





# Effect of feeding rations on milk yield of alpine goats under Mongolian conditions

Purevdolgor Dagviikhorol<sup>1</sup> , Batsukh Tovvudorj<sup>2\*</sup> , Sainchuluu Amarsanaa<sup>3\*\*</sup> ,  
Bayar Beisen<sup>4</sup> 

<sup>1</sup>Mongolian University of Life Sciences, School of Animal Science and Biotechnology

<sup>2,4</sup>Animal Science Sector, Research Institute of Animal Husbandry, Ulaanbaatar, Mongolia

<sup>3</sup>Mongolian University of Life Sciences, School of Agroecology, ecology department, Ulaanbaatar, Mongolia

\*Corresponding author1: Batsukh Tovvudorj, [Batsukh7494@gmail.com](mailto:Batsukh7494@gmail.com)

\*\*Corresponding author2: Sainchuluu Amarsanaa, [Sainchuluu@mul.edu.mn](mailto:Sainchuluu@mul.edu.mn)

## CITATION

Purevdolgor Dagviikhorol, Batsukh Tovvudorj, Sainchuluu Amarsanaa, Bayar Beisen. Effect of feeding rations on milk yield of alpine goats under Mongolian conditions. International Journal of Social Science and Humanities Research-MIYR 2026, 6(1), 1-9. <https://doi.org/10.53468/mifyr.2026.6.1.1>

## ARTICLE INFO

Received: 05 Jan 2026

Revised: 07 Jan 2026

Accepted: 27 Feb 2026

Available online: 30 March 2026

## COPYRIGHT



Copyright © 2026 by author(s). International Journal of Social Science and Humanities Research-MIYR is published by Misheel institute for young researcher's NGO. This work is licensed under the Creative Commons Attribution (CC BY 4.0) license. <https://creativecommons.org/licenses/by/4.0/>

**Abstract** This study aimed to develop appropriate feeding rations and norms for dairy Alpine goats under Mongolian conditions and to evaluate their effects on feed chemical composition, feed intake, live weight change, and milk yield. The experiment was conducted from June to September 2021 under barn-feeding conditions at a goat farm in Övörkhangaï province, Mongolia. A total of 30 lactating Alpine goats were randomly assigned to one control group and four experimental groups, each receiving different feeding rations. During the experimental period, feed intake, palatability, live weight changes, milk yield, and milk nutritional composition were determined using standard analytical methods.

The results showed that goats in the experimental groups had 2.5–3.6% higher feed intake compared to the control group. In addition, live weight increased by 3.6–4.1%, and milk yield improved by 1.6–1.9 times. These findings indicate that an optimized combination of feed ration composition and nutrient balance is a key factor in improving the milk productivity of Alpine goats under Mongolian conditions.

Therefore, implementing the developed feeding strategies in production practice could significantly enhance the productivity and efficiency of dairy goat farming, while also supporting domestic milk and dairy production and contributing to the supply of environmentally friendly and safe food products for the population

**Keywords** – Alpine goat, feeding ration, milk production, feed intake, live weight change

## 1. INTRODUCTION

Originating in the Alpine mountain area near the France-Switzerland border, the Alpine dairy goat breed High milk output, excellent reproductive performance, environmental stress resistance, and prolificacy define this very successful dairy breed. Usually weighing between 60 and 65 kg, mature Alpine cows may produce an average of 900–1000 liters of milk yearly throughout their 280–295 day lactation cycle [1]. The typical milk composition comprises roughly 3.7% fat and 3.2% protein [2].

Items ranging from infant formula to yogurt, cheese, ice cream, and cream are made from Alpine goat milk; recently, it has also been included in cosmetic items [3]. Rich in calcium, phosphorous, cobalt, vitamins A, B, C, and D, as well as vital amino acids including tryptophan and cysteine, is goat milk. Goat milk is especially fit for small children and the elderly because of its composition, which is somewhat similar to human breast milk [4], [5]. Goat milk's small fat globule size helps it to be antioxidant and immune-supportive as well as fast-digested [6]. Moreover, goat milk is a safe and health-promoting substitute for those allergic to cow's milk [7], which is one of the main causes of its growing popularity in many developed nations.

Often by crossbreeding with local breeds to increase milk yield, international studies have demonstrated that Alpine and Saanen goats have been effectively brought into hot, dry, or humid areas. In India, Alpine goats demonstrated greater heat tolerance than Saanen goats, even though their milk output was only moderate. Although Saanen

goats produced more milk, they were more vulnerable to environmental stress [8]. Crossbreeding Alpine and Toggenburg goats with local breeds has produced a 2–3 times boost in milk output in several African nations [9]. Over the past two decades, Alpine goats have been extensively brought to China, producing new genotypes of hybrid populations [10]. Brazil has successfully undertaken bioeconomic studies of small-scale farms cultivating Alpine hybrids [11].

In industrialized nations, including those in the European Union, the United States, Australia, and New Zealand, goat milk consumption has been rising gradually. Producers extensively use it to produce probiotic milk, yogurt, and baby formula [12], among other specialty items. Furthermore, influencing new trends in the cosmetics business is the special composition of goat milk and its advantages for skin care. Reflecting customer enthusiasm and a new degree of inventiveness in cosmetic production, an increasing variety of natural, vitamin-rich skincare products, including goat milk, have hit the market [13].

The growing urban concentration of the population in Mongolia has resulted in higher demand for milk and dairy products. But a big problem is domestic manufacture unable to satisfy this demand. Urban areas have an average yearly per capita milk consumption of over 80 kg; rural inhabitants consume only roughly 20 kg, suggesting a clear discrepancy [15]. Although Mongolians' suggested annual intake of milk and dairy products for sustaining optimal health is assessed at 137.8 kg, actual consumption is 40% less; rural consumption is especially low [16]. Furthermore, domestic goat milk production is still underdeveloped, which causes dependency on imports and maybe compromises food security.

Compared to high-yielding dairy breeds, Mongolian native goats yield just 0.3–0.5 liters daily and provide milk with quite low protein and fat content, which limits their market competitiveness. Therefore, enhancing public health, food security, and economic resilience depends on introducing and adjusting high-yield dairy goats that are robust against Mongolia's natural and climatic conditions—while optimizing their feeding and management techniques. The aim of this project is to improve, under Mongolian conditions, the feeding and housing methods for Alpine dairy goats. This study explores the impacts of customized feed formulations—considering nutrient composition, palatability, intake, changes in live weight, and milk yield—through the development and experimental testing of specific nutritional rations suited to local conditions for the first time.

## 2. LITERATURE REVIEW

Comparative research by Ts. Davaasuren (1975) in Erdene soum, Gobi-Altai province, assessed the milk output of local Mongolian goats as well as the Tulman Khokht breed. Over the first month postpartum, Mongolian goats produced an average of 343 g of milk daily; in the fourth month, 438 g; and in the last month of lactation, 48 g. Tulman Khokht goats yielded around 1.6 times more milk than Mongolian goats under the same conditions: 579 g, 828 g, and 112 g, correspondingly.

Haenlein (2008) claims that highlighting the vital importance of goat farming in food security in developing nations, most of the worldwide increase in goat numbers and milk production is driven by these countries. Genetic elements, management techniques, and environmental surroundings all affect the milk yield of dairy goat breeds.

Reviewing many dairy goat breeds reveals the following average annual milk production and butterfat contents: Saanen goats produce 1,134–1,360 liters with 3.5–4.0% butterfat; Alpine goats yield 946–1,360 liters with 3.0–4.0% butterfat [17]; Toggenburg goats average 959 liters with 3.2% butterfat; Nubian goats yield 681–1,134 liters with 4.0–5.0% butterfat; and LaMancha goats produce 1,000–1,134 liters with the highest butterfat content ranging from 3.9–8.0% [18].

One clear benefit of goats is their effective eating behavior, which calls for less input than that of other livestock. Goats may choose to graze on the nutritious sections of plants, such as seeds, leaves, and buds, avoiding stems and prickly parts by means of their very flexible lips and necks [19]. Their diet consists of a broad range of shrubs, legumes, and browsing species [20]. They are nimble and capable of standing on their hind legs to access higher plants.

Feed formulations for dairy goats have to be enhanced with both micro- and macronutrients as well as vitamins [21]. Especially balanced concentrate feed enhanced with minerals, vitamins, and bioactive compounds is crucial [22]. Recommended reasonably priced feed materials include maize, straw-grass silage, brewer's grains, sunflower meal, and fodder beets [23]. Ideal feeding management calls for the combined use of concentrated foods [24] and green grass. While the highest nutritional needs arise during early to mid-lactation and late pregnancy [25], goats in early gestation take rather little feed.

To satisfy the large energy requirement during peak lactation, feed intake capacity and the metabolic conversion of body tissues into energy rise [26]. While fat reserves are hardly used throughout early pregnancy and peak

breastfeeding, appetite usually falls during late gestation and early lactation [27]. To completely satisfy dietary needs, thus, it is best to offer premium fodder and either supplemental feeding or use of lush pastures. Maintaining moderate to good body condition for dairy goats would help to guarantee good milk output [28].

Gerlach (2017) advises feed rules to be catered to physiological phases, including live weight, production level, pregnancy, and lactation. Adult goats should get high-quality silage at daily rates of 3.0 kg; growing goats should get 1.5 kg. The best delivery for concentrates is compound or mixed feed. Giving nursing goats premium hay and luscious feeding results in higher milk output [29].

### 3. MATERIALS AND METHODS

Conducted under limited housing conditions at a farm in Arvaikheer soum, Uvurkhangai province, where Alpine dairy goats are raised, the experimental study took place in 2021. The experiment involved a total of 25 healthy, well-conditioned adult female goats free from structural flaws and comparable in live weight and milk output. With five goats in each group, the goats were split into four groups: one control group and three experimental groups. Three distinct feed rations were created and evaluated.

Table 1. Composition of the Feed Rations

Group	Feed Composition
Control	Hay + Bran
Ration 1	Hay + Bran + Beet
Ration 2	Hay + Bran + Carrot
Ration 3	Hay + Bran + Cabbage

Aiming for a daily milk yield of 3.0 liters, calculations were done depending on the daily nutritional needs of a goat with an average live weight of 40 kg, guiding the development of the feed rations. The Feed Evaluation Laboratory of the Animal Husbandry Research Institute examined the chemical composition of the feed components. Moisture content was found per MNS 6548:2015; total protein was measured with MNS 6549:2015; total fat content followed MNS 6554:2015; total fiber was evaluated using MNS 6551:2015; and total ash content was computed with MNS 6548:2015 [24] [25]. Calculation techniques [12] were used to evaluate the digestibility of organic matter and general nutritional value. At the start and finish of the experiment, the goats' live weight was recorded; milk yield was tracked by gathering milk samples from the control group. SPSS 25 software was used for data analysis. The average live weight of the dairy goats was calculated to be 40 kg, and based on this, the daily requirements for 14.5 MJ of metabolizable energy, 1650 g of dry matter, and 120 g of digestible protein were used to develop the feed rations and formulas [26], [27].

Table 2. Feed Rations

Specification	Feed (kg)	Ration Composition (%)	Metabolizable Energy (MJ)	Dry Matter (g)	Digestible Protein (g)	Calcium (g)	Phosphorus (g)
Norm		100	14.5	1650	120	3.8	3.6
Control	Hay	1.3	50.8	7.1	1040	53	2.8
	Bran	1.1	49.2	8.8	880	106.9	2.2
Ration 1	Hay	0.6	29.2	4.3	546	25	1.3
	Bran	1.3	13.3	1.9	195	11.7	0.8
	Beet	0.9	57.5	8.5	893	87.5	1.8
Ration 2	Hay	0.7	35.1	5.0	637	29	1.47
	Bran	1.2	12.3	1.7	180	9.6	1.1
	Carrot	0.8	52.6	7.5	704	77.8	1.6
Ration 3	Hay	0.7	35.1	5.0	630	29	1.5
	Bran	1.2	12.1	7.5	180	20.4	4.1
	Cabbage	0.8	52.7	1.8	706	77.8	1.6

## 4. RESULT

The feed's nutritional value is mostly indicated by its chemical composition; the rations' chemical composition was assessed, and the findings are shown in Table 3.

Table 3. Chemical Composition of the Rations (on an air-dry basis)

Specification, %	Control	Ration 1	Ration 2	Ration 3
Organic Matter	95.3	96.5	94.1	94.3
Total Protein	13.6	9.2	10.8	8.9
Total Fat	3.5	2.6	2.4	2.1
Total Fiber	22.7	17.2	17.9	17.6
Total Ash	4.7	3.5	5.9	5.7
Nutritional Value	15.4	14.7	14.2	14.3

The rations' overall protein level varies from 8.9% to 13.6%, total fat from 2.1% to 3.5%, total fiber from 17.2% to 22.7%, and total ash from 3.5% to 5.9%, according to Table 3. The control group (with grass + bran) has a total protein content of 13.6%, the grass + bran + carrot group has 9.2%, the grass + bran + carrot group has 10.8%, and the grass + bran + cabbage group has 8.9%. Rations guided the feeding of control and experimental group goats; feed efficiency was calculated using the approach shown in Table 4.

Table 4. Feed Intake

Group	n	M±m
Control	5	92.4±1.11b
Ration 1	5	96.0±2.12a
Ration 2	5	94.9±1.42a
Ration 3	5	95.6±1.56a

*Different superscripts (a, b) indicate significant differences (P<0.05)*

The control group's feed efficiency was 2.5-3.6% lower than the other three rations (P<0.05). The three experimental rations' feed efficiency, ranging from 95.7% to 96.4%, showed no notable variation. Groups with silage were 2.1-3.6% more efficient than the control group when silage was included in the proper proportion in the feed, probably because of better feed digestibility and higher appetite. Improving milk yield and quality as well as preserving consistent body weight depends on the right mix of silage in the feed [28].

Table 5. Changes in the Body Weight of the Experimental and Control Groups of Goats

Group	Body Weight, kg	Difference, kg
Control	38.8±1.5 (Start)	39.0±1.2 (End)
Ration 1	41.5±1.4 (Start)	43.2±1.1 (End)
Ration 2	38±1.3 (Start)	39.5±1.3 (End)
Ration 3	39.2±0.7 (Start)	40.6±1.2 (End)

When measuring the live weight of the goats at the beginning and end of the experiment, the goats in the control group gained 0.2 kg (0.5%) by the end of the trial. However, goats fed with the grass + bran + carrot mix gained 1.7 kg (4.1%), those fed with the grass + bran + carrot mix gained 1.5 kg (3.9%), and goats fed with the grass + bran + cabbage mix gained 1.4 kg (3.5%). In the control group, where goats were fed with the grass + bran mixture, the milk yield decreased by the end of the experiment. However, the goats fed with the grass + bran + carrot mixture showed a

1.9-fold increase in milk yield, those fed with grass + bran + carrot had a 1.6-fold increase, and those fed with grass + bran + cabbage had a 1.7-fold increase in milk yield (Figure 1).

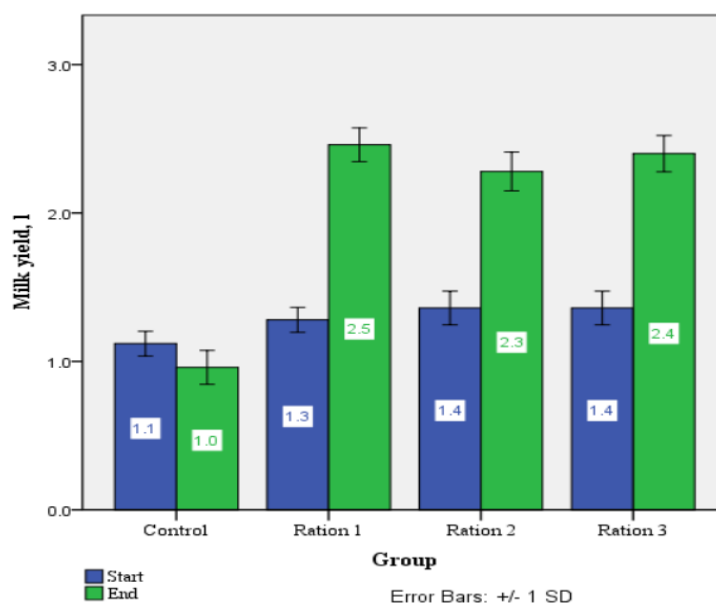


Figure 1. Milk yield of Alpine goats

## 5. DISCUSSION

We ran the first-ever trial study on the nutritional norm of Alpine breed goats being brought into Mongolia. Goats' milk output and quality are directly affected by the kind, composition, and nutritional value of the feed they consume [29]. Researchers have looked at how various feed combinations—including typical hay, cabbage, carrots, and other mixed feeds—affect the milk yield and quality of Anglo-Nubian, German White, and Alpine breeds. The Alpine breed's milk output tripled and the German White breed's yield rose 2.5 times when goats were milked twice a day with an electric milking machine [30]. Though our findings were lower than in the prior study, it shows a good rise in milk yield given it is the first study done under Mongolia's severe climate conditions.

Milk production rose by 10% at the end of the trial in a study on one-year-old Canary Majorana breed goats fed a mixed diet of 33% corn seeds, 26.5% dried alfalfa, 24% dried sugar beet pulp, 10% wheat bran, and 6.5% soybean meal. Though our study's outcomes contrast with these results, it obviously shows that the best mix of wet feeds in the nutritional norm is quite important for raising milk yield.

Apart from milk yield, taking the rise in body weight into account, the body weight of goats in the experimental group rose by 3.6-4.1%, which implies that more energy could be needed to boost milk output. This is in line with earlier research, including El-Kholodny et al. (2018), which indicated that a mix of moist feeds including turnips and cabbage enhances the general nutritional state of goats [32], so helping to maintain stable body weight.

Herders generate income, create jobs, and ensure food security through dairy goat farming [18]. In terms of feed formulation, mixing 15% dried leaves with wheat bran in the feed has been shown to increase milk yield and be more cost-effective compared to other types of supplementary feed [33].

Satik (2015) claims that a study on Sarabi breed goats aged 5–6 months and weighing 20 kg involved splitting them into three groups and changing the protein sources in their feed. The most economically efficient choice was Group G1, which had the greatest feed digestibility (73.82%) and daily weight gain (90.8 g) from a combination of Kochia silage (50%) and concentrate feed (50%). This is consistent with our results, which show that adding silage to the feed formulation for dairy goats raises milk output and is financially advantageous [34].

Gerlach's (2013) research indicated a linear correlation and a tendency for greater preference in the dry matter intake of Saanen breed goats as the proportion of fermented sugar beet (SBS and TBS with chemical additives) rose. Goats had 4–5 times greater digestibility in high sugar feed on sugar beet silage with chemical additives that preserved

sugar better. The sweet flavor and increased energy content could be related to this since they might influence the metabolism of the goats by supplying more energy for their requirements [21].

According to Monzón-Gil et al. (2010), goats fed with supplemented mixed feed showed a 10% increase in milk yield and a 5% increase in protein content. The results of our study are consistent with these findings, particularly highlighting that the optimal inclusion of silage feed in the nutritional norm is an important factor for increasing milk yield [36].

In our study, the group fed with a diet of grass + bran + turnip showed the highest milk protein content, which may be related to the combination of natural sugars and minerals found in turnips. This aligns with the theoretical premise that the type of feed and its chemical composition directly influence milk quality [37], [38].

In our country, to sustainably increase the milk yield of dairy goats, it is necessary to continue research in the following areas: testing and experimenting with natural protein sources that are high in amino acids, supplementing diets with biologically active additives such as probiotics, enzymes, and organic minerals, and aligning pasture management with optimal feed allocation strategies.

## 6. CONCLUSIONS

Under Mongolia's climate, a preliminary study was carried out to assess how succulent feed affected the chemical makeup, palatability, nutrient digestibility, and production of Alpine dairy goats. With crude protein varying from 8.9% to 13.6%, crude fat from 2.1% to 3.5%, fiber content from 17.2% to 22.7%, and ash content from 3.5% to 5.9%, the nutritional makeup of the experimental feed compositions differed. The protein content of the control group—fed hay and bran—was the greatest.

The groups fed succulent feeds—beets, carrots, and cabbage—showed 2.5–3.6% higher feed intake than the control group ( $P < 0.05$ ), therefore indicating improved palatability and enhanced nutrient absorption. Whereas the control group showed only a 0.2 kg or 0.5% rise, live weight gain in the succulent-fed groups ranged between 1.4–1.7 kg, comparable to a 3.5–4.1% increase during the study period. This proves the better nutritional value of the formulations of succulent feed.

Whereas the control group showed a drop in output, milk yield in the succulent-fed groups rose 1.6 to 1.9 times ( $P < 0.05$ ). These findings imply that mixing succulent diets with hay and bran can greatly increase feed intake, live weight gain, and milk supply, thereby providing financial advantages.

This study is the first of its kind to show, under Mongolia's severe environment, the need to create appropriate feed diets for high-yielding dairy goat breeds. It also emphasizes the need to add easily accessible succulent foods like cabbage and root vegetables to boost dietary protein in the next feed development projects.

For Mongolia's animal industry, using this knowledge offers social as well as financial value. By increasing the supply of wholesome milk and dairy products, successfully adjusting high-yielding Alpine dairy goats to Mongolian conditions can improve not only the income of herders and farmers but also national food security. In areas with limited milk supply and vulnerable populations including children with nutritional deficits—this is especially important. In such places, raising dairy goats and using balanced feeding methods can help solve public health issues.

Furthermore, this work helps to create semi-intensive agricultural methods combining current dairy technologies with ancient pastoralism. It can help organic farming, raise women's involvement in agriculture, support small and medium sized businesses, and generate rural jobs. The creation of ideal feed formulations also presents a strategic way to better use local feed resources and lower winter feed shortages. This work fits really nicely with national development projects and agriculture plans.

Thus, this kind of research is not only crucial for raising the output of a particular livestock breed but also has wider consequences for enhancing food supply, feed production, rural development, and sustainable livestock systems in Mongolia.

## REFERENCES

- [1] Belanger, J. (1990). *Raising milk goats the modern way* (Rev. ed.). Storey Publishing.
- [2] Jackson, M. (2024). *Alpine goats*. Independently Published.
- [3] Gail, L. (2010). *Raising milk goats successfully*.
- [4] Park, Y. (2017). *Goat milk—Chemistry and nutrition*.
- [5] Indra, R. (2000). *Milk and dairy products*. Ulaanbaatar.

- [6] Tserenkhand, Z., Tumurtogtokh, E., Damdinsuren, D., Bukyei, E., & Buyandelger, E. (2023). Results of studying the fatty acid composition of yak meat of Mongolia. *International Journal of Social Science and Humanities Research-MIYR*, 3(3), 1–12.
- [7] Nayik, G. A., et al. (2021). Recent insights into processing approaches and potential health benefits of goat milk and its products: A review. *Frontiers Media S.A.*  
<https://pmc.ncbi.nlm.nih.gov/articles/PMC8685332/>
- [8] Singh, M. K. (2015). Performance of Saanen and Alpine goats under tropical Indian conditions. *Indian Journal of Animal Sciences*, 85(3), 305–310.
- [9] Peacock, C. (2005). Goat production and development in Africa. *Small Ruminant Research*, 60(1–2), 179–186.
- [10] Zhang, Y., Zhao, X., & Li, W. (2013). Crossbreeding between local goats and exotic dairy breeds in China: A review. *Livestock Science*, 157–164.
- [11] McManus, C., Paludo, G. R., Louvandini, H., Gugel, R., Sasaki, L. C. B., & Paiva, S. R. (2009). Heat tolerance in Brazilian sheep: Physiological and blood parameters. *Tropical Animal Health and Production*, 41(1), 95–101. <https://link.springer.com/article/10.1007/s11250-008-9162-1>
- [12] Haenlein, G. F. W. (2004). Goat milk in human nutrition. *Small Ruminant Research*, 51(2), 155–163. <https://doi.org/10.1016/j.smallrumres.2003.08.010>
- [13] Ncube, K. T., Modiba, M. C., Mpofu, T. J., Mtileni, B., & Nephawe, K. A. (2024). Genomic tools for medicinal properties of goat's milk for cosmetic and health benefits: A review. <https://www.preprints.org/manuscript/202404.1662/v1>
- [14] Šalavardić, Ž. K., Potočnik, K., Zvonko, A., & Novoselec, J. (2015). Milk production traits from Alpine breed of goats in Croatia and Slovenia.
- [15] Ministry of Food, Agriculture and Light Industry of Mongolia. (n.d.). <http://www.mofa.gov.mn>
- [16] National Statistics Office of Mongolia. (n.d.). <http://www.1212.mn>
- [17] Purevdolgor, D., Khaliunaa, T., & Tumenbayr, K. (2021). Milk yield study of Alpine goats. *Mongolian Journal of Agricultural Sciences*, 32(1), 21–24.
- [18] Bivatec Ltd. (2005). *Goat breeds and milk productivity*.
- [19] Nadmid, N. (2006). *Goat husbandry*. Ulaanbaatar.
- [20] Gendaram, K. (2009). *Animal feeding science*. Ulaanbaatar.
- [21] Mutunga, T., Musalia, L., Gichimu, B., & Migose, S. (2023). Dairy goat production in Kenya: A review.
- [22] Hart, S. (2008). *Goat nutrition*.
- [23] Ibrahim, F. A. M., Ahmed, A., & Soliman, S. (2008). Cultivation and evaluation of green forage mixtures for lactating Zaraibi goats. *Egyptian Journal of Nutrition and Feeds*, 11, 329.
- [24] Gerlach, K., Liao, Y., & Südekum, K. (2014). Aerobic exposure of lucerne silages and its impact on preference and dry matter intake by goats. *Small Ruminant Research*, 308–313.
- [25] Maged, G., El-Emam, M. E., El-Kholany, T. H., & El-Sawah, T. H. (2014). Milk production and feed utilization of Zaraibi goats. *Journal of Animal and Poultry Production*, 5, 815–826.
- [26] Ahuya, C., Ojango, J., Mosi, R., & Peacock, C. (2009). Performance of Toggenburg dairy goats. *Small Ruminant Research*, 7–13.
- [27] Sahlu, T., & Goetsch, A. L. (n.d.). Feeding the pregnant and milking doe.
- [28] El-Sayed, F. A., & Sadek, W. M. A. (2015). Effect of feeding silage types on goat growth performance. *Journal of Animal and Poultry Production*, 8, 567.
- [29] Gerlach, K., Reimink, A., Messerschmidt, U., & Südekum, K. H. (2017). Ensiled sugar beets in goat diets. *Archives of Animal Nutrition*, 71(4), 297–310. <https://pubmed.ncbi.nlm.nih.gov/28541752/>
- [30] Gendaram, K., Togtokhbayar, N., & Rinchindorj, D. (2009). *Methodology for chemical analysis of feed and meat*. Ulaanbaatar.
- [31] Tserendulam, R. (1990). *Nutritional value chart of feeds*. Ulaanbaatar.
- [32] Richard, O. (2017). *Feed and nutrition of livestock*. Ulaanbaatar.
- [33] Barbosa, J. G. (2012). Urea levels in feeding Alpine goats. *Revista Brasileira de Zootecnia*, 41(7). <https://doi.org/10.1590/S1516-35982012000700022>

- [34] Hempstead, M. N., Lindquist, T. M., Shearer, J. K., Shearer, L. C., & Plummer, P. J. (2021). Health and welfare survey of dairy goat farms. *Animals*, 11(7). <https://doi.org/10.3390/ani11072007>
- [35] Gerlach, K., Roß, F., Weiß, K., Büscher, W., & Südekum, K. H. (2013). Maize silage deterioration effects on goats. *Agricultural and Food Science*, 22, 168–181.
- [36] Zazharska, N., Boyko, O., & Brygadyrenko, V. (2018). Diet influence on goat milk productivity. *Indian Journal of Animal Research*, 52(5), 711–717.
- [37] Goetsch, A. L. (2019). Advances in dairy goat nutrition. *Asian-Australasian Journal of Animal Sciences*, 32(8), 1296–1305. <https://doi.org/10.5713/ajas.19.0485>
- [38] Hempstead, M. N., Lindquist, T. M., Shearer, J. K., Shearer, L. C., Cave, V. M., & Plummer, P. J. (2021). Welfare assessment of dairy goat farms. *Frontiers in Veterinary Science*, 8. <https://doi.org/10.3389/fvets.2021.646715>
- [39] Kim, H. J., Kim, J. H., & Lee, H. J. (2016). Comparison of milk composition between Korean native black goats and Alpine goats. *Journal of Animal Science and Technology*.
- [40] Kiptui, B. J., Mewa, E. A., & Kitilit, J. K. (2025). Supplementation effects on milk yield in dairy goats. *International Journal of Scientific Research and Science Technology*, 12(1), 413–419.
- [41] Sadik, W. (2015). Effect of feeding different types of silage on goat growth performance.
- [42] Maged, G. A., Sadik, W. M. A., & Mehany, A. A. (2018). Silage mixtures in dairy goat diets.
- [43] Monzón-Gil, E., Castañón, J. I. R., & Ventura, M. R. (2010). Low-forage rations and milk production. *Small Ruminant Research*, 94(1–3), 196–200. <https://doi.org/10.1016/j.smallrumres.2010.07.018>
- [44] Inglingstad, R. A., Næsset, A. L., Randby, T., & Steinshamn, H. (2019). Forage quality effects on goat milk. *Journal of Dairy Science*, 3, 2345–2354.
- [45] Ashry, M. M., Fadel, M. A., Kholif, A. E., & Salem, A. Z. M. (2018). Protein source replacement in goat diets. *Egyptian Journal of Nutrition and Feeds*, 3, 545–556.

## AUTHOR'S INTRODUCTION

### 1. First Author



Purevdolgor Dagviikhorol


[Dagviipurev@gmail.com](mailto:Dagviipurev@gmail.com)

Doctoral student at the School of Animal Science and Biotechnology, Mongolian University of Life Sciences, Ulaanbaatar, Mongolia


Work: Animal Science Sector, Research Institute of Animal Husbandry, Ulaanbaatar, Mongolia

Work field: Animal nutrition, care, and husbandry, pasture management


## 2. Corresponding Author

	Batsukh Tovuudorj <a href="mailto:Batsukh7494@gmail.com">Batsukh7494@gmail.com</a>
	Ph.D in Animal Science Work: Director, Research Institute of Animal Husbandry, Ulaanbaatar, Mongolia Work field: Animal production, animal nutrition and breeding, selection

## 3. Corresponding Author

	Sainchuluu Amarsanaa <a href="mailto:sainchuluu@mul.s.edu.mn">sainchuluu@mul.s.edu.mn</a>
	2018 Ph.D in Environmental Science Work: Senior lecturer, School of Agroecology, Mongolian University of Life Sciences, Ulaanbaatar, Mongolia Work field: Ecological resoration, rangeland ecology, sustainable land management

## 4. Co-Author

	Beisen Bayar <a href="mailto:beisenbayar@gmail.com">beisenbayar@gmail.com</a>
	Ph.D in Veterinary Science Work: Scientific secretary, Research Institute of Animal Husbandry, Ulaanbaatar, Mongolia Work field: Animal production, animal nutrition and physiology, biotechnology, animal medicine