    | 774.10     | 1757.05    | 1852.84    | 1502.35   |
|           |         | 2       | 1195.98                                  | 1624.11    | 924.25     | 1651.73    | 2669.77    | 1638.20   |
|           |         | 9       | 1102.60                                  | 1499.87    | 1414.41    | 1282.60    | 1898.12    | 1430.33   |
|           |         | 10      | 1127.89                                  | 1544.92    | 1224.31    | 1478.42    | 1964.14    | 1473.11   |
|           |         | 17      | 1147.78                                  | 1514.00    | 817.00     | 1640.44    | 2008.89    | 1444.18   |
|           |         | 18      | 1166.75                                  | 1611.06    | 1351.70    | 1252.39    | 2048.48    | 1494.86   |
|           |         | 25      | 1176.26                                  | 1498.29    | 519.36     | 1541.37    | 1889.63    | 1398.64   |
|           |         | 26      | 1110.92                                  | 1559.78    | 886.74     | 1499.46    | 1975.81    | 1438.30   |
|           |         | 33      | 1173.47                                  | 1545.41    | 756.70     | 1491.88    | 1863.16    | 1425.54   |
|           |         | 34      | 1132.01                                  | 1577.34    | 727.99     | 1403.65    | 1901.69    | 1399.39   |



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       | 7       | 11.86               | 16.68               | 4.55                | 6.12                | 16.10                 | 55.31 |
|           |         | 8       | 11.42               | 15.26               | 5.92                | 4.02                | 15.38                 | 52.00 |
|           |         | 15      | 12.18               | 15.28               | 4.18                | 7.29                | 15.29                 | 54.22 |
|           |         | 16      | 13.30               | 14.24               | 6.27                | 6.49                | 16.72                 | 57.02 |
|           |         | 23      | 12.40               | 15.88               | 5.90                | 4.47                | 15.65                 | 54.30 |
|           |         | 24      | 12.42               | 16.00               | 2.41                | 8.79                | 15.14                 | 54.76 |
|           |         | 31      | 13.06               | 17.02               | 3.50                | 7.63                | 14.84                 | 56.05 |
|           |         | 32      | 13.20               | 16.06               | 3.84                | 9.75                | 16.58                 | 59.43 |
|           |         | 39      | 12.62               | 15.24               | 3.28                | 8.78                | 15.53                 | 55.45 |
|           |         | 40      | 13.34               | 16.00               | 4.14                | 7.60                | 11.57                 | 52.65 |
| T2        | 2       | 5       | 11.00               | 16.44               | 4.00                | 7.91                | 16.15                 | 55.50 |
|           |         | 6       | 13.30               | 17.60               | 3.13                | 6.27                | 15.76                 | 56.06 |
|           |         | 13      | 12.32               | 15.88               | 2.48                | 9.19                | 16.22                 | 56.09 |
|           |         | 14      | 13.90               | 17.60               | 4.66                | 5.79                | 15.20                 | 57.15 |
|           |         | 21      | 13.46               | 16.38               | 3.05                | 8.02                | 15.51                 | 56.42 |
|           |         | 22      | 13.00               | 16.14               | 3.48                | 8.43                | 15.75                 | 56.80 |
|           |         | 29      | 12.80               | 15.98               | 4.50                | 7.27                | 14.93                 | 55.48 |
|           |         | 30      | 13.12               | 17.50               | 3.98                | 8.07                | 18.60                 | 61.27 |
|           |         | 37      | 13.18               | 16.66               | 3.95                | 7.54                | 16.80                 | 58.13 |
|           |         | 38      | 12.94               | 16.98               | 3.63                | 8.09                | 13.74                 | 55.38 |

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       | 3       | 12.70               | 16.86               | 4.12                | 6.57                | 20.09                 | 60.34 |
|           |         | 4       | 12.50               | 16.92               | 3.08                | 5.75                | 20.00                 | 58.25 |
|           |         | 11      | 12.58               | 16.14               | 6.38                | 5.68                | 15.49                 | 56.27 |
|           |         | 12      | 13.44               | 16.90               | 3.61                | 7.33                | 14.75                 | 56.03 |
|           |         | 19      | 12.16               | 16.20               | 3.21                | 11.49               | 14.78                 | 57.84 |
|           |         | 20      | 13.54               | 16.46               | 3.02                | 11.37               | 14.46                 | 58.85 |
|           |         | 27      | 12.76               | 16.41               | 3.60                | 9.64                | 15.91                 | 58.32 |
|           |         | 28      | 12.06               | 16.06               | 4.00                | 7.44                | 16.30                 | 55.86 |
|           |         | 35      | 13.22               | 17.32               | 3.42                | 8.96                | 14.54                 | 57.46 |
|           |         | 36      | 12.96               | 15.22               | 4.06                | 5.02                | 15.80                 | 53.06 |
| T4        | 4       | 1       | 12.36               | 14.02               | 3.30                | 8.23                | 16.72                 | 54.63 |
|           |         | 2       | 12.62               | 16.60               | 3.88                | 7.37                | 20.05                 | 60.52 |
|           |         | 9       | 12.52               | 17.28               | 6.28                | 6.64                | 15.24                 | 57.96 |
|           |         | 10      | 12.62               | 16.94               | 5.48                | 7.33                | 16.65                 | 59.02 |
|           |         | 17      | 11.86               | 15.52               | 3.46                | 7.82                | 14.47                 | 53.13 |
|           |         | 18      | 12.28               | 14.92               | 5.30                | 5.23                | 14.62                 | 52.35 |
|           |         | 25      | 12.84               | 15.78               | 2.16                | 8.16                | 16.47                 | 55.41 |
|           |         | 26      | 12.80               | 17.00               | 4.04                | 8.31                | 16.99                 | 59.14 |
|           |         | 33      | 12.88               | 16.08               | 2.74                | 8.08                | 15.25                 | 55.03 |
|           |         | 34      | 12.58               | 16.54               | 3.30                | 6.76                | 15.63                 | 54.81 |

