**Table 2. Effect of dietary threonine levels on growth performance traits.**

| Treatment Groups (%) | Live body weight (g) | | | Body weight gain (g) | | | Feed intake gm/day | | | Feed conversion | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Initial (1 wk) | 3 wk | 6wk | 1-3 wk | 3-6wk | 1-6wk | 1-3wk | 3-6wk | 1-6wk | 1-3wk | 3-6wk | 1-6wk |
| **Control** | 21.75 | 69.49 | 157.64 | 47.74 | 88.14 | 135.89 | 7.11 | 16.32 | 12.52 | 2.08 | 3.90 | 3.23 |
| **(0.0)** | ±0.13 | ±0.17 | ±0.53 | ±0.58 | ±0.70 | ±40 | ±0.40$^{d}$ | ±0.10$^{c}$ | ±0.02 | ±0.10$^{d}$ | ±0.16 | ±0.09 |
| **0.05** | 21.75 | 74.96 | 177.77 | 53.21 | 102.81 | 156.02 | 6.88n | 17.39 | 13.19 | 1.82 | 3.55 | 2.96 |
| | ±0.16 | ±0.41 | ±8.82 | ±0.25 | ±0.40 | ±0.15 | ±0.02$^{e}$ | ±0.40$^{a}$ | ±0.23 | ±0.09$^{e}$ | ±0.02 | ±0.06 |
| **0. 10** | 21.98 | 72.51 | 160.37 | 50.52 | 89.53 | 140.05 | 7.91 | 15.49 | 12.46 | 2.19 | 3.75 | 3.17 |
| | ±0.91 | ±0.72 | ±0.47 | ±1.23 | ±1.53 | ±2.75f | ±0.05$^{c}$ | ±0.28$^{d}$ | ±0.15 | ±0.05$^{c}$ | ±0.75 | ±0.19 |
| **0.15** | 21.78 | 72.91 | 160.94 | 51.13 | 88.03 | 139.16 | 8.37 | 14.38 | 11.98 | 2.30 | 3.45 | 3.03 |
| | ±0.73 | ±0.11 | ±0.54 | ±0.64 | ±0.65 | ±1.23 | ±8.82$^{a}$ | ±0.02$^{e}$ | ±0.01 | ±0.11$^{b}$ | ±0.19 | ±0.15 |
| **0.20** | 22.08 | 74.03 | 173.69 | 51.95 | 99.65 | 151.60 | 8.13 | 15.78 | 12.72 | 2.19 | 3.32 | 2.94 |
| | ±0.16 | ±0.10 | ±0.33 | ±0.07 | ±0.24 | ±0.63 | ±0.12$^{b}$ | ±0.24$^{d}$ | ±0.10 | ±0.08$^{c}$ | ±0.04 | ±8.82 |
| **0.25** | 21.92 | 75.42 | 167.90 | 53.50 | 92.48 | 145.98 | 8.30 | 16.18 | 13.03 | 2.19 | 3.67 | 3.13 |
| | ±0.04 | ±0.15 | ±0.29 | ±0.19 | ±0.13 | ±0.32 | ±0.03$^{a}$ | ±0.06$^{c}$ | ±0.05 | ±0.12$^{c}$ | ±0.01 | ±0.07 |
| **0.30** | 21.38 | 77.19 | 165.11 | 55.80 | 87.92 | 143.72 | 8.14 | 14.99 | 12.25 | 2.04 | 3.63 | 2.99 |
| | ±0.25 | ±0.16 | ±0.32 | ±0.25 | ±0.43 | ±0.56 | ±0.17$^{b}$ | ±0.58$^{e}$ | ±0.42 | ±0.04$^{d}$ | ±0.26 | ±0.10 |
| **0.05** | 21.02 | 68.15 | 161.42 | 47.13 | 93.27 | 140.40 | 8.40 | 16.23 | 13.10 | 2.50 | 3.66 | 3.27 |
| | ±0.33 | ±0.33 | ±0.56 | ±0.66 | ±0.89 | ±0.23 | ±0.06$^{a}$ | ±0.50$^{c}$ | ±0.32 | ±0.11$^{a}$ | ±0.06 | ±0.02 |
| **0.40** | 21.68 | 75.07 | 178.94 | 53.38 | 103.87 | 157.25 | 8.32 | 16.69 | 13.34 | 2.19 | 3.39 | 2.98 |
| | ±0.06 | ±0.16b | ±0.39 | ±0.13 | ±0.23 | ±0.35 | ±0.01$^{a}$ | ±0.17$^{b}$ | ±0.10 | ±0.08$^{c}$ | ±0.18 | ±0.14 |
| **Sig.** | **N.S.** | **N.S** | **N.S** | **N.S** | **N.S** | **N.S** | ***** | ***** | **N.S** | ***** | **N.S** | **N.S** |

a,b,c Means within columns having different superscripts are significant different at ($P \leq 0.05$)

N.S. = Non significant * .$P \leq 0.05$

**Table 3. Effect of dietary threonine supplementation on some slaughter parameters of Japanese quail.**

| Treatment Groups (%) | Carcass characteristics (%) | | | | | | | Diameter length (Cm) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L.B.W. (g) | Carcass (%) | Dressing (%) | Whole front (%) | Whole rear (%) | Giblets (%) | Feather (%) | Breast thickness (Cm) | Breast perimeter (Cm) | Keel length (Cm) |
| **Control** | 179.83 | 69.01 | 73.84 | 46.27 | 22.74 | 4.83 | 4.56 | 1.95 | 14.40 | 6.33 |
| **(0.0)** | ±6.90 | ±0.93 | ±0.89 | ±0.51 | ±0.74 | ±0.16 | ±0.27 | ±0.07 | ±0.24[d] | ±0.15 |
| **0.05** | 197.83 | 69.27 | 74.25 | 45.23 | 24.04 | 4.98 | 4.73 | 1.50 | 14.42 | 6.38 |
| | ±6.47 | ±0.97 | ±1.06 | ±0.56 | ±0.48 | ±0.18 | ±0.19 | ±0.13 | ±0.19[d] | 0.17 |
| **0. 10** | 187.67 | 71.88 | 76.86 | 47.57 | 24.31 | 4.98 | 4.70 | 1.45 | 14.83 | 6.32 |
| | ±4.13 | ±1.76 | ±1.80 | ±1.18 | ±0.71 | ±0.18 | ±0.12 | ±0.09 | ±0.19b[c] | ±0.14 |
| **0.15** | 192.67 | 70.90 | 76.03 | 47.17 | 21.74 | 5.13 | 4.81 | 1.35 | 14.73 | 6.20 |
| | ±11.01 | ±1.28 | ±1.43 | ±1.25 | ±0.23 | ±0.24 | ±0.15 | ±0.06 | ±0.14[c] | ±0.08 |
| **0.20** | 185.00 | 69.45 | 74.47 | 47.03 | 22.42 | 5.02 | 4.88 | 1.37 | 15.02 | 6.18 |
| | ±7.11 | ±0.87 | ±0.84 | ±0.09 | ±0.27 | ±0.27 | ±0.19 | ±0.08 | ±0.25[b] | ±0.09 |
| **0.25** | 200.17 | 68.77 | 74.10 | 45.93 | 22.84 | 5.33 | 4.84 | 1.38 | 14.80 | 6.40 |
| | ±7.99 | ±0.72 | ±0.75 | ±1.03 | ±0.44 | ±0.23 | ±0.22 | ±0.07 | ±0.28[c] | ±0.17 |
| **0.30** | 167.50 | 69.47 | 75.15 | 46.19 | 23.29 | 5.68 | 5.00 | 1.40 | 13.88 | 6.08 |
| | ±4.23 | ±0.18 | ±0.79 | ±0.83 | ±0.17 | ±0.09 | ±0.20 | ±0.12 | ±0.14[e] | ±0.12 |
| **0.05** | 175.67 | 70.55 | 75.85 | 47.54 | 23.01 | 5.30 | 5.15 | 1.37 | 14.33 | 6.05 |
| | ±5.24 | ±0.80 | ±0.81 | ±0.57 | ±0.68 | ±0.16 | ±0.12 | ±0.08 | ±0.31[d] | ±0.09 |
| **0.40** | 212.33 | 68. 95 | 74.03 | 46.52 | 22.44 | 5.08 | 4.76 | 1.53 | 15.27 | 6.50 |
| | ±9.53 | ±0.71 | ±0.68 | ±0.92 | ±0.43 | ±0.12 | ±0.29 | ±0.13 | ±0.14[a] | ±0.09 |
| **Sig.** | **N.S** | **N.S** | **N.S** | **N.S** | **N.S** | **N.S** | **N.S** | **N.S** | ***** | **N.S** |

a, b,….d. Means in a column with no common superscript differ significantly ($P \leq 0.05$)

**Table 4. Chemical composition of Japanese quails breast meat as affected by dietary threonine supplementation.**

| Chemical analysis | Threonine supplemented levels (%) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **( 0.00) Control** | **0.05** | **0.10** | **0.15** | **0.20** | **0.25** | **0.30** | **0.35** | **0.40** |
| Moisture % | 72.40 | 70.00 | 70.90 | 70.60 | 70.50 | 67.70 | 70.30 | 72.30 | 72.10 |
| Protein % (As dry matter) | 78.00 | 80.30 | 80.60 | 78.30 | 82.95 | 79.95 | 81.95 | 77.50 | 80.10 |
| **Amino acids:** | | | | | | | | | |
| Therionine | 3.19 | 3.65 | 3.51 | 3.40 | 3.48 | 3.40 | 3.44 | 3.31 | 3.66 |
| Aspartic | 6.72 | 7.67 | 7.59 | 7.21 | 7.48 | 7.09 | 7.41 | 6.93 | 7.44 |
| Serine | 2.91 | 3.33 | 3.20 | 3.06 | 3.18 | 3.10 | 3.20 | 3.04 | 3.21 |
| Glutamic | 10.64 | 12.04 | 11.74 | 10.97 | 11.58 | 11.08 | 11.61 | 10.84 | 11.81 |
| Proline | 1.77 | 2.01 | 1.89 | 1.85 | 2.06 | 1.92 | 1.90 | 1.83 | 2.00 |
| Glycine | 3.02 | 3.41 | 3.22 | 3.22 | 3.60 | 3.30 | 3.23 | 3.04 | 3.22 |
| Alanine | 3.96 | 4.46 | 4.34 | 4.16 | 4.37 | 4.26 | 4.21 | 4.07 | 4.38 |
| Valine | 3.11 | 3.54 | 3.47 | 3.25 | 3.38 | 3.27 | 3.22 | 3.06 | 3.41 |
| Isoleucine | 3.03 | 3.52 | 3.41 | 3.17 | 3.30 | 3.21 | 3.21 | 2.96 | 3.39 |
| Leucine | 5.80 | 6.59 | 6.44 | 6.10 | 6.32 | 6.22 | 6.26 | 5.97 | 6.55 |
| Tyrosine | 2.60 | 2.89 | 2.85 | 2.69 | 2.81 | 2.72 | 2.77 | 2.65 | 2.90 |
| Phenylalanine | 2.89 | 3.27 | 3.20 | 3.05 | 3.16 | 3.13 | 3.11 | 3.01 | 3.23 |
| Hisitidine | 2.28 | 2.59 | 2.60 | 2.18 | 2.52 | 2.19 | 2.18 | 2.04 | 2.38 |
| Lysine | 5.91 | 6.88 | 6.56 | 6.12 | 6.50 | 6.33 | 6.49 | 6.08 | 6.74 |
| Argnine | 4.49 | 5.10 | 4.92 | 4.65 | 4.97 | 4.77 | 4.87 | 4.56 | 5.02 |

**Table 5. Effect of dietary threonine levels on economical efficiency of Japanese quails.**

| Items | Threonine supplemented levels (%) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **( 0.00) Control** | **0.05** | **0.10** | **0.15** | **0.20** | **0.25** | **0.30** | **0.35** | **0.40** |
| **Av. Feed intake (kg/bird) [a]** | 0.438 | 0.462 | 0.436 | 0.419 | 0.445 | 0.456 | 0.429 | 0.459 | 0.467 |
| **Price/kg feed (P.T.)* b** | 213.50 | 214.40 | 215.30 | 216.20 | 217.10 | 218.00 | 218.90 | 219.80 | 220.70 |
| **Total feed cost (P.T.) axb=c** | 93.51 | 99.05 | 93.87 | 90.59 | 96.61 | 99.41 | 93.91 | 100.89 | 103.07 |
| **Av. L. B.W.G. (kg) d** | 0.136 | 0.156 | 0.140 | 0.139 | 0.152 | 0.146 | 0.144 | 0.140 | 0.157 |
| **Price/kg live weight (L.E)e** | 2.400 | 2.400 | 2.400 | 2.400 | 2.400 | 2.400 | 2.400 | 2.400 | 2.400 |
| **Total revenue (P.T.) dxe=f** | 326.40 | 374.40 | 336.00 | 333.60 | 364.80 | 350.40 | 345.60 | 336.00 | 376.80 |
| **Net revenue (P.T.) F-C=g** | 232.89 | 275.35 | 242.13 | 243.01 | 268.19 | 250.99 | 251.69 | 235.11 | 273.73 |
| **Economical efficiency(g/c) *** | 2.49 | 2.779 | 2.579 | 2.683 | 2.776 | 2.525 | 2.680 | 2.330 | 2.656 |
| **Relative economic efficiency **** | 100 | 111.56 | 103.533 | 107.71 | 111.44 | 101.36 | 107.59 | 93.54 | 106.62 |

* Economical efficiency (net revenue per unit feed cost)

** Relative economic efficiency (assuming that economical efficiency of the control ($T_1$) equals 100).