# Effect of adding different levels from *brassica oleracea var. caulorapa*. *L* in some semen quality traits of the broiler breeder males (Ross 308) Aqeel Hajim Nasser Al-Zalzaly<sup>1</sup> and Emad Abdul-Jabbar Ali<sup>2</sup> Al-Qasim Green University / College of Agriculture / Department of Animal Production alzlzly86@gmail.com

### ABSTRACT

This study was conducted in the poultry farm of the Department of Animal Production / College of Agriculture / Al-Qasim Green University on 2022 /12/1 until 2023 /1/14, for a period of 6 weeks ., Twenty-five 45-week-old roosters were used in five treatment , where each treatment consisted of 5 replicates, and each replicate contained one rooster. All replicates were subjected to similar conditions of nutrition, temperature and lighting. Kohlrabi leaf powder was added to the roosters' ration as follows: T1 :5 mg / 100g feed / day, T2 :10 mg / 100g feed / day, T3 :15 mg /100g feed / day, T4 :20 mg /100 g feed /day, T5: control treatment (no addition). The aim was to study changes in the qualitative characteristics of roosters' semen. The results indicated a clear improvement in the condition of the qualitative characteristics in the addition parameters compared to the control group, as the results showed a clear improvement in the volume of the ejaculate (ml), collective movement %, individual movement %, sperm concentration (X 109 / ml), and percentage of live sperm. %, percentage of dead sperm, %. We conclude from this study that some of the active substances found in Kohlrabi fruit powder can improve the qualitative characteristics of the semen of Ross 308 broiler breeders.

Keywords : Kohlrabi , roosters , Qualitative characteristics of semen

# **INTRODUCTION**

The fertility of roosters is extremely important for increasing the efficiency of poultry production, and this fertility decreases at the age of 50 weeks [1]. The decrease in the male hormone testosterone. which is responsible for the fertility of roosters, is due to the conversion of testosterone into estrogen via the aromatase enzyme, which prevents the secretions of follicle-stimulating hormone and luteinizing hormone[2]. This aging of broiler breeder males has several negative effects on Semen quality. It also clearly reduces the activity of antioxidant enzymes in the sperm . Thus an increase in the production of Reactive Oxygen Species (ROS) leads to cell death and a reduction in semen quality [3]. These problems prompted the addition of medicinal plants that are safe and cheap, reduce mortality, and can maintain optimal growth of animals [4]. In the current millennium, plant foods have received great attention due to their potential nutritional properties, presumed safety and therapeutic effects A wide range of horticultural crops are included in the Brassica family, due to their economic importance worldwide [5]. Kohlrabi (Brassica oleracea *var. caulorapa. L*) is a plant of the Brassicaceae family. It is believed that the northern coast of Europe is its native habitat and carries a wide range. Wide range of temperatures so that it can be planted early or late. Kale is mainly grown in India, Pakistan, Iran, and Belarus. It is an important crop in Egypt, but in Syria, Western European countries, and North and South America, it is considered a second-class crop, but it is grown in Iraq mainly in the governorate. Karbala and in the Babylon and Baghdad governorates on a small scale [6]. It is a plant rich in antioxidants that help reduce the potential risk of various types of diseases and is an important source of

vitamin C, folic acid, and many minerals such as iron, potassium, and selenium [7]. Kalam is a plant available all year round and can be eaten raw or cooked. It is recommended to eat both roots and leaves for human consumption because they contain large amounts of nutrients and are low in calories [8]. Therefore, the study aims to add different levels of brassica oleracea var fruit powder Brassica oleracea var. caulorapa. L to the ration of broiler breeder males, know its effect on the qualitative characteristics of semen, as it may help increase fertility thanks to it containing a high percentage of antioxidants that combat free radicals that hinder the testicles from producing sperm.

## Materials and Methods:

Twenty-five roosters of the ROSS 308 broiler breeder males strain were used, with an average weight of 6.5 kg for the roosters and 4 kg for the hens, at the age of 45 weeks. The first two weeks were dedicated to training the roosters to give semen only The duration of semen collection and the study of some of its properties were divided into four periods (semen was collected three times a week for each period, and the roosters were left for two weeks without semen collection as a period of adaptation for the roosters). The replicates were distributed randomly in pens with an area of (1.5 x 1 x 1.5) m<sup>2</sup>, according to the floor breeding system. Coarse wood sawdust was used as bedding for the floor with a thickness of 7 cm. A lighting system of 14 hours of light per day was followed until the end of the experiment. According to the guide to Raising chickens[9]. 120g of feed was offered to each rooster. Upside-down hanging drinkers were used to provide water. The experimental treatments were divided as follows: The roosters were distributed individually and randomly into cages, with 5 treatments, each treatment with 5 replicates, with 1 rooster per replicate. They were subjected to the same conditions of feeding, temperature, and lighting. Powder of kohlrabi fruit was added to the roosters' feed as follows:

- $\circ$  T1: 5 mg/100g / day, kohlrabi fruit powder in feed .
- $\circ$  T2: 10 mg/100g / day , kohlrabi fruit powder in feed.
- $\circ$  T3: 15 mg/100g / day, kohlrabi fruit powder in feed.
- $\circ$  T4: 20 mg/100g / day , kohlrabi fruit powder in feed.
- T5: Control (no kohlrabi fruit powder).

The birds were fed a standard diet, the composition of which is shown in Table 1. Feed and water were provided freely to the birds throughout the experiment.

Table 1: Percentages of feed materials included in the composition of the productive diet for broiler breeder males used in the experiment, with the calculated chemical composition.

Ingredient	%
Maize	29.1%
Wheat	43.4%
Soybean Meal 44%	7.5%
Wheat Bran	15.8%
Sunflower Oil	0.5%
Limestone	1.2%
Premix	2.5
Total	100
Calculated Chemical Composition *	
Crude Protein	13.33 %
Metabolizable Energy (kcal/kg feed)	1350
Methionine (%)	0.29
Lysine (%)	0.61
Methionine + Cystine (%)	0.55
Calcium (%)	0.64
Available Phosphorus (%)	0.49

Table 1 Ingredient of the diet used in the study .

\*Premix of Belgian origin, each 1 kg contains: Production stage for females: 0.31% methionine per kilogram, 0.71% lysine, 0.15% choline chloride, and 0.1% sodium bicarbonate. For males: 0.29% methionine, 0.61% lysine, 0.1% choline chloride, and 0.3% sodium bicarbonate.

\* Chemical analysis calculated according to[10].

# **RESULTS AND DISCUSSION:**

# Qualitative characteristics of semen: Ejaculate volume (ml):

Table 2 shows the effect of adding different percentages of kohlrabi fruit powder to the feed on the average ejaculate volume, where a significant increase (P $\leq$ 0.05) in the ejaculate volume (ml) is observed in the third treatment T3, compared with the control treatment T5,

during the third period. no significant differences (P $\leq$ 0.05) were observed between the other treatments T1, T2 and T4 compared to the control treatment. the four experimental treatments did not show significant differences (P $\leq$ 0.05) in average ejaculate volume compared to the control treatment for the first, second, and fourth periods.

Treatment	The first period	The second period	The third period	The fourth period
T1	$0.31 \pm 0.06$	$0.38 \pm 0.05$	$0.03 \text{ ab} 0.40 \pm$	$0.42 \pm 0.04$
T2	$0.33 \pm 0.02$	$0.33 \pm 0.01$	$0.02 \text{ ab } 0.33 \pm$	$0.36\pm0.02$
T3	$0.28 \pm 0.01$	$0.41 \pm 0.05$	0.05 a 0.44 ±	$0.41 \pm 0.04$
T4	$0.28 \pm 0.03$	$0.44 \pm 0.63$	ab $0.39 \pm 0.04$	$0.45 \pm 0.03$
T5	$0.30 \pm 0.04$	$0.32 \pm 0.04$	$0.03 \text{ b} \ 0.29 \pm$	$0.31 \pm 0.04$
Significance	N.S	N.S	*	N.S

 Table 2: Effect of Experimental transactions on the ejaculate volume (ml) of broiler breeder

 males Ross 308 (mean ± standard error).

Different letters indicate significant differences between treatments ( $P \le 0.05$ )

Treatments: 5T, control treatment without any addition, T4, T3, T2, T1, treatments for adding Brassica tuber powder to the feed at levels of 5, 10, 15 and 20 mg/100 gm feed/day, respectively.

#### Mass motility % :-

It is noted from Table 3 the effect of adding different percentages of kohlrabi fruit powder to the feed on the mass motility rate of sperm in the first period. We notice that there are no significant differences ( $P \le 0.05$ ) between all

experimental treatments compared to the control treatment T5, and it was significantly superior ( $P \le 0.05$ ). Addition treatments T1, T2, T3 and T4 for the second, third and fourth periods compared with the control treatment T5.

Table 3: Effect of Experimental transactions on the Mass motility%	of broiler breeder males
Ross 308 (mean ± standard error).	

Treatment	The first period	The second period	The third period	The fourth period
T1	79.17 ± 1.59	<b>a</b> 0.67 83.33 ±	<b>a</b> 82.91 ± 0.4	<b>a</b> 82.08 ± 1.84
T2	$80.00 \pm 1.52$	<b>a</b> 83.75 ± 0.75	<b>ab</b> 80.83 ± 1.44	<b>a</b> 83.33 ± 0.96
T3	$80.42 \pm 2.39$	<b>a</b> 82.75 ± 1.30	<b>a</b> $83.33 \pm 0.68$	0 <b>a</b> 00. 83.33 ±
T4	$80.83 \pm 1.07$	<b>a</b> 82.91 ± 0.41	<b>a</b> 82.91 ± 1.4	<b>a</b> 83.75 ± 1.4
T5	$77.08 \pm 2.39$	<b>b</b> 75.42 ± 2.19	<b>b</b> 78.76 ± 1.04	<b>b</b> $75.14 \pm 0.79$
Significance	N.S	*	*	*

Different letters indicate significant differences between treatments ( $P \le 0.05$ )

Treatments: 5T, control treatment without any addition, T4, T3, T2, T1, treatments for adding Brassica tuber powder to the feed at levels of 5, 10, 15 and 20 mg/100 gm feed/day, respectively.

#### Individual motility % :-.

Table 4 shows the effect of adding different percentages of kale fruit powder to the feed on the percentage rate of individual motility of sperm. In the first period, we note that there are no significant differences ( $P \le 0.05$ )

between all experimental treatments compared to the control treatment T5, and the results recorded a significant increase. ( $P \le 0.05$ ) in experimental treatments T1, T2, T3 and T4 for the second, third and fourth periods compared with the control treatment T5.

# Table 4: Effect of Experimental transactions on the Individual motility (ml) of broiler breeder males Ross 308 (mean ± standard error).

Treatment	The first period	The second period	The third period	The fourth period
T1	$69.17 \pm 1.59$	<b>a</b> 73.39 ± 0.68	<b>a</b> 72.91 ± 1.4	<b>a</b> 72.08 ± 1.84
T2	$70.00 \pm 1.52$	<b>a</b> 73.75 ± 0.79	<b>a</b> 71.66 ± 1.17	<b>a</b> 73.33 ± 0.96
T3	$70.42 \pm 2.39$	<b>a</b> 72.66 ± 1.22	<b>a</b> 74.33 ± 0.67	<b>a</b> 73.33 ± 0.00
T4	$70.83 \pm 1.07$	<b>a</b> 73,91 ± 0.06	<b>a</b> 74.92± 0.40	<b>a</b> 74.74 ± 0.41
T5	$67.08 \pm 2.39$	<b>b</b> 65.42 ± 2.19	<b>b</b> 68.75 ± 1.04	<b>a</b> 65.14 ± 0.79
Significance	N.S	*	*	*

Different letters indicate significant differences between treatments ( $P \le 0.05$ )

Treatments: 5T, control treatment without any addition, T4, T3, T2, T1, treatments for adding Brassica tuber powder to the feed at levels of 5, 10, 15 and 20 mg/100 gm feed/day, respectively.

#### Sperm concentration (X 109/ml) :-

It is noted from Table 5 that the effect of adding different percentages of kohlrabi powder to the feed on sperm concentration during the study period was a significant increase ( $P \le 0.05$ ) for the third treatment, T3, for the second period, compared to the control treatment, T5. The results of treatments T2 and T4 recorded an increase in the sperm concentration rate, but no increase was recorded. Significant differences compared to the control treatment T5, and the first treatment T1 did not record significant differences for the second period compared to the control treatment T5. The results of the third significant period showed that

differences (P  $\leq 0.05$ ) were recorded for the two treatments T3 and T4 compared to the control treatment T5. The two treatments T1 recorded an increase in and T2 the concentration rate and did not Significant differences were recorded compared to the control treatment. It was noted from the results of the fourth period that significant differences were recorded for treatments T3 and T4 compared to the control treatment, and no significant differences were recorded for treatments T1 and T2 compared to the control treatment. The results of the first period of the study showed that there were no significant differences between the treatments compared to the control treatment.

Treatment	The first period	The second period	The third period	The fourth period
T1	$17.450 \pm 0.51$	<b>b</b> $17.10 \pm 0.41$	<b>ab</b> $18.2 \pm 0.30$	<b>b</b> $18.10 \pm 0.07$
T2	$17.050 \pm 0.05$	<b>ab</b> $18.07 \pm 0.37$	<b>ab</b> 17.67 ± 0.56	<b>b</b> $18.12 \pm 0.37$
T3	$17.500 \pm 0.23$	<b>a</b> 19.05 ± 0.08	<b>a</b> 19.72 ± 0.19	<b>a</b> 19.05 ± 0.03
T4	$17.700 \pm 0.38$	<b>ab</b> 18.07 ± 0.56	<b>a</b> 18.57 ± 0.52	<b>a</b> 19.0 ± 0.41
T5	$17.100 \pm 0.41$	<b>b</b> 17.05 ± 0.19	<b>b</b> $16.82 \pm 0.11$	<b>b</b> $17.4 \pm 0.41$
Significance	N.S	*	*	*

 Table 5: Effect of Experimental transactions on the sperm concentration (X 109 / ml) of broiler

 breeder males Ross 308 (mean ± standard error).

Different letters indicate significant differences between treatments ( $P \le 0.05$ )

Treatments: 5T, control treatment without any addition, T4, T3, T2, T1, treatments for adding Brassica tuber powder to the feed at levels of 5, 10, 15 and 20 mg/100 gm feed/day, respectively.

#### **Percentage of live sperm :**

From the results of Table 6, it is noted that the effect of adding different percentages of kohlrabi powder to the feed on the percentage of live sperm increased significantly (P  $\leq$  0.05) for the treatments T3 and T4 for a period of one second compared to the control treatment T5. The results for the treatments T1 and T2 did not record significant differences compared with the control treatment. T5. The results of the third period rates showed significant differences (P  $\leq$  0.05) for the addition treatments T1, T2, T3, and T4 compared to the control treatment T5. It was noted from the results of the fourth period that significant differences ( $P \le 0.05$ ) were recorded for the T4 treatment compared to the control treatment T5. Treatments T1, T2 and T3 recorded an increase in the average percentage of live sperm, and no significant differences were recorded compared to the control treatment T5. The results of the first period of the study showed that there were no significant differences between the treatments compared to the control treatment T5.

Table 6: Effect of Experimental transactions on the Percentage of live sperm of broilerbreeder males Ross 308 (mean ± standard error).

Treatment	The first period	The second period	The third period	The fourth period
T1	$91.22 \pm 1.62$	<b>b</b> 91.03 ± 1.10	<b>a</b> 90.00 ± 1.19	<b>ab</b> 91.83 ± 0.9
T2	$91.75 \pm 1.70$	<b>b</b> $91.30 \pm 2.90$	<b>a</b> 91.55 ± 2.11	<b>b</b> 92.20 ± 1.4
T3	$90.50 \pm 1.59$	<b>a</b> 92.69 ± 0.24	<b>a</b> 91.40 ± 1.20	<b>b</b> 92.50 ± 0.59
T4	88.54 ± 1.19	<b>a</b> 92.13 ± 0.62	<b>a</b> 92.46 ± 1.19	<b>a</b> $92.54 \pm 0.39$
T5	$91.31 \pm 0.92$	<b>b</b> 91.85 ± 0.92	<b>b</b> $89.62 \pm 0.52$	$c 90.04 \pm 0.52$
Significance	N.S	*	*	*

Different letters indicate significant differences between treatments ( $P \le 0.05$ )

Treatments: 5T, control treatment without any addition, T4, T3, T2, T1, treatments for adding Brassica tuber powder to the feed at levels of 5, 10, 15 and 20 mg/100 gm feed/day, respectively.

#### Percentage of dead sperm:

The results of Table 7 show the effect of adding different percentages of kohlrabi powder to the feed on the percentage of dead sperm. A significant decrease (P $\leq$ 0.05) during the second period in the percentage of dead sperm for the two treatment T3 and T4 compared to the control treatment T5, and the two treatments T1 and T2 did not record significant differences compared. With control treatment T5. In the third period, the average results of treatment T4 decreased significantly compared to the control treatment T5, and the

results of treatment T2 and T3 decreased, and no significant differences were recorded compared to treatment T1 and the control treatment T5. It was noted that the results of the rates of treatment T3 and T4 were significantly lower ( $P \le 0.05$ ) in the fourth period than the results of the rates of treatment T1 and T2 and the control treatment T5. The results of the first period of the study indicated that there were no significant differences between the treatments compared to the control treatment T5 in the percentage rates of dead sperm.

# Table 7: Effect of Experimental transactions on the Percentage of dead sperm of broilerbreeder males Ross 308 (mean ± standard error).

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Treatment	The first period	The second period	The third period	The fourth period
T1	8.88 ± 1.62	<b>a</b> 9.70 ± 1.02	<b>a</b> 10.00 ± 1.18	<b>b</b> 8.17 ± 0.9
T2	$8.25 \pm 1.81$	<b>b</b> 8.70 ± 1.88	<b>b</b> 8.45 ± 1.11	<b>cb</b> $7.80 \pm 0.58$
T3	9.50 ± 1.59	<b>c</b> $7.29 \pm 0.25$	<b>b</b> 8.22 ± 1.20	<b>c</b> $7.50 \pm 0.54$
T4	9.46 ± 1.19	<b>c</b> $7.87 \pm 0.62$	<b>c</b> $7.58 \pm 1.19$	<b>c</b> $7.46 \pm 0.39$
T5	$8.29 \pm 0.92$	<b>a</b> 9.15 ± 0.92	<b>a</b> 10.37 ± 0.58	<b>a</b> 9.96 ± 0.52
Significance	N.S	*	*	*

Different letters indicate significant differences between treatments ( $P \le 0.05$ )

Treatments: 5T, control treatment without any addition, T4, T3, T2, T1, treatments for adding Brassica tuber powder to the feed at levels of 5, 10, 15 and 20 mg/100 gm feed/day, respectively.

It appears from the results of some semen characteristics that most of the treatments for adding kohlrabi plant powder have achieved high effectiveness as a natural substance with antioxidant properties. The significant improvement (P  $\leq 0.05$ ) in some semen characteristics may be attributed to the kohlrabi plant containing the most important nutritional compounds that are a source of semen. Good for energy as well as an effective source of antioxidants, including some vitamins, as it contains vitamins C, E, K, and A, as well as some mineral elements (Ca, P, Fe, Mg, Mn, Cu, Se) and some carbohydrate substances that sperm use as a source of energy. Thus, its activity increases, which reflects positively on individual and collective movement. It also has the ability to scavenge free radicals of active oxygen species (ROS), especially flavonoids, which have the ability to maintain the properties of semen and protect sperm from programmed cell death [11]; [12]. This noticeable improvement in semen and reproductive organs, including the testicles, and increased sperm motility are due to the effect of antioxidants [13]. These results supported previous studies, as the optimal use of diets rich in vegetables and foods derived from other plants, including fruits and unprocessed foods with a mixture of antioxidants, can be useful in alleviating harmful environmental effects and treating reproductive damage that appears with age[1] ; [14]; [15]; [16]; [17]; [17]. Researchers [18] noted that there is a different variation in results between treatments when using different medicinal plants that are rich in antioxidants in food additives, which may produce diverse and noticeable effects in the organism, especially when fertility decreases with age, and this is what enhances the results Which we arrived at.

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