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The Utilization of *Sonneratia alba* and *Avicennia lanata* Leaves on the Performance of Jawarandu Goats

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Abstract *S. alba* leaves and *A. lanata* leaves are forages that grow in mangrove ecosystems which are considered potential to support the performance of goat jawarandu. This study aims to determine the effect of the leaves of *S. alba* and *A. lanata* on the performance of jawarandu goats. This research was conducted in Environment XII of Seberang Fishermen Village, Belawan I Village, Medan Belawan District, Medan City. The study lasted for 3 months, starting in July to October 2019. The research method was a completely randomized design (CRD) with 3 treatments and 4 replications so that there were 12 male goats that were kept with an average initial body weight of 14.65 ± 1.65 . The treatments given were leaves of *S. alba* and *A. lanata* with a ratio of P1 (100: 0); P2 (50:50); and P3 (0: 100). The research parameters are Feed Consumption, Average Daily Gain, and Feed Conversion. The results showed that the utilization of the *S. alba* and *A. lanata* leaves had a significant effect on feed consumption and average daily gain, but did not significantly effect on feed conversion. It can be concluded that the utilization of *S. alba* leaves gives a greater effect on the performance of goat jawarandu compared to *A. lanata* leaves or combination feed.

Keyword: *Sonneratia alba*, *Avicennia lanata*, performance, jawarandu goats

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1 Introduction

Feed is one of the most decisive factors in livestock farming, in addition to providing seeds and procedures, feed is also a factor that greatly influences production and is the largest production cost in livestock business, both fusion and breeding of beef cattle. Related to forage in Indonesia is often a problem for breeders, for that breeders must make alternative feed that can meet the needs of feed other than forage.

Forage forage such as grass and legumes that grow on dry land cannot grow on wet land. According to [1] land can be interpreted as a pool or air storage area, having terrestrial and aquatic characteristics. Wetlands are exemplified such as swampy areas, mangrove forests, brackish water, inundation areas of floods, inundation forests and other similar areas.

Mangrove ecosystem is a transitional ecosystem between land and sea which is known to have a very large role and function. Ecologically, mangroves have a very important function in the role of the food chain in a container, which can ride the lives of various types of fish, shrimp and mollusks [2]. Plants that can grow in mangrove ecosystems are *Sonneratia alba* and *Avicennia lanata*.

Sonneratia alba is a kind of pioneer, intolerant of fresh water for a long period. Love the soil mixed with mud and sand, sometimes when on a reef and coral. It is often found in coastal locations protected from waves, as well as in estuaries and around offshore islands. *Sonneratia alba* grows scattered, sometimes up to 15 m tall. The bark is dark white to brown, with a longitudinal smooth. Root-shaped wires under the ground and surface surfaces as breath roots that form a blunt cone and reach up to 25 cm.

Avicennia lanata is a plant that grows in the highlands, river banks, areas that are dry and tolerant of high salt levels. This tree grows upright or widens, can reach heights of up to 8 meters. It has breath roots and is pencil-shaped. Wood skin like sharks are black, brown to black.

Breeders of jawarandu goats who live in mangrove ecosystems have difficulty in finding forage (grass and legume) to meet their animal feed needs. Using breeders used *Sonneratia alba* leaves and *Avicennia lanata* leaves as jawarandu goat feed.

2. Materials and Methods

This research were used male goats 12 heads with weight average of 14.65 ± 1.65 kg. Composition of research feed ingredients were were leaves of *S. alba* and *A. lanata*, medicines such as worm medicine (kalbazen), anti bloat for bloating and vitamins. Drinking water to meet the water requirement given adlibitum.

Equipment used include: individual cages 12 units and equipments, live weight scale and carcass weighing 50 kg with sensitivity 10 g, 2 kg weight scale with sensitivity 5 g for weighing feed.

2.1. Research methods

The experimental design used research was completely randomized design (CRD) with 3 treatments and 4 repetitions. The treatment in this research were P1, P2 and P3 with a ratio of P1 (100: 0); P2 (50:50); and P3 (0: 100) of *S. alba* and *A. Lanata*.

Parameter of Research were Feed Consumptions = obtained from the decrease of feed given with leftover feed. Average Daily Gain = obtained from the decrease of final weight with initial weight. Feed Conversion = obtained from the ratio of feed consumption with average daily gain. The data was processed by the method of SAS and then continued with Duncan test.

3. Results and Discussion

3.1 Nutritional contents of *S. alba* and *A. lanata* leaves

Table 1. Nutritional contents of *S. alba* and *A. lanata* leaves (%)

Contents	<i>Sonneratia alba</i>	<i>Avicennia lanata</i>
Dry Matter	54,85	42,15
Ash	0,92	13,58
Crude Protein	9,75	11,87
Crude Fiber	13,61	17,43
Crude Fat	2,46	3,38

The nutritional content of the leaves of *Sonneratia alba* and *Avicennia lanata* is sufficient for the goat's crude protein for growth and fattening. This is in accordance with a reference from [3], that the requirement for goat crude protein which has a body weight of 15 kg with 0-75 grams of body weight gain is 7.50-11.00%.

Crude fiber on the leaves of *Sonneratia alba* and *Avicennia lanata* is lower compared to other forages such as *Pennisetum purpureum*, *Brachiaria humidicola*, and *Leucana leucocephala*. Other forages have a crude fiber content of 23-35% [4]. While the crude fiber on the leaves of *Sonneratia alba* and *Avicennia lanata* is 13.61% and 17.43%.

3.2 Effect of Treatment on Feed Consumption

Tabel 2. Data on feed consumption based on dry matter (g / head / day)

Treatment	Repetition				Average
	U1	U2	U3	U4	
P1	1113,90	742,06	736,86	808,00	850,20 ^a ±178,75
P2	611,72	732,69	784,90	803,49	733,20 ^a ± 86,35
P3	434,18	532,22	298,55	267,55	383,12 ^b ± 122,94

The degree of difference in feed consumption is also influenced by several factors, especially factors of food quality and livestock energy needs. The better the quality of the feed, the higher the consumption of food for a livestock [5]. The quality of *Sonneratia alba* leaves is better compared to *Avicennia lanata* leaves and mixed feed. This causes the consumption of *Sonneratia alba* leaves to be higher compared to *Avicennia lanata* leaves or mixed feed.

Avicennia lanata leaves have anti-nutrients such as tannins, alkaloids and flavonoids which are quite strong. This anti-nutrient causes the taste of the leaves to be bitter so that the palatability of Avicennia lanata leaves is low. According to [6], Avicennia spp plant parts contain active compounds which can be used as pharmaceutical ingredients, food ingredients, and feed. Some compounds are known to be toxic which are strong in tanunun such as tannins, alkaloids and flavonoids.

3.3 Effect of Treatment on Average Daily Gain

Tabel 3. Data on average daily gain (g / head / day)

Treatment	Repetition				Average
	U1	U2	U3	U4	
P1	55,23	32,50	35,95	61,07	46,18 ^a ±14,08
P2	35,95	27,85	49,16	37,73	37,67 ^{ab} ± 8,78
P3	25,83	23,21	22,14	26,07	24,31 ^b ± 1,94

The results of the analysis of variance can be seen that the balance of the application of Sonneratia alba leaves and Avicennia lanata lanata leaves on jawarandu goats in mangrove ecosystems has a significant effect ($P < 0.05$) on body weight gain of jawarandu goats. This growth in body weight is also related to the level of animal feed consumption. This is consistent with the statement of [7], that weight gain is influenced by several factors including total protein obtained daily, livestock type, age, genetic environment, individual conditions and management management.

Low cassava protein content in the leaves of Sonneratia alba accelerates the recycling of protein (N) in rumen microbes to digest food. This is consistent with the statement of [8], that in the use of low protein feed, N recycling events play a very important role in contributing to the availability of N for the need for rumen microbes to digest feed fermentatively.

The high content of crude fiber in Avicennia lanata leaves affects the growth of body weight, this is because crude fiber cannot be used as a whole by ruminants so leaves are difficult to digest. In accordance with the literature of [9] which states that fiber has never been used as a whole by ruminants, about 20-70% of the fiber consumed is found in feces. High crude fiber content in complete feeds will reduce the digestibility coefficient in the feed ingredients, because crude fiber contains parts that are difficult to digest.

3.3 Effect of Treatment on Feed Conversion

Tabel 4. Data on feed conversion

Treatment	Repetition				Average
	U1	U2	U3	U4	
P1	20,16	22,83	20,49	13,23	19,17 ^m ± 4,13
P2	17,01	26,30	15,96	21,29	20,14 ± 4,70
P3	16,80	22,92	13,48	10,26	15,86 ± 5,40

The results of the analysis of variance can be seen that the balance of the administration of leaves of Sonneratia alba dan Avicennia lanata lanata on jawarandu goats in the mangrove ecosystem had no significant effect ($P > 0.05$) on feed conversion of the jawarandu goats. The

lowest feed conversion obtained at P3 shows that the administration of 100% *Avicennia lanata* leaves to jawarandu goats is very efficient. This is in accordance with the statement of [10] which states that feed conversion can be used to determine production efficiency because it is closely related to production costs, the lower the value of feed conversion, the higher the use of feed efficiency.

4. Conclusion

The application of *Sonneratia alba* leaves gives a greater influence on the performance of goat jawarandu compared to *Avicennia lanata* leaves or combination feed. The leaves of *Sonneratia alba* can be given up to 100%, so that the leaves of *Sonneratia alba* can be used as a basic feed to meet the needs of feed for jawarandu goats in the mangrove ecosystem.

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