

The energy requirement for birds

The bird's energy requirement divided to several sections:

1 – Energy required to save a life (sustainability): divided to

A- The base of metabolic energy (BM): It is the energy required to do metabolic processes.

Identified The base of metabolic energy using the following basis: -

BM Bird's first week needs to 6 calories / g body weight / h

BM second week needs to 7 calories / g body weight / h

BM third week needs to 3 calories / g body weight / h

By using the following equation we can be calculate The base of metabolic energy of a birds

B.M. = 24 * live weight by grams * number of calories required for one gram B.W.

Example / The rate of bird weight 1.75 kg, how much energy is estimated to a base of metabolic

$$BM = 24 * 1750 * 3 = 126000$$

$$BM = 126000 \ / \ 1000 = 126 \text{ kcal / day}$$

To calculate B.M. For laying hens can be used

Scot, Nesheim & Young method by applying the following equation: -

$$B.M. (k.cal / day) = W (170-2.2T) +2 E +5 \Delta W$$

W = weight by kg

T = the temperature

E = daily egg mass

ΔW = daily increase for weight

Example / The weight of 43 weeks-old chicken is 1640 g , the rate of egg weight is 60 g , the daily weight increases 3 g , egg production rate 80% and the daily temperatures 27 C°. How much is the energy required to the bird per day

$$\text{B.M. (k.cal / day)} = W (170-2.2T) + 2 E + 5 \Delta W$$

$$= 1.640 (170-2.2*27) + 2 X (0.80*60) + 5 * 3$$

$$= 292.384 \text{ K.cal}$$

B - The energy needed for the activity: the energy needed for daily movement of the birds.

Can determine the energy required to daily bird activity using the following equations: -

Energy activities (in the case of ground breeding) = B.M. * 0.5

Energy activities (in the case of cages breeding) = B.M. * 0.37

Example / Calculate the energy activity to the bird by weighing 120 g and two weeks old. If the breeding in the cages

$$\text{BM} = 24 * 120 * 7 / 1000$$

$$\text{BM} = 20.160 \text{ kcal / day}$$

Energy activity (in the case of breeding in cages) =

$$20.160 * 0.37 = 7.45 \text{ kcal}$$

2- Energy needed for growth:

Estimated energy needed for growth by calculating the amount of energy stored in the body in the form of protein and fat. Due to the different nature of the growth, it is difficult to estimate the amount of energy with a great degree of accuracy. The following table shows the chemical composition of the increase in body weight in developing chicks and laying hens, which can be used in the estimation of the energy needed for growth, are as follows:

The chemical composition of the increase in body weight

	<i>The rate of protein %</i>	<i>The rate of fat %</i>
<i>Developing chicks</i>	18	3
<i>Laying hens</i>	18	15

The estimated heat stored in each gram of protein 4 kcal and in one gram of fat 9 kcal.

Energy stored in protein form = Daily increases in body weight by grams x Rate of protein x the calories of one gram of protein.

Energy stored in fat form = Daily increases in body weight by grams x Rate of lipids x the calories of one gram of fat.

The amount of energy needed to chick grows at a rate of 20 grams per day =

$$(20 \times 0.18 \times 4) + (20 \times 0.03 \times 9) = 19.8 \text{ kcal / day}$$

The amount of energy needed for growth of laying hen grow at a rate of 8 grams per day =

$$(8 \times 0.18 \times 4) + (8 \times 0.15 \times 9) = 16.56 \text{ kcal / day.}$$

3- The energy required for the production of eggs: -

Each **one gram of eggs** production need to **1.5 kcal of energy**.

Example / If egg production rate of 80% and an average weight of eggs per 60 g how much of energy required for production of eggs in that day?

Egg mass = (production rate x the egg weight) = $60 \times 0.80 = 48$

Energy required to egg production = Egg mass * 1.5 = 72 kcal

Net energy

Net energy in the developing stage = Energy required to save a life + growth energy.

Net energy of chicken in production stage = Energy required to save a life + growth energy + egg production energy.

* Calculate the Energy Activities to bird weighed 1300 g, 26 days old and breeding in the cages.

* The egg production rate is 60% and average weight of eggs 55 g . Calculate the egg productions energy.

* If the weight of chicken 2.2 kg , the average of daily increase 5 g , the rate of egg weight 60 g , production rate 82% and the breeding in cages. Calculate the net energy for birds.

* If you have a flock in production period. Egg weight 62 g, weekly increase in body weight 28 g, the body weight 2300 gram, the rate of egg production 75% and the breeding on the ground. How much net energy needs to these birds?