Ann. For. Res. 66(1): 2405-2418, 2023
ISSN: 18448135, 20652445

ANNALS OF FOREST RESEARCH
www.e-afr.org

EFFECT OF HUMAN OVARIAN STIMULATING HORMONE (FSH) ON THE OVARIAN FERTILITY OF LAYING HENS

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Abstract

This study was conducted in the Science Department / College of Basic Education / Al-Mustansiriya University for the period from 1-15-2022 to 2-15-2022. The research aims to study the effect of injecting non-laying chickens at the age of 8 months and chickens with low ovulation before the end of production with FSH at a concentration I.U/l 75. The effect of hormonal injections on productive performance and some qualitative characteristics of eggs such as egg weight, diameter and height of yolk, histological study of ovary and ovary weight were studied. In this study, (24) non-laying, low-ovulating chickens and laying hens were used, distributed into four groups with six replications, and a group of laying hens of brown Lohmann breed, aged 8-12 months, weighed individually, and distributed into the following groups: The first control group (laying hens) were not treated: they were not injected with a hormone and were fed only laying hens diets. The second group, the control, was hormonally treated (laying eggs): they were injected with half a dose of the hormone once during the duration of the experiment. They were fed only the diets of laying hens. The third group (non-laying hens at the age of 8 months): They were injected with half a dose of the hormone for one time and were fed with diets for laying hens. The fourth group (hens with few eggs before the end of their production): they were injected with half a dose of the hormone for once, which stimulates the ovaries for a month, and they were fed with diets for laying hens. The results showed significant differences in the characteristics of egg production when calculating the general rate, as the production percentage for the second, third and fourth groups reached (80.0%, 83.3% and 73.6%), respectively. While the first and fourth treatments gave the lowest percentage of egg production in this comparison. The second and third treatments also gave the highest average egg weight when calculating the general rate compared to the rest of the treatments, as the average was (65 ± 0.44 and 85.3 ± 1.20). Significant differences appeared in the rates of egg weight in the four groups. It was also noted that there were significant differences in the rate of feed consumption as. It is noticed a decrease in the amount of feed consumed by the first treatment compared to the rest of the groups, as it reached (100.5 ± 1.20 grams / day / chicken), and the highest rate of feed consumption was in the second and third treatments, when it reached (220.2 and 250.3) grams / day / chicken. Significant differences were seen in the diameter and height of the yolk of the five groups. The largest diameter was in the hormonal treatment, reaching (0.20 ± 5.5 cm), and the highest height of the yolk in the first, second, and hormonal treatment, reaching (17 ± 0.33, 17 ± 0.25, 17 ± 0.50), respectively. And density in the texture of albumen, which indicates the giving of fodder and protein in appropriate quantities, which resulted in quality in the eggs produced in terms of weight and texture. The autopsy results

also showed the weight of the ovary, the number of eggs, mature follicles, and yolks above the ovary increased in the first, second, and hormonal treatment) and the largest weight of the ovary was in the treatment It reached (11.8 gm). It is clear from the current research that the type of feed, additives, nutritional supplements, and care for the hygiene and health of chickens have a great impact on obtaining high-quality productive characteristics in the produced eggs. Differences appeared in all treatments in relation to chicken weights, as the live body weight increased and the amount of change in body weight when calculating the general rate, and the highest percentage of weight was in the hormone group, which reached (2600 ± 50 grams).
Keywords: human ovarian, FSH, ovarian fertility

Introduction:

Chickens are raised mainly for the purpose of obtaining white meat or to obtain eggs, and for laying chickens, egg production comes in the first place for production, and meat production is in the second stage, and eggs are one of the most important sources of animal proteins, and it is a complete food for humans and is distinguished from other proteins by being easy to transport and store and marketing it (Habib, 1983). The female reproductive system of chickens consists of the left ovary and the left ovarian canal or reproductive canal. In fact, during the first embryonic stages, both the right and left ovaries exist, as well as the right and left oviducts, but during embryonic development, the development and growth of the ovary will not continue. The left side and the left oviduct, while growth stops on the right side and decays and becomes vestigial and sometimes vesiculate. This discrepancy is quite clear on the seventh day of the embryonic stage. The female reproductive system of the hen consists of the following parts (ovary, oviduct and consists of the parts (trumpet, most, isthmus, The uterus, the vagina (Allam, 1978; Thamer 2017). Unbalanced nutrition causes animal weakness, low production, high feeding costs, and low egg production. Animals with many embryos, low sperm count, high percentage of abnormal and dead animals in males, low fertility in general, and feeding may be a reason for forming weak young that are unable to live and resist inappropriate environmental conditions, which leads to their death (Habib, 1983). If there is a clear deficiency in the nutrients that it needs, then the production of eggs decreases, and it may stop. Nutrition also affects the size of the eggs, the hardness of the shell and its thickness as well as affects the level of fat and albumin in the components of the egg (Mohsen, 2001). The ovary appears before puberty in the form of A light -colored, tortuous mass, and when the hen approaches puberty, the ovary secretes the hormone estrogen, which raises the concentration of lipids in the blood. By examining the ovaries, it is possible to see about 2000 eggs that form what is called the cluster of eggs. It is also possible to distinguish other large numbers of these eggs microscopically. Which later becomes the vitelline membrane, after that the growth of the egg increases gradually and the secretion and deposition of the yolk material or yolk, which consists of thick layers of yellow yolk and thin layers of yolk increases It appears at the cross section in the form of circular rings around the center of the egg, and the yellow color concentration increases in the yellow yolk layer due to the presence of a large amount of carotenoid pigments called (xanthophyll) in the diet. At first, the germinal disk is in the middle of the egg.. but after its increase

In size as a result of yolk deposition, the germinal disk moves to the upper end of the egg under the vitelline membrane. Each egg grows over a period of 10 days until its growth is complete and ready to separate from the ovary. It is noted that its size increases in the last seven days to ten times. It is also noted that there are large numbers There are eggs of varying degrees of growth, but only the largest of them is separated from the ovary through the stigma fissure, which gradually expands in an area where the density of the hairs decreases. The abdominal space where it sucks again. The hen lays a number of eggs in successive days and is called the egg chain clutch. Usually the length of the chain ranges between 2-10 eggs, and the period between each two chains ranges between 1-3 days, depending on the efficiency of production. The egg needs about 25 hours in its journey through the oviduct until the hen lays a fully formed egg, and it takes about 30 minutes before the second egg is released from the ovary.. This period varies according to the length of the chain and the time that elapses between two chains (Allam, 1978; Al-Rubaie, 2020.(

There are many studies that used herbs and some nutrients for the purpose of raising the efficiency of egg production and obtaining good egg production characteristics such as (egg weight, diameter and height of the yolk), such as using crushed black seed seeds in laying hens diets (Al-Hamid, 2009), and studying the effect of adding chamomile flower powder to the diet in the productive characteristics (Al-Mashhadani, 2007), and the use of safflower meal (safflower) as a partial substitute for soybean proteins (Al-Badi, 2005), all studies have shown an improvement in egg production and its productive characteristics, but with the passage of time and with an increase or decrease in the concentrations of these substances decrease Or the percentage of egg production increases and its productive qualities are affected.

MATERIALS AND METHODS

The devices used listed below**:**

	the device name	Company name/origin
1	Electronic scale arranged after the separator (1 gram - 5 kilograms)	China
2	Sensitive electronic scale two ranks after the separator (0.01 - 400 grams)	China

2-1-3**The number used, foodstuffs and fodder**

I used the tools, foodstuffs and fodder in the table below:

	Number, food and fodder	Manufacturer/origin
1	Anatomy tools	homemade
2	Bird cages	China
3	Feed for laying hens	National Feed Company / Iraq
4	hormone	/ FSH/ Germmeny

2**-ways of working**

A study was conducted on egg production in local chickens and the effect of hormones on the ovulation process for a period of 30 days.

3-Prepare the chicken: Laying chickens were purchased from the local markets, known as the Lohmann breed (red-white), at the age of (8-12) months. Six chickens were distributed in each group .Hens were placed inside cages, with 3 chickens in each cage, with a capacity of 1 m x 50 cm and a height of 50 cm.

With feed placed three times and water during the day only.

4-Collect the eggs

Eggs were collected from (24) chickens per day for a month of the experiment in order to observe the changes that occurred before and after the study. The changes in eggs were studied through:

Egg weight, number of eggs, diameter and height of yolk, weight of ovaries and chicken weight before and after the experiment

5- Preparing the feed

This experiment was conducted to find out the effect of using two levels of protein (local and imported) and different sources of protein and the interaction between the level of protein and its source on the productive performance of female laying hens, as the protein concentrate (fodder of local origin) was used by the National Company for Feed Production / Diwaniyah, which consists of soybean meal and corn bile, in addition to a mixture of vitamins and minerals), lysine and methionine. As for the local protein, local fish meal (Local Fish Meal) was used, which was prepared by the Gulf Company for Fisheries and Fish Protein Production / Basra, which consists of non-economic fish that are not consumed by humans. The leftovers of the local poultry slaughterhouses (Poultry Offal Meal) produced by the International Company for Meat Preparation / Baghdad, and it was a mixture of the uneaten leftovers of the slaughterhouses, such as internal guts, chicken heads and legs, and feathers. The new feed was prepared by taking the feed for laying hens and adding local protein by mixing 5 kg of Feed for laying hens with 1 kg of local protein whose components were mentioned previously.

6- Giving the hormone

After a month of using the feed and discovering some non-laying hens among the chickens, they were injected with ovarian stimulating hormone (75 I.U / l (FSH). The hormone was injected subcutaneously under the wing at a rate of 1/2 cc.

Productive traits

1- Egg production rate

The eggs were collected once a day, at six in the morning and one in the afternoon, and the percentage of weekly egg production H.D. was calculated according to the equation reported by Al-Fayyadh and Naji (1989) as follows:

$$HD = \frac{\text{The number of eggs produced in a given time period}}{\text{The number of chickens in the rearing barn x the length of the period in days}} X100$$

2-Average egg weight

The eggs of the repeated treatments were weighed weekly by a sensitive scale and the average weight of the eggs of the repeated treatments were extracted weekly during the experiment period. Tuesday of each week was chosen as a date for weighing the eggs**.**

3-Measure the height and diameter of the egg yolk

Measurement was done with a millimeter ruler**.**

4**- Feed consumption rate (g / bird / day)**

The daily fodder was provided freely at seven o'clock in the morning of each day, and the fodder was taken from a pre-weighed quantity, and at the end of the week the remainder of the fodder was collected and weighed, and thus we had the amount of fodder consumed during the week**.** The average daily feed consumption (gm / bird) per week was calculated according to the equation mentioned by Ibrahim**:.(2000)**

$$\text{The average daily feed consumption} = \frac{\text{The amount of feed consumed per week by one refined bird}}{\text{Number of birds in one replicate x 7 days}}$$

5**- The rate of weight gain**

The birds of the repeated treatments were weighed individually using a sensitive scale at the beginning and end of the experiment, and according to the rate of weight gain during the experiment period (a gram of weight gain per bird within 30 days) according to the equation reported by Ibrahim**(2000)**,

$$\text{The rate of weight gain of the bird} = \frac{\text{Final Weight (gm) - Starting Weight (gm)}}{\text{30 days}}$$

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statistical analysis

The experiment was carried out using a randomized complete block design (RCBD) as stated in Snedecor and Cochran (1980), and the statistical analysis of the data was done using the ready-made statistical program SAS (1989). Significant differences between the averages were also determined using the Duncan test, as stated in Steel and Torrie**.(1980)**

Results and discussion:

The characteristic of egg production is the main objective of establishing a project for the production of eggs, whether it is table eggs or hatching eggs. The data of Table No. (1) indicates the presence of significant differences at a significant level of $P < 0.01$ between all treatments and the control group and between the groups in the percentage of egg production, where the percentages were the highest In the second, third and fourth groups, compared to the control group, as the second group recorded the highest rates of egg production, followed by the third group,

which was fed special diets for laying hens with local protein, where the number of eggs during a month of the experiment period in the first group was 132 eggs, and in the second group 156 eggs and in the third group (168 eggs) and the fourth group (145 eggs). In general, an improvement in egg production rates is noted in the second, third and fourth groups to a large extent compared to the control group. Which one of its aspects is an increase in appetite as a result of the increase in the level of the hormone in the blood, which leads to an improvement in production activities in the body at all levels, from the feathers to the weight of the animal as a whole. and increasing its productive activities, this agrees with (Al-Mashhadani, 2011). This result is consistent with the recommendations of the company that produces this breed of chicken and with the results reached by (Al-Mashhadani, 2011), who referred to the rates of egg production in this strain, whether pure or hybrid, that takes a natural curve, as production gradually escalates with the age of the animal to reach its peak and then It gradually decreases according to the hen's ovulation cycle. The weight of the egg is a true indicator of its size, which contributes to determining the price of eggs, which represents another goal for breeders of table eggs. It is noted from the results shown in Table (1) that there are significant differences at a significant level of $P<0.01$ between all treatments for the characteristic of egg weight compared to the control group. The results of the first group (control) indicated a decrease in the weight of chicken eggs compared to the rest of the groups, as the average weight of Eggs were (0.40 ± 62.5) gm during this period without treatment. In the second and third groups, the average weight of eggs was (65 ± 0.44 and 85.30 ± 0.50) gm, respectively, where an improvement in egg production was observed in the treatments, while the decrease in weight returned. Eggs in the fourth group, where he indicated a decrease in the weight of eggs compared to the rest of the second and third groups. The protein, the amino acid methionine, the lipid, and the essential fatty acid linoleic acid ready for metabolism within the body have a major role in determining the weight of the egg nutritionally (Bray and colleagues, 1965 and Cerniglia and colleagues, 1984). Therefore, the high level of fiber worked to reduce the weight of the egg by increasing the bird's need for protein and essential amino acids due to the increased loss of internal nitrogen as a result of the fiber's action by removing a layer of cells lining the intestine (Mason and Palmer, 1983; Parsons and colleagues, 1983). Due to the fibers having a bulky effect, as it works to stimulate the slow dilatational receptors in the crop to send nerve signals to the central nervous system and the bird’s feeling of hunger, hyperactivity and nervousness). It is worth noting that the weight of the egg is affected by the percentage of protein, methionine, or linoleic in the diet, or the amount of these nutrients consumed by the bird per day (Miles, 1998)**.**The amount of feed consumed is an indicator of the nutritional content of the diet provided to the birds and its efficiency, and it is the determining factor for the efficiency and profitability of production. Table No. (1) shows the data related to the averages of feed consumed by the birds of different treatments during the experiment, and from it it is noted that there are significant differences at a significant level ($P<0.01$ in the amount of Forage consumed for the three treatments and the control group were as follows (100.5 ± 1.20, $.3250 \pm 2.45$, 220.2 ± 1.30, 200.4 ± 1.50) and the highest rate of consumption was in the second (hormonal) group, while the lowest consumption of feed was in the first treatment, control and fourth treatment. This is due To the hormonal treatment that leads

to raising the activities of the body and productive activities.It was noted in Table No. (2) that there was a difference in the height of the yolk and the diameter of the circle of dense albumin in all treatments, and it was noted that there was a higher height in the second, third and fourth treatments compared to the control group (0.33 ± 17, 0.25 ± 17, 0.10 ± 16, 0.25 ± 14) mm on In succession, it was also noted that the size of the diameter of the dense albumen is due to the weight of the egg, but in general, most of the treatments contained .The diameter of the circle is relatively large in relation to the dense albumen, and the results agree with (Al-Mashhadani, 2011) and ((Xiang, etal, 2014), where he indicated that the quality of the albumen and the height of the yolk is due to the quality of the protein used in the feed.The data in Table No. (2) indicate that there are differences between all the experimental treatments for live body weight and in the four groups. As it is noted a rise in the weights of the chickens from the beginning of the experiment to its end, but there is a discrepancy between the weights of each chicken. This depends on the structural metabolic rates according to the amount of feed ingested. Significant differences were observed between the groups and the control group at a significant level ($P<0.01$), and the rates of weight gain in the groups were The four were as follows (5%, 20.6%, 23.3%, 11.6) respectively. Also, the third group recorded the highest weight and the lowest weight was in the first group, the untreated control. The results agree with Al-Mashhadani 2011, where he indicated that the weights increased not in size, but in feathers and fat in the abdomen Hen and feed consumed in the production of eggs. . The results of egg production, egg weight, egg mass, daily feed consumption and feed conversion coefficient are shown in Table.(1)

Significant differences were observed in the weights of the ovaries before the experiment and after the completion of the experiment, as the weight of the ovaries ranged between 5.5-6.5 grams and reached (6.50-11.20) grams after the end of the experiment, where significant differences were observed at a significant level ($P<0.01$).

The highest increase was recorded in the third group, which indicates that the quality of feed, protein, and hormonal treatment in particular contributed to an increase in the size of the ovary and the number of mature follicles, as in pictures No. (2, 3) compared to picture (1), which shows the shape of the reproductive system in the control group. The two pictures also show (4,5) the size of the ovaries, follicles, and reproductive system, where the results indicated that the use of gonads stimulating hormone, the appropriate dose is ½ cc of Gonal-f 75 I.u/l concentration, which was injected into hens (18) without laying and low ovulation, half the dose under the wing. Under the armpit) the response to the hormone appeared fast between 3-6 days, as the hens that were able to lay eggs regained their ovaries. As for the chicken that did not ovulate, there was a presence of grease on the ovary, as in the picture (6). The phenomenon of hyperovulation was also seen when the laying hen was injected with the hormone, as in the picture (7). Picture No. (8) also shows the difference between the active ovary and the ovary that has finished ovulating. The ovulation cycle is observed from 7-10, then a 3-2 day break in the hormonally injected groups compared to the hormonally uninjected control, where the ovulation cycle is 5 days of ovulation and 1-2 days. Break Chicken nervousness, its movement, fast eating and drinking large amounts of water, with an increase in feathers and an increase in the length of chicken claws. Note: Two-yolk eggs were

obtained from the second group, hormonally injected control. Note, as a result of excessive ovulation, which led to blockage of the oviduct and non-ovulation of the chicken.

Table No. (1) shows the percentages of egg production, the number of eggs produced, the average egg weight, and the amount of feed consumed in the experimental groups for a month.

productive qualities totals	time periods	The percentage of egg production	The number of eggs produced	Egg weight/gm	feed consumption rate bird/day/gram
The first group without treatment (control) A	30days	.656 %	132	62.5 ± 0.40	100.5 ± 1.20
The second group is control (Hormonally treated) B	30days	80.2 %	180	65.4 ± 0.44	250.3 ± 2.45
The third group is non-white (Hormonally treated) C	30days	83.3%	250	85.3 ± 0.50	220.2 ± 1.30
The fourth group is low in eggs (Hormonally treated) D	30days	73.6%	150	64.2 ± 0.50	200.4 ± 1.50

There are significant differences between groups A, B, C, and D at a significant level ($p<0.01$).

Table No. (2) represents the height and diameter of the egg yolk and the diameter of the albumen, the weight of the chickens in the experimental groups.

productive qualities totals	time periods	Yolk height (mm)	Yolk diameter (cm)	Thick albumen diameter	Weigh the chickens before treatment	Chicken weight after treatment	The rate of weight gain
The first group is untreated Control A	30 day	14 ± 0.25	4.0 ± 0.75	7 ± 0.24	1850 ± 55.40	2000 ± 50.40	5%
The second group is control (Hormonally treated) B	30 day	17 ± 0.33	4.5 ± 0.50	9 ± 0.50	1900 ± 40.50	2400 ± 53.30	16.6%

The third group was the non-laying hens before production (hormonally treated) C	30 day	17 ± 0.25	5.5 ± 0.15	12 ± 0.33	1900 ± 50.66	2500 ± 40.30	23.3%
The fourth group is low-ovulating chickens before the end of production (Hormonally treated) D	30 day	16 ± 0.10	4.5 ± 0.55	8 ± 0.50	1850 ± 40.50	2300 ± 50.25	11.6%

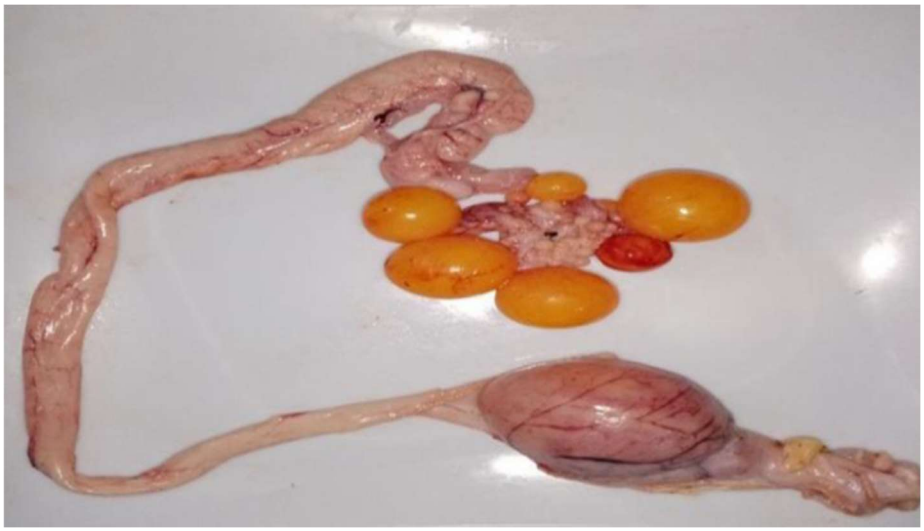
There are significant differences between groups A, B, C, and D at a significant level ($p<0.01$).

Table No. (3) shows the weight of the ovaries before and after treatment in the experimental groups**.**

Ovary weight (gm) totals	Before treatment	after treatment
The first group is control (non-hormonally treated) A	5.50 ± 0.10	6.50 ± 0.20
The second group is control (Hormonally treated) B	5.50 ± 1.10	9.50 ± 0.33
The third group was the non-laying hens before production (second transaction) C	5.55 ± 0.45	11.20 ± 0.10
The fourth group is low-ovulating	5.60 ± 0.44	8.50 ± 0.55

chickens before the end of production (Third transaction) D		

There are significant differences between groups A, B, C, and D at a significant level ($p<0.01$).



Picture No. (1) shows the ovaries, mature follicles, the oviduct, and the uterus containing an egg in the control group.

Picture No. (2) of the ovary after the hormonal injection.

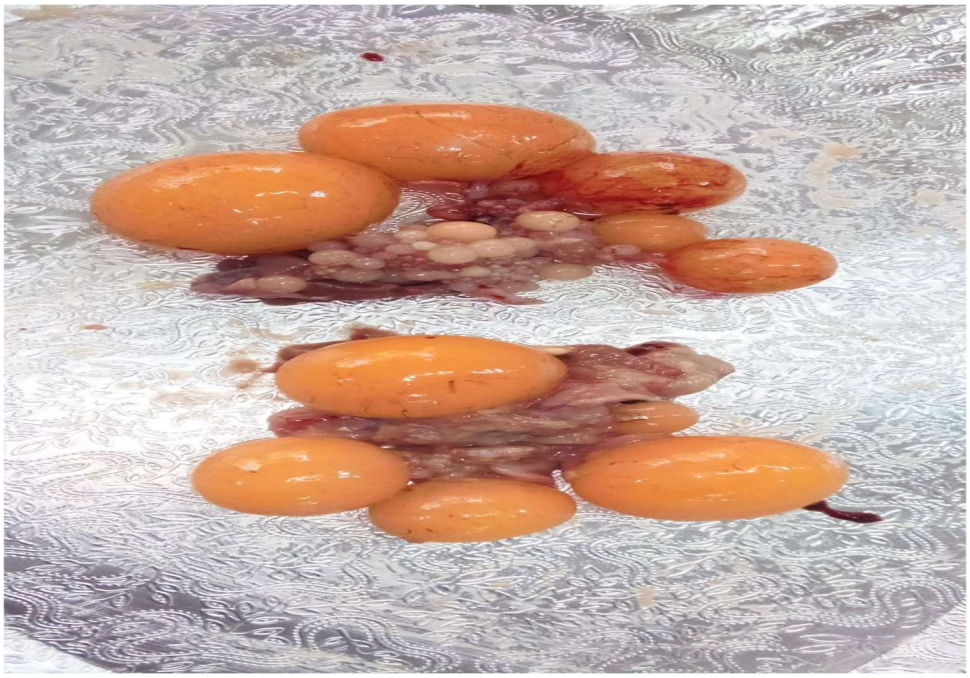
Picture No. (3) shows different sizes of the ovaries after the end of the experiment in hormonal injections.

Picture No. (4) of a fertile ovary, oviduct and uterus containing an egg in the second group treated with local protein and laying hens feed.

Picture No. (5) showing a fertile ovary, oviduct, and uterus containing an egg in the third group.

Picture No. (6) shows the stimulation of the ovaries that have finished ovulating after using the stimulating hormone (note the ovarian greasiness) with the presence of large numbers of mature follicles.

Picture No. (7) shows the phenomenon of hyperovulation in chickens producing eggs after being injected with the hormone.



Picture No. (8) shows an active ovary filled with mature follicles, and at the bottom of it is an ovary at the end of the ovulation period before the eggs are cut off.

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