

# Comparative Analysis of Blood Serum Minerals in NARI Suwarna Lambs on Various Feeding Plans

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## ABSTRACT

The NARI Suwarna lambs are highly valued for their exceptional protein content and immediate development, thereby emphasizing the essential need of meeting their precise nutritional needs for prosperous farming. Proper nutrition performs a crucial role in determining the growth, conception and general wellness of these organisms. The observations can be influenced by external factors including climate and environment, which can impact their generalization. The goal of this investigation is to examine the mineral composition of the blood Serum in NARI Suwarna sheep that were challenged to two distinct feeding methods. A total of fifty-four mature NARI Suwarna ewes, all of identical ages, were allocated into two categories. Category I (n=27) received a regular sheep feed, whereas Category II (n=27) were permitted to graze in the pasture. The average serum quantities of Glucose (G), Phosphorus (P), Iron (Fe), Copper (Cu), Calcium (Ca) and Zinc (Zn), in lambs that were provided scientifically as well as grazed on pastures, were (10.46±0.7)mg/dl, (11.32±0.4 7.04±0.39) mg/dl, (72.43±2.69) and (7.39±0.39, 63.2±2.79) mg/dl, (1.9±0.18) ppm, (1.9±0.17, 2.15±0.22) ppm (2.12±0.19) (2.57±0.24) ppm and (2.74±0.25) correspondingly. Initial findings reveal substantial disparities in the levels of minerals present in the blood of NARI Suwarna lambs that were exposed to distinct feeding regimens. Ewes sustained under experimental feeding had elevated blood calcium and glucose contents in comparison to those kept under grassland feeding.

**Keywords:** Blood Serum Minerals, Ewes, NARI Suwarna Lambs, Feeding Plans

## INTRODUCTION

The mineral percentage in the blood serum of these sheep is a crucial sign of their dietary state, metabolism procedures and sensitivity to possible diseases. It is crucial to comprehend the fluctuations of blood serum minerals in NARI Suwarna Lambs to enhance their development, conception and ability to resist diseases (1). These sheep are highly esteemed for their capacity to flourish in various agro-climatic settings, rendering them a favored option among livestock caretakers. Assessing the concentrations of vital minerals in their blood serum provides useful information on the sufficiency of their food intake and the effectiveness of nutrient administration (2). Ca, P, Mg, k and sodium are essential minerals that have an important involvement in the physiological processes of the NARI Suwarna Sheep. Ca is needed for bone formation and muscle operation, whereas P is crucial for G consumption and total improvement. Mg has a role in neuronal activity and muscular contraction, while k and Na are essential for regulating fluid balance and osmotic pressure (3). Figure (1) shows the NARI Suwarna Lambs in pasture.



**Figure (1).** NARI Suwarna Lambs in pasture Greenland [Source:

<https://5.imimg.com/data5/SELLER/Default/2021/6/MP/CO/GM/39474451/dscn6582-2-jpg-500x500.JPG>)]

The presence of blood serum minerals in NARI Suwarna sheep performs a crucial role in customizing nutrition regimens that cater to the special needs of these animals. Through the examination of mineral identities, scientists and livestock caretakers can detect imbalances or overabundance, enabling accurate modifications in the composition of animal feed and supplementation. Considering the increasing demand for superior sheep products, it is crucial to prioritize the enhancement of the welfare and efficiency of NARI Suwarna sheep (4). An in-depth awareness of the minerals present in blood serum is crucial for maintaining the health of particular animals and for effectively managing this valuable livestock breed consistently as well as efficiently.

Examining the mineral levels in the blood serum of NARI Suwarna sheep is crucial not only for the well-being of each animal but also for the long-term viability and financial success of livestock production (5). Optimal mineral balance is essential for achieving better reproductive efficiency, accelerated growth stages and increased illness resistance, leading to greater overall production of the herd. By examining the intricate interaction of vital minerals, we can gain a deeper comprehension of the dietary needs of these creatures and devise focused approaches to enhance their overall well-being and efficiency. As we begin this investigation, the results have the potential to make a substantial impact on the improvement of livestock management techniques, guaranteeing the health and production of NARI Suwarna lambs in the constantly changing field of agriculture (6).

Customizing feeding regimens for NARI Suwarna sheep is essential for achieving optimal growth and maintaining good health. Commencing with a well-rounded initial meal abundant in proteins, vitamins as well as minerals guarantees prompt growth and progress. The process of converting to maturation diets includes gradually introducing high-quality grass and concentrates to facilitate the development of the stomach. Adapting to growth diets that consist of a combination of forages, cereals and micronutrients helps to maintain and support the formation of muscle. Specialized diets are advantageous for breeding ewes throughout pregnancy and breastfeeding as they improve lamb birth weights. Non-breeding adults demand management diets to fulfill their dietary requirements without experiencing significant weight gain. Regular monitoring of mineral levels in the blood serum is essential for guiding efficient mineral dietary supplements, as it helps to identify and rectify deficiencies while preserving metabolic balance. Implementing these diverse feeding programs guarantees that NARI Suwarna Lambs obtain accurate nutrition at every stage of their development (7, 8).

Study (9) investigated the percentage of farms that provided additional trace minerals and to evaluate the levels of trace minerals in the blood of young male lambs after they were separated from their mothers. They focused on selenium (Se) and zinc (Zn) levels. The findings provided valuable information regarding the levels of trace minerals in the blood of a specific group of young male sheep. Additionally, it highlighted the concerning fact that 33% of ranches failed to supply mineral supplements.

Research (10) examined the impact of adding “magnesium (Mg)” to the food on the mineral levels and metabolic processes of female sheep throughout the “transition period (TP)”. Regarding the consistent stability of “Calcium (Ca)”, “phosphate (P)” and “glucose (G)” levels in the blood during the TP, the addition of magnesium administration could be considered as a means to enhance metabolic well-being in ewes.

Article (11) evaluated the impact of nutritional treatment with “nano Zn oxide (nZnO)” contrasted to “Zn oxide (ZnO)” on the efficiency, rumen fermenting, leukocytes, “Total antioxidant capacity (TAC)”, blood serum enzymes and nutrients in sheep. In general, substituting nZnO for ZnO could be a beneficial method for enhancing “Dry matter intake (DMI)”, “DM digestibility (DMD)”, “Total antioxidant capacity(TAC)” in the “rumen fluid (RF)” along with Dairy, “leukocytes (le)” as well as dairy Zn percentage in sheep, without causing any negative impacts on the blood levels of “Copper(Cu), Ca, P, Mg and Zn-dependent” processes.

Research (12) investigated the levels of “lead (Pb)”, “cadmium (Cd)”, Cu, Zn, “iron (Fe)” and “selenium (Se)” in the bloodstream of Barki sheep. The findings had the potential to enhance the animal's nutrition that increased the rate of development and reproduction.

Article (13) examined the impact of FSH-induced ovarian hyperstimulation on the caruncles of female sheep, considering different feeding regimens. The data they had collected highlight the potential impact of nutritional and hormonal factors on the functioning of the uterus, leading to disruptions in uterine functioning and influencing the consequences of pregnancy.

Paper (14) analyzed the ruminal bacteria, fungus and protozoa in the highland grassland. They examined these microorganisms at several taxonomic levels and discovered variations in the richness coupled with composition of rumen microbes among goats and sheep that cohabitated in similar grasslands. The findings indicated that the bacteria in the rumen perform a crucial role in enabling sheep to acclimate to high-altitude grazing environments.

Study (15) examined five effective farming methods highlights the conflict between the optimization of on-farm feed utilization and farm earnings, as well as the desired characteristics of the lambs by the sheep-meat business. Initial results showed that the livestock company's demand for a steady production of lamb throughout the season yet particular lamb traits is aligned to optimize financial and ecological performance at the stage of particular farms.

Research (16) analyzed the efficiency and the structure of the rumen and intestines of Santa Inês sheep that were challenged to a period of limited eating immediately by a period of normal feeding. Feed constraint subsequent by refeeding in sheep resulted in partial compensatory growth. Furthermore, their mechanism caused structural changes in the stomach and digestive tract, possibly resulting in compensated growth during intervals of excessive feeding.

The bloodstream metabolic properties of “NARI Suwarna sheep” were assessed in Article (17) at different stages of the diestrus process and gestation. The study revealed a greater demand for nutrients to sustain fetal growth and the dilution of blood induced by rising blood volume after birthing may be the source of the lower concentrations of albumin, total serum protein, and some compounds in delayed pregnancy.

Paper (18) examined the impact of climate on various physiological parameters including “physical weight (PW)”, “Scrotal diameter (SD)”, “libido test (Lt)”, reaction duration and serum composition in NARI Suwarna ewes. The

impact of the environment on PW, SD, Lt, reaction duration and serum content in NARI Suwana ewes was demonstrated to be negative.

Study (19) analyzed the impact of adding “almond oil (AO)” and “olive oil (OO)” to “skim milk (SM)” and “TRIS egg yolk (TEY)” adapters on the serum content characteristics of refrigerated NARI Suwana sheep serum over 72 hours. The inclusion of OO at a concentration of 0.25% in the TEY extender resulted in a more favorable preservation of accelerated progressing serum motility proportion compared to other extensions.

Research (20) analyzed the efficacy of different durations of progesterone therapy (6 days, 10 days and 14 days) on the effectiveness of synchronization and reproductive responses in multiparous sheep. However, findings should be verified in the increased amount of livestock before suggesting the approach. The goal of this investigation is to examine the mineral composition of the blood in NARI Suwana sheep that were challenged to two distinct feeding methods.

## MATERIALS AND METHODS

Fifty-four mature NARI Suwana sheep of identical ages were randomized and allocated into two categories. The sheep were immunized toward Feet and the “mouth, “Enterotoxaemia (EA)”, “Peste des petits ruminants (PDPR)” and “Black Quarter infections (BQI)”. Additionally, they were dewormed every four months using wide-spectrum anthelmintics. Within category I, a group of 27 ewes was provided with a total of about 350g of well-balanced lamb feed for 7 months. The feed consisted of “Yellow maize (YM)”, “Soya bean meal (SM)”, “Wheat bran (WB)”, salt and mineral combination. It was formulated to contain energy at a level of 46.00%, crude protein at 16.00%, crude fiber at 36.50%, salt at 3.00% and nutrition combination at 3.00%. Furthermore, in addition to the concentrated meal, the ewes were provided with unlimited amounts of ragi straw and hydration. The sheep in category II (n=27) were not provided with any concentrated nutrition or mineral combination. They were permitted to grassland in the yard for 11 hours every day and they were sustained under grassland feeding for the whole 7-month investigation phase. In addition, blood specimens were collected to ascertain the levels of blood Ca, P, G, Zn, Cu and Fe. The blood specimens were collected from both ewes kept in controlled environments and ewes that grazed on grassland. The amount of Ca, P and G in the blood collections was determined using an automated blood biochemical analyzer, using established protocols. The elements Zn, Cu and Fe were examined using “atomic absorption spectroscopy (AAS)”. An investigation was conducted to examine the levels of blood biochemical indicators in connection to the kind of meal.

The Student's t-test was employed to examine the considerable disparities in blood mineral compositions between sheep kept under a systematic feeding method and those grazing on pasture.

## RESULTS AND DISCUSSION

The table presents “the blood concentrations of Ca, P and G” in NARI Suwana ewes that survived fewer than two alternative food administration methods. The blood calcium content was elevated ( $11.32 \pm 0.4$ ) mg/dl in sheep fed a balanced diet compared to those feeding on grassland ( $10.46 \pm 0.7$ ) mg/dl.

The average blood P contents in lambs fed a balanced diet were measured to be ( $7.39 \pm 0.39$ ) mg/dl in the category of lamb fed a weighed diet. The blood concentrations of sheep feeding on grassland were measured to be ( $7.04 \pm 0.39$ ) mg/dl, with no substantial change observed. The blood G content was elevated ( $p < 0.01$ ) in sheep that were provided a complete diet compared to those were sustained under grassland feeding conditions ( $72.43 \pm 2.69$  Vs  $63.2 \pm 2.79$ ) mg/dl.

The average blood amounts of Zn, Cu and Fe in sheep that were given a well-balanced diet were measured as  $1.9 \pm 0.17$ ,  $2.12 \pm 0.19$  and  $2.74 \pm 0.25$  ppm, respectively. The mean blood contents of Zn, Cu and Fe in sheep kept

through grassland feeding were measured as  $1.9 \pm 0.18$ ,  $2.15 \pm 0.22$  and  $2.57 \pm 0.24$  ppm, respectively. There was no considerable difference in the amounts of Zn, Cu and Fe in the serum collections comparing the two categories of sheep.

Indian sheep and goat farms use grasslands as a nutrition source and lack augment their animals with minerals. In most cases, commercial premixtures or mineral segments are not used. In addition, the consideration of trace component inclusions is taken into consideration, rendering their contribution insignificant. This is compounded by the shortage of elements like Cu and Se in certain places where livestock are grazing. Investigation of substance proportions and connections in sand, pasture and blood of Lamb has revealed excesses of minerals. Lamb with Cu deficiency exhibits excess levels of P and Fe, while the pastures as well as sand have excessive amounts of Fe. Multiple studies have shown a correlation between nutrition and reproduction in sheep. As an illustration, the process of removing minerals from a system resulted in enhanced productivity and reproductive characteristics. Minerals such as P, Ca, I, Mg, Cu, Se and Zn perform a crucial role in regulating reproduction functions.

It was discovered that when comparing livestock grazing on pastures with those were on a healthy diet, the average levels of Ca and G in the blood were lower in the former category. This information is presented in Table (1), which includes data on several macro and micro components. The low levels of G detected in the blood of goats who fed on grassland indicated a significant lack of energy.

**Table (1).** Ca, P, G, Zn, Cu and Fe blood concentrations in NARI Suvarna lambs managed fewer than two distinct nutrition regimens

(Source: author)

Nutrition Technique	Grassland Feeding	Scientific nutrition
Quantity of livestock	27	27
G (mg/dl)	$63.2 \pm 2.79b$	$72.43 \pm 2.69a$
Zn (ppm)	$1.9 \pm 0.18$	$1.9 \pm 0.17$
Fe (ppm)	$2.57 \pm 0.24$	$2.74 \pm 0.25$
Ca (mg/dl)	$10.46 \pm 0.7b$	$11.32 \pm 0.4a$
P (mg/dl)	$7.04 \pm 0.39$	$7.39 \pm 0.39$
Cu (ppm)	$2.15 \pm 0.22$	$2.11 \pm 0.19$

Energy reduction inhibits the rise in LH levels which is crucial for the development of ovarian follicles during the preovulatory phase. Due to this rationale, flushing is acknowledged as a substantial controller of reproduction has been achieved by either granting livestock access to abundant and nourishing pastures or by providing them with energy-dense supplementation. Additionally, it has been shown that providing additional energy can have a good impact on the body circumstance, growth and ovulation rate of sheep with a pure diet. Energy consumption can increase insulin production, enhance susceptibility to hypothalamic gonadotrophins and enhance the number of growing eggs. Energy administration enhanced the dimensions of the preovulatory follicles and advanced the timing of ovulation in sheep. The reduced reproduction effectiveness of sheep under grassland feeding can be caused by energy deficit, as indicated by their hypoglycemic state, which can have a negative impact on reproduction performance.

## CONCLUSION

Analyzing the mineral composition of the blood in NARI Suvarna sheep, with a specific concentration on their nutritional demands is due to their exceptional meat quality and fast growth rate. The investigation entailed a



comparison between two feeding techniques, one entailing a well-balanced sheep feed and the other permitting grazing in the pasture. Analysis indicated substantial disparities in the blood mineral levels between the sheep exposed to various feeding regimens. Significantly, sheep subjected to control feeding in a scientific setting displayed elevated average levels of Ca and G in their bloodstream in comparison to those were allowed to graze on grass. The significance of diet in shaping the development, pregnancy and overall well-being of NARI Suwana sheep is highlighted, which could have significant consequences for achieving good farming achievements. It is crucial to recognize that external factors, including climate and ecosystems, might affect the outcomes, thereby affecting the capacity to apply the findings to other situations. The initial observations highlight the need for customized dietary regimens to maximize the well-being and efficiency of NARI Suwana sheep in various agricultural environments. Constraints include a limited number of observations, a short time frame, potential variability in individual sheep reactions and the impact of external stimulation. Subsequent experiments could investigate the enduring consequences of various feeding regimens on NARI Suwana lambs, examining their impact on development, wellness and production.

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