

Table 3: Egg productive traits ($\bar{X} \pm SE$) of laying Japanese quails as affected by dietary supplementation of threonine levels during the experimental periods (7-15 wks of age).

| Threonine levels (%) | Average egg weight (g) | Egg Number (56 days) | Egg mass (g egg/56 days) | Daily feed intake (g) | Feed conversion (g feed/g egg) | Egg Production (%) | Egg Production g egg/hen/day |
|-----------------------|---------------------------|--------------------------|----------------------------|---------------------------|--------------------------------|--------------------------|------------------------------|
| (0.00) Control | 10.93±0.16 ^f | 39.93±1.25 ^b | 433.88±11.40 ^{de} | 33.85±0.79 ^a | 4.42±0.13 ^b | 71.31±2.23 ^b | 7.75±0.20 ^{de} |
| 0.05 | 12.21±0.09 ^{bc} | 45.69±0.91 ^a | 556.78±9.57 ^b | 30.42±0.52 ^{bc} | 3.08±0.07 ^e | 81.60±1.63 ^a | 9.94±0.17 ^b |
| 0.10 | 11.54±0.16 ^e | 36.69±1.00 ^c | 422.11±11.10 ^e | 32.93±1.13 ^{ab} | 4.39±0.12 ^b | 65.52±1.78 ^c | 7.54±0.20 ^e |
| 0.15 | 13.29±0.05 ^a | 47.86±0.84 ^a | 636.09±11.32 ^a | 32.34±0.44 ^{abc} | 2.86±0.04 ^e | 85.46±1.51 ^a | 11.36±0.20 ^a |
| 0.20 | 12.32±0.09 ^b | 37.43±1.11 ^{bc} | 460.39±12.65 ^{cd} | 29.98±1.21 ^{bc} | 3.72±0.17 ^{cd} | 66.84±1.98 ^{bc} | 8.22±0.23 ^{cd} |
| 0.25 | 12.16±0.13 ^{bcd} | 40.42±1.24 ^b | 489.19±12.78 ^c | 30.12±0.56 ^{bc} | 3.52±0.14 ^d | 72.19±2.22 ^b | 8.74±0.23 ^c |
| 0.30 | 11.82±0.13 ^{de} | 31.68±1.36 ^d | 373.27±15.07 ^f | 34.81±0.68 ^a | 5.36±0.16 ^a | 56.58±2.42 ^d | 6.67±0.27 ^f |
| 0.35 | 12.43±0.09 ^b | 32.89±1.08 ^d | 408.72±13.46 ^e | 32.13±0.99 ^{abc} | 4.52±0.20 ^b | 58.74±1.92 ^d | 7.30±0.24 ^e |
| 0.40 | 11.89±0.11 ^{cd} | 34.75±0.77 ^{cd} | 413.25±10.00 ^e | 28.75±1.17 ^d | 3.94±0.18 ^c | 62.05±1.37 ^{cd} | 7.38±0.18 ^e |
| Sig. | ** | ** | ** | ** | ** | ** | ** |

A,b,c ... Means having different letters at the same column are differ significantly (P<0.05).

** = (P<0.01).

Table 4. Reproductive performance ($\bar{X} \pm SE$) of laying Japanese quails as affected by dietary supplementation of threonine levels, during the experimental period(7-15 wks of age).

| Threonine levels (%) | Fertility eggs (%) | Hatchability/Total eggs (%) | Hatchability/Fertile eggs (%) | Hatch chick weigh (g) |
|---------------------------------|-----------------------|--------------------------------|----------------------------------|--------------------------|
| (0.00) Control | 96.62±0.45 | 74.60±1.13 ^{ab} | 77.20±0.89 ^{ab} | 7.57±6.42 ^{ab} |
| 0.05 | 97.25±0.37 | 64.36±1.60 ^c | 66.16±1.49 ^b | 7.12±7.29 ^{bc} |
| 0.10 | 97.10±0.10 | 70.97±1.32 ^b | 73.08±1.30 ^c | 6.84±2.92 ^c |
| 0.15 | 97.05±0.40 | 60.30±0.54 ^d | 62.14±0.58 ^e | 7.76±6.60 ^a |
| 0.20 | 96.82±0.50 | 77.82±1.45 ^a | 80.36±1.16 ^a | 7.61±7.76 ^{ab} |
| 0.25 | 96.72±0.45 | 73.81±1.24 ^{ab} | 76.30±0.95 ^{bc} | 7.75±4.06 ^a |
| 0.30 | 95.06±1.25 | 65.45±2.14 ^c | 68.83±1.97 ^d | 7.09±4.45 ^{bc} |
| 0.35 | 96.21±0.52 | 73.57±1.02 ^b | 76.48±1.14 ^{bc} | 6.93±3.72 ^c |
| 0.40 | 97.05±0.77 | 72.08±1.14 ^b | 74.25±0.75 ^{bc} | 6.81±3.75 ^c |
| Sig. | NS | ** | ** | ** |

a,b,c ... Means having different letters at the same column are differ significantly (P<0.05).

** = (P<0.01);

NS= Not significant.

Table 5. Egg quality measurements ($\bar{X} \pm SE$) of laying Japanese quails as affected by dietary supplementation of threonine levels.

| Threonine levels (%) | Egg components (%) | | | Egg shape index (%) | Yolk index (%) | Egg specific | Haugh units |
|-----------------------|--------------------|--------------------------|----------------|---------------------------|----------------|--------------|-------------------------|
| | Shell weight | Yolk weight | Albumin weight | | | | |
| (0.00) Control | 14.98±1.59 | 34.40±2.10 ^{ab} | 50.62±1.51 | 80.33±0.72 ^{abc} | 48.67±1.03 | 2.21±0.12 | 91.40±1.25 ^a |
| 0.05 | 13.22±0.40 | 37.68±2.81 ^{ab} | 55.38±6.95 | 77.02±0.76 ^c | 44.50±1.15 | 2.07±0.04 | 89.08±2.47 ^a |
| 0.10 | 13.38±0.34 | 32.56±1.52 ^b | 54.07±1.52 | 77.32±0.72 ^c | 44.28±2.14 | 2.09±0.02 | 86.92±1.63 ^a |
| 0.15 | 14.70±0.84 | 33.37±1.75 ^{ab} | 51.94±1.61 | 78.46±0.93 ^{bc} | 47.91±2.38 | 2.27±0.08 | 81.17±2.54 ^b |
| 0.20 | 12.68±0.52 | 37.93±0.43 ^{ab} | 49.39±0.67 | 78.59±0.65 ^{bc} | 42.42±1.10 | 2.08±0.04 | 88.20±0.88 ^a |
| 0.25 | 14.35±0.77 | 39.96±1.10 ^a | 45.68±1.24 | 77.59±1.08 ^c | 45.21±0.66 | 2.18±0.09 | 89.43±1.57 ^a |
| 0.30 | 14.88±0.60 | 34.79±2.39 ^{ab} | 50.34±2.04 | 82.31±1.52 ^a | 43.18±1.65 | 2.20±0.06 | 90.43±2.99 ^a |
| 0.35 | 13.85±0.63 | 32.38±0.85 ^b | 53.77±1.35 | 81.49±2.01 ^{ab} | 44.05±0.78 | 2.09±0.04 | 87.36±1.50 ^a |
| 0.40 | 13.93±0.66 | 36.58±2.24 ^{ab} | 49.50±1.91 | 80.30±0.91 ^{abc} | 46.38±1.63 | 2.08±0.05 | 90.67±2.26 ^a |
| Sig. | NS | * | NS | * | NS | NS | * |

A,b,c ... Means having different letters at the same column are differ significantly (P<0.05).

* = (P<0.05); ** = (P<0.01); NS= Not significant.

Table 6. Males and females reproductive system organs as affected by dietary threonine levels of laying Japanese quails at 15 weeks of age.

| Items* | Threonine levels (%) | | | | | | | | |
|-------------------------------|----------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | (0.00) Control | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 |
| <i>Females:</i> | | | | | | | | | |
| Largest 3 follicles weight(g) | 15.33±0.33 | 16.67±2.60 | 16.67±1.76 | 16.67±1.20 | 15.00±2.65 | 16.00±1.15 | 16.33±1.20 | 16.33±1.33 | 16.00±0.58 |
| Oviduct weight (g) | 12.33±0.33 | 11.00±0.73 | 12.00±1.73 | 11.33±0.88 | 11.33±1.20 | 11.66±0.88 | 12.00±1.15 | 11.66±1.20 | 11.67±0.88 |
| Oviduct length (cm) | 33.00± 1.53 | 34.33±0.33 | 34.00±1.15 | 35.00±0.58 | 33.67±1.20 | 32.67±1.76 | 33.33±0.88 | 32.67±0.88 | 32.33±0.88 |
| <i>Males:</i> | | | | | | | | | |
| Testes weight (g) | 6.00±0.58 | 6.33±0.88 | 6.67±1.20 | 6.33±1.20 | 6.33±0.33 | 6.67±0.67 | 6.33±0.88 | 6.67±0.88 | 6.67±0.33 |
| Testes length (cm) | 1.25±0.08 | 1.30±0.06 | 1.32±0.08 | 1.25±0.04 | 1.25±0.04 | 1.28±0.06 | 1.28±0.6 | 1.30±0.12 | 1.32±0.07 |
| Testes width (cm) | 0.60±0.04 | 0.57±0.06 | 0.52±0.05 | 0.58±0.03 | 0.58±0.03 | 0.53±0.03 | 0.53±0.03 | 0.53±0.05 | 0.57±0.09 |

* All values were not significant.

Table7. Influence of dietary threonine levels on economic efficiency of laying Japanese quails from 7 to 15 weeks of age.

| Measurements | | | | | | | | | | |
|-----------------------|--------------------------|------------------------|-----------------------|--------------------|-----------------------|--|--------------------------------|--------------------------|--------------------------------|-------------------------------|
| Threonine levels (%) | Feed intake (kg/hen) (a) | Price/Kg feed (LE) (b) | Feed cost/hen (a*b=c) | Egg number/hen (d) | Feed cost/egg (c/d=e) | Price of one egg (P.T.) ² F | Price of total eggs/hen(d*f=g) | Net revenue (P.T.=g-c=h) | Economic efficiency (h/c)*100* | Relative economic efficiency* |
| (0.00) Control | 1.90 | 180.25 | 342.48 | 39.93 | 8.58 | 35.00 | 1397.55 | 1055.07 | 308.07 | 100.00 |
| 0.05 | 1.70 | 185.25 | 314.93 | 45.69 | 6.89 | 35.00 | 1599.15 | 1284.22 | 407.78 | 132.00 |
| 0.10 | 1.84 | 190.25 | 350.06 | 36.69 | 9.54 | 35.00 | 1284.15 | 934.09 | 266.84 | 86.62 |
| 0.15 | 1.81 | 195.25 | 353.40 | 47.86 | 7.38 | 35.00 | 1675.10 | 1321.70 | 374.00 | 121.40 |
| 0.20 | 1.68 | 200.25 | 336.42 | 37.43 | 8.99 | 35.00 | 1310.05 | 973.63 | 289.41 | 93.94 |
| 0.25 | 1.69 | 205.25 | 346.87 | 40.42 | 8.58 | 35.00 | 1414.70 | 1067.83 | 307.85 | 99.93 |
| 0.30 | 1.95 | 210.25 | 409.99 | 31.86 | 12.94 | 35.00 | 1108.80 | 698.81 | 170.45 | 55.33 |
| 0.35 | 1.80 | 215.25 | 387.45 | 32.89 | 11.78 | 35.00 | 1151.15 | 763.70 | 197.11 | 63.96 |
| 0.40 | 1.61 | 220.25 | 354.60 | 34.75 | 10.20 | 35.00 | 1216.25 | 861.65 | 242.99 | 78.87 |

* Economic efficiency (Net revenue per unit feed cost FI- According to the local market of the experimental time.

** Relative economic efficiency (assuming that economical efficiency of the control (T₁) equals 100).