

Libido Test of Kacang Bucks Before and After Administration of Organic Tablet Supplementation Based on *Sesbania grandiflora* Leaves

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Abstract

The purpose of this study was to determine the effect of organic *Sesbania grandiflora* leaves-based tablet supplements affects on libido and semen production in Kacang bucks. The research method used in this study was an experiment with two treatments. The treatments tested were field grass feed (T0) and field grass feed supplemented with organic *Sesbania grandiflora* leave-based tablets (T1). Libido intensity and semen production were observed every four days with five replications. The data obtained were analyzed statistically, and then tested using a t-test. The results showed a significant increase in reaction time from 4.25 ± 0.28 at T0 to 5.00 ± 0.00 at T1. The average ejaculation time score increased from 4.87 ± 0.25 to 5.00 ± 0.00 , the number of ejaculations increased from 1.87 ± 0.25 to 2.25 ± 0.28 , and the ejaculation distance increased from 1.50 ± 1.29 to 2.12 ± 1.54 . The average semen volume increased from 0.68 ± 0.31 mL to 0.88 ± 0.08 mL; the average pH value approached 7.0, namely 6.85 ± 0.10 , before becoming 6.86 ± 0.21 ; the semen consistency was moderate; and the semen pH was normal. In conclusion, supplementation with organic tablets based on *Sesbania grandiflora* leaves can increase libido intensity and semen production in Kacang bucks

Keywords: libido, organic, semen, supplementation, tablets, *Sesbania grandiflora*

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I. INTRODUCTION

Natural mating can only fertilize one ovum per ejaculation, while the sperm count of a male goat in a single ejaculation can reach 2,000 to more than $4,000 \times 10^6$ per milliliter in Kacang bucks [1; 2]. Therefore, the use of superior bucks for natural mating is relatively inefficient, and expensive [3]. Therefore, the ejaculate from a single superior bull can be manipulated into hundreds of doses, either in liquid or frozen form, for subsequent insemination into numerous females [2].

The application of AI technology is an effective and efficient way to increase the population, productivity, and reproductive capacity of bucks [3]. Semen quality and quantity are influenced by various factors, one of which is the quality of the feed provided to the bull before semen collection [4], as it provides nutrients for maintenance, production, and reproduction [5]. Feed is needed as a source of protein and energy for male cattle to maintain stamina, increase libido, and produce semen.

high nutritional content, especially protein, making them suitable as a supplementary feed for livestock [6].

The nutritional content of *Sesbania grandiflora* leaves includes carbohydrates, calcium, protein, fat, phosphorus, sodium, potassium, thiamin, riboflavin, niacin, vitamin A, vitamin B1, and vitamin C [6; 7]. The use of *Sesbania grandiflora* leaf-based supplements as a nutritional supplement to basal feed is thought to increase stamina, libido, and semen quality of male livestock. There have been no reports on the use of *Sesbania grandiflora* leaf-based supplements to increase libido in Kacang bucks. Therefore, research was conducted on the use of *Sesbania grandiflora* leaf-based supplemental feed made in organic tablet form to increase libido in Kacang bucks.

II. MATERIAL AND METHODS

Schedule and Location

This research was conducted over approximately four months. Bull care, libido evaluation, semen collection, and macroscopic semen assessment were performed at the Teaching Farm, Faculty of Animal Husbandry, University of Mataram, Indonesia.

Research Materials and Equipment

The subjects used in this study were 10 Kacang bucks, aged 2 to 3 years and weighing approximately 25 to 30 kg. The bucks were randomly divided into two groups of five each. The equipment used in this study included scales, an artificial vagina, a thermometer, a stopwatch, syringes, collection tubes, a light microscope, micropipettes with tips, glass slides, and cover glasses. The feed supplement ingredients consisted of organic tablets made from *Sesbania grandiflora* leaf flour, rice bran, molasses, lime, mineral mix, and salt, as well as Vaseline, tissue, warm water, Wormectin, Warmizol, Vitamin B complex, Vitamin B12, and pH paper.

Treatments

This study used an experimental method with two treatments, each consisting of five male Kacang goats, and 10 replications for each treatment, hereafter referred to as T0 and T2. The first treatment (T0) included 100 percent field grass without supplements, whereas the second treatment (T1) included organic pigeon pea leaf-based tablets.

Preparation of the Organic Tablets

The formulation of the organic tablets is presented in Table 1. The stages of supplemental feed preparation were performed according to the guidelines described by [8] as follows: the first mixture was prepared by weighing all the ingredients in Table 1 according to the measurements, followed by stirring until evenly distributed. Next, the molasses and salt are mixed in a bowl for the second batch, stirring until the salt is homogeneous. Then, make the third batch by gradually adding the second batch to the first batch while stirring thoroughly. The third batch was poured into a tablet press with a volume of 2% of the male goat's body weight [9]. Store the resulting mixture in plastic bags and feed the livestock three times a day: morning, noon, and evening.

Table 1. Organic formulation of tablets

Ingredients	Kuantities (%)	Offered (gr/head)
Sesbania grandiflora leaf powder	36	45
Rice brand	22	28
Molasis	27	35
Lime	7	9
Salt	6	8
Mineral mix	2	3
Total	100	128

Preparation and treatment of the kacang buck

The Kacang bucks used in this study were obtained from local livestock markets and differed in origin, care, and feeding practices. Therefore, the bucks used must be healthy and free from internal and external parasites before research implementation. Therefore, they were treated with Warmnzol (Medion, Bandung, Indonesia) at a dose of 7.5 g per head per week for 4 weeks to eliminate internal parasites. To prevent external parasites, particularly scabies, Warmectin (Medion, Bandung, Indonesia) was injected subcutaneously twice, seven days apart.

Pre-Study

During the pre-study, goat libido evaluation training, semen collection training, and semen evaluation training were conducted every two days for two weeks to ensure smooth data collection.

Feeding Treatment

Ten bucks, five each for T0 and T1, were randomly selected. Both groups of bucks were fed the same basic diet, namely, field grass, amounting to 10%-15% of their body weight. However, the T1 treatment group was supplemented with organic tablets at 2% of their body weight, or ~ 2 percentage 30 kg, or 600 g/day. Feeding was performed three times daily: in the morning, afternoon, and evening. The T1 supplement was administered ~ 1 h before the field grass, and 200 g in the morning, afternoon, and evening. Water was provided ad libitum.

Libido test and semen collection

Libido tests and semen collection for both treatment groups were conducted five times, four days apart, starting on day 22, calculated from the first day of feeding. The libido test was conducted as described by [10], as follows: libido time or reaction time, i.e., the time required by the male from being approached to the female until mounting (seconds), was scored as follows: score 5, if the time required was 1–15 seconds. Scores of 4, 3, 2, and 1 are given if the required time is 16-30 seconds, 31–45 seconds, 46–60 seconds, and > 60 seconds, respectively.

Further explained that the ejaculation time is the time (seconds) from the start of female mounting to ejaculation. Scores of 5, 4, 3, 2, and 1 are given if the required time is 1–15, 16–30, 31–45, 46–60, and > 60 s, respectively. The number of ejaculations is the frequency of ejaculations within a 10-min period from the time the male is brought close to the female, and the scores are given according to the number of ejaculations [10].

The time interval between the first and subsequent ejaculations was scored as follows: a score of 5 was given if the time required was 1–100 s, while scores of 4, 3, 2, and 1 were given if the time required was 101–200 seconds, 201–300 seconds, 301–400 seconds, 401–500 seconds, and >500 s, respectively [10].

Preparation for the libido test was carried out as follows: The female goat was placed in a cage to prevent resistance when mounted by the male goat. The buck, whose libido was to be tested and whose semen was collected, was tied to a wooden pole ~ 5 m from the cage containing the female goat. Data collection was carried out by four technicians: the first held the buck, the second collected the semen, the third recorded the time, and the last assessed and recorded the macroscopic data of the semen produced. Semen was then transported to the laboratory for further examination.

Semen Assessment

The obtained semen must be evaluated immediately. Semen color and volume are directly evaluated in the collection tube. Semen consistency was assessed by tilting the collection tube containing semen and then turning it upright. If the semen sinks quickly, the consistency is runny, and if it takes a long time to sink, the consistency is thick. The acidity of the semen, or the potential hydrogen (pH) of the semen, is assessed by dropping the semen onto pH paper, causing a color change. The resulting color change is then compared with the color standard on the pH paper packaging to determine the semen pH.

Variables

The variables studied were: libido time, ejaculation time of the goat, number of ejaculations, interval between ejaculations, and macroscopic semen assessment, including volume, color, pH, aroma, and consistency.

Data Analysis

Data were statistically analyzed using a t-test [11].

III. RESULTS AND DISCUSSION

Libido Time

Libido refers to the ability of a male to mate and produce good semen, which is a prerequisite for fertilization [12]. Evaluation of libido in bucks can be performed using several parameters, including libido time/reaction time, ejaculation time, number of ejaculations, and the interval between ejaculations. Table 2 presents the results of libido observations for T0 and T1.

The libido time is the time required by the male from being brought close to the female until mounting. Based on the data from this study, the libido time increased by 0.75 points at T1 compared to T0. The administration of organic tablet supplements based on *Sesbania grandiflora* leaves showed a significant impact ($p > 0.05$) on the libido time of Kacang bucks. The average libido time score at T1 was 5.00 ± 0.00 , faster than that at T0 (4.25 ± 0.28).

Table 2. Libido of Kacang bucks before and after receiving organic tablet supplements

Parameter	Treatments and scores (seconds)	
	T0	T1
<i>Libido Time</i>	$4,25 \pm 0,28^a$	$5,00 \pm 0,00^b$
Ejaculation time	$4,87 \pm 0,25^a$	$5,00 \pm 0,00^a$
Number of ejaculations	$1,87 \pm 0,25^a$	$2,25 \pm 0,28^b$
Distance between the ejaculation	$1,50 \pm 1,29^a$	$2,12 \pm 1,54^b$

Note: Different superscripts in the same column indicate significant differences ($p < 0.05$).

The libido time of the research results after supplementation of organic tablets based on *Sesbania grandiflora* leaves was relatively similar to the results of the study by [13], namely 12.83 ± 7.31 (score 5) in Bligon, Kejobong and Etawa crossbred bucks. [14] also reported similar results, namely, a score of 5 after supplementation of date palm juice at a distance of 4, 3, 2 and 1 day using Kacang bucks. Meanwhile, [15] reported the results of research on Saanen bucks at the first and second shelters, namely 14.49 ± 2.15 (score 5), 14.73 ± 1.73 (score 5) then the libido score decreased in the third shelter, namely 15.86 ± 2.27 (score 4). The libido score of this study was significantly higher than that of [16] study, which averaged 1.07 ± 0.13 minutes or a score of 1 using 2.5-year-old Kacang bucks. The significantly higher libido score of T1 ($p < 0.05$) compared to T0 may be due to the provision of organic tablet supplementation based on *Sesbania grandiflora* leaves increasing feed nutrition, thereby directly increasing the libido of male Kacang bucks.

Ejaculation Time

Ejaculation time is the time from mounting to ejaculation. As shown in Table 2, the ejaculation time at T1 was faster but not significantly different ($p < 0.05$) compared to T0. At T0, the average ejaculation time was 4.87 ± 0.25 , while at T1 it was 5.00 ± 0.00 , representing a 0.13-point increase. The results of this study are similar to those reported by two previous researchers, namely 2.00 ± 00 seconds with a score of 5 [13]. Similarly, [14] reported that the ejaculation time of Kacang bucks after date palm juice supplementation achieved an average score of 5 at collection intervals of 4, 3, 2, and 1 day.

Number of ejaculations performed

The number of ejaculations is the frequency of semen discharge calculated over 10 min from the time the male is brought close to the female. The results of this study showed an average score of ejaculation numbers at T0 of 1.87 ± 0.25 and significantly ($p < 0.05$) the score increased by 1.88 to 2.25 ± 0.28 after the administration of organic tablet supplements based on *Sesbania grandiflora* leaves (Table 2) compared to no supplementation. The ejaculation number score from this study is the same as that reported by [14], which was 2.30 ± 0.45 in males given date palm extract supplements with a 4-day storage interval. A score of 1.07 ± 0.13 with a 4-day storage interval without any feed supplementation [16].

Inter-ejaculation interval

The ejaculation interval is the time between the first ejaculation and the next. The results of this study showed no significant difference between the interejaculation interval scores at T0 and T1. Table 2 shows that the average interejaculation interval score at T0 was 1.5 ± 1.29 and 2.12 ± 1.54 at T1. Although not significantly different, this study showed a significant increase (0.16 points) at T1 compared to T0. These results are lower than those of [14], where the inter-ejaculation interval after date palm juice supplementation averaged 4 points at a 4-day interval and 3 points at 3, 2, and 1 day intervals.

Based on the data in Table 2 show that administering organic tablet supplements based on *Sesbania grandiflora* leaves increases the intensity of goat libido in all parameters, including libido time, ejaculation time, number of ejaculations, and ejaculation distance. The increase in livestock libido is thought to be due to the influence of active ingredients in *Sesbania grandiflora* leaves, such as carbohydrates, calcium, protein, fat, phosphorus, sodium, potassium, thiamin, riboflavin, niacin, vitamin A, vitamin B1, and vitamin C, which are important for livestock growth and reproduction. In addition to the nutritional content of *Sesbania grandiflora* leaves, the nutrients contained in other feed ingredients mixed in the organic tablet also contribute and complement each other, resulting in a positive collaboration in increasing the intensity of goat libido [4]. In addition, protein and energy are needed by male livestock to maintain stamina, increase libido, and semen production [4].

According to [17], environmental and husbandry management also influence the intensity of livestock libido. Furthermore, [17] also explain that internal livestock factors, such as genetics or breed and the age of the bull also influence libido intensity. The energy content in feed is also a crucial factor in the intensity of livestock libido [4]. Lack of energy in feed can disrupt general metabolism and hormones, resulting in insufficient testosterone production, low libido, and impaired semen production [14; 18].

Feeding and nutrition are not only important for increasing libido but also for semen quality and quantity, sperm fertility, and animal welfare [19]. Low energy content in feed will not only reduce body weight but also leg and thigh strength for support during copulation. Protein deficiency results in decreased libido and ejaculation duration. Minerals and vitamins affect bones, sperm concentration, motility, and fertility. Iron and copper are nutrients that play a vital role in general health and fertility, affecting the structure and function of gonads and gametes [4]. Deficiencies in these elements can cause sperm damage, decreased libido, and oxidative damage to testicular tissue and spermatozoa, which can lead to low fertility [20].

Semen Production

The variables observed in this study about Kacang buck semen production included color, odor, volume, semen pH, and consistency. Observations of Kacang buck semen production before and after the administration of organic pigeon pea leaf-based tablets are presented in Table 3.

Table 3. Macroscopic parameters of fresh semen of Kacang bucks before and after the administration of organic tablets based on *Sesbania grandiflora* leaves

Parameter	Treatments	
	T0	T1
colors	Crem	White to crem color
aroma	Specific	specific
Volume (mL)	$0,68 \pm 0,31^a$	$0,88 \pm 0,08^a$
Concistency	Medium	Medium
pH	$6,85 \pm 0,10^a$	$6,86 \pm 0,21^a$

Note: Different superscripts in the same column indicate significant differences ($p < 0.05$).

Semen Color and Aroma

The semen of Kacang buck produced in this study showed no signs of change either before or after the administration of the *Sesbania grandiflora* leave-based organic tablet supplement. It was creamy with a distinctive goat semen aroma. Normal, good semen is creamy, like milk. Normal fresh goat semen is white to creamy [21]. Semen color typically affects its odor. A distinctive odor indicates normal semen and the absence of microbial contamination [22]. A creamy semen color and thick consistency indicate a high sperm concentration [23]. A brownish color indicates pus from a genital tract infection, and a greenish color indicates fecal contamination [21; 22;23].

Semen Volume

Semen volume can be directly determined using the scale on the collection tube. The results of this study showed an average increase of 0.2 mL in semen volume, but not significantly different, from 0.68±0.31 mL before administration of the organic *Sesbania grandiflora* leave-based tablet supplement to 0.88±0.08 mL after (Table 3). According to [24] stated that livestock fed with feed containing high nutritional content will increase their semen production. Similarly, in this study, *Sesbania* leaves combined with other feed ingredients, such as molasses, bran, and a mineral mix provided a balanced and complementary nutrient content for bucks, thus supporting optimal spermatogenesis.

The semen volume produced in this study was classified as normal, namely 0.5 -3.0 mL/ejaculation [25; 4]. The semen volume of the results of this study was relatively higher compared to male bucks given elephant grass basal feed and 0%, 5% and 10% blood meal supplementation, i.e., 0.42, 0.82 mL, and 0.69 mL [17].

Consistency

Semen consistency is closely related to spermatozoa concentration within it. The thicker the semen consistency, the higher the spermatozoa concentration. Conversely, the thinner the semen, the lower the spermatozoa concentration [26; 2]. The semen consistency in the study was moderate, both before and after the administration of organic tablet supplements based on *Sesbania grandiflora* leaves. In addition, added that the spermatozoa concentration for semen with a thin, medium, and thick consistency was <1,000 x 10⁶/mL, 1,000 x 10⁶ - 1,500, and >1,500 x 10⁶/mL, respectively [27].

Semen Acidity

Semen acidity (pH) significantly affects sperm viability [3 and 4]. Semen with a high concentration typically has a slightly acidic pH [26]. Semen pH in this study was 6.85±0.10 before administration of the organic tablet supplement and remained unchanged after administration of the *Sesbania grandiflora* leave-based organic tablet supplement, at 6.86±0.21 (Table 3). Good semen has a slightly acidic pH of around 6.5-6.9, with an average of 6.75. In this study, the acidity levels were normal both before and after administration of the *Sesbania grandiflora* leave-based organic tablet supplement. Normal semen acidity is around 6.8-7.2, with an average of 7.0 [4], and 5.9-7.3 [27]. The pH of goat feed supplemented with 5% and 10% blood meal was 6.54 and 6.42, respectively [28].

IV. CONCLUSION

Administering organic *S. grandiflora* leave-based tablet supplements significantly affected libido intensity and semen quantity in Kacang bucks. However, this research can be continued using different dosages of organic tablet supplements to improve sperm quality.

Conflict of Interest

The authors state that no conflict of interest.

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