**Research Article**

# Study the Effect of Stress Transfusion on Some Blood Parameters in Goats

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**Abstract:** The study was conducted in a private field for bore goat (Hybrid goat) breeders in the governorate to determine the effect of transportation stress on the animals (goats). Twelve animals of similar age, weight and type were selected. They are about 1,5-2 years old and weigh an average of 30-35 kg males. Where blood was drawn from the jugular vein of the goat group in a state of rest, blood samples were drawn from stressed goats after a two-hour drive from 9 am to 11 am, and the air temperature was approximately 39 degrees Celsius. The ball was repeated for three consecutive days, and blood parameters were measured. (LYM. WBc) and GRAcells HGB), and because the number of white blood cells is considered a function of the animal's health condition and stress, especially neutrophils (neutrophil granulocytes), and they are the most numerous types of white cells in number and constitute 60-70% of white blood cells Its average life in hours is 4-10 hours. Measurement of erythrocytes and haemoglobin indicates anaemia after the stage of stress and stress as a result of lack of feed consumption, which leads to specific diseases such as iron deficiency. The results showed arithmetic differences in blood values between stressed and unstressed animals, and they were as follows:

1.      The average number of white blood cells (WBC) in goats before stress was (19.10) x 103 cells/μl, while in stressed goats, it was (21.51) x 103/μl.
2.      The percentage of LYM lymphocytes before stress was 39.517%, and after stress, it was 79.18%.
3.      The percentage of neutrophilic granulosa cells is 3.12% before stress, while after stress, it is 22.57%.
4.      The average number of red blood cells (RBC) in unstressed goats was (0.17) x 106 cells/ml), while the average number of red blood cells in stressed goats was (0.14 106 (/mL).
5.      The levels of haemoglobin Hb in non-stressed goats were (8.12) g/100ml .
6.   Stressed goats and the percentage of haemoglobin in stressed goats was (8.04) gm/100ml.

**Keywords:** Transportation stress, Goat, Blood, T LYM, GRAC

# INTRODUCTION

Recent research efforts have confirmed that goats are the ideal climatic animal model due to their better heat tolerance, drought tolerance, ability to survive in pastures, and disease resistance (Chakravarty, 2020). When the animal is exposed to stress, the animal resorts to reducing feed consumption, and nutritional deficiency leads to specific diseases such as iron deficiency. And the addition of dietary supplements compensates for the deficiency (Padayatty, 2016). The transportation process is considered part of the procedures for bringing animals to slaughterhouses. When transported under terrible conditions, animals can die, and this happens during a very high temperatures as a result of poor ventilation, and stress may result. The animals are there to die the health condition of the animals must be adequate to bear the burdens of transport, so it must be examined by a specialized person before transporting the animals, taking into account the animals that suffer from infectious diseases that can cause the rapid spread of infection during the transport process, goats transportation for 12 h over a distance of about 350 km exhibit significantly decrees live body weight compared to their preloads weight ( Ambore B .N.*et al*., 2019), also reported that transportation of goat up to 8 h during hot (*Gupta et al.,* 2018), resulting in decreased body weight. The goats subjected to 7 h of road transport stress during hot, humid environmental conditions displayed oxidative stress and haematological derangements, which require 7 to 16 days to restore the normal state (Polycarp *et al*., 2016). Goat milk has a crucial role in eradicating poverty while avoiding disasters. (Mangwai *et a*l., 2020). Hence, having the potential scope to ensure food security is an essential source of income for poor and marginalized farmers worldwide.

**Research objective:**
1.  Follow-up of animal behaviour, where animal behaviour is evaluated using several characteristics such as (tension and relaxation) .

2. We are monitoring the reproductive performance of goats through oestrous expression with poor embryonic growth .
3. Determine an integrated solution to get rid of heat stress and transportation stress due to their negative impact on goat production .
4. Using blood analysis as an indicator of the health status of the animal is inexpensive.

## MATERIALS AND METHODS

12 Male goats of the Orabi type (bore goat) were selected. They are 1,5-2 years old, and their age was determined by the teething method, and their weight was 30-35 kg using a fixed scale. Coloured markers were placed to distinguish between the two groups. . was isolated in a special enclosure divided into two parts, the first group (relaxed animals) and the second group (stressed animals), as a result of transportation by car 180-200 km per day in the afternoon for three days from stressed goats after a two-hour drive from 9 am to 11 am.

### Collection of blood standards

Blood samples (5 ml) were drawn from the jugular vein of goats (Jugular Vein) using a sterile medical syringe with a capacity of 10 cubic centimetres. The drawn blood was distributed into four test tubes containing EDTA (Ethylene Damien Tetra Acidicaeid) anticoagulant. Then these tubes were placed in the refrigerator for preservation, and then they were transferred directly to the laboratory using the CBC device.

## RESULT

The study sample included 12 goats with two blood samples before and after the exercise test (effort), and each sample was investigated for haematology analysis (complete blood count). There were a high total WBCs count in the blood sample with Mean ± SD of ($19.10 \pm 0.522$ vs .$21.51 \pm 0.103$) 10^3/ulu for both before and after exercise tests, respectively, with statistical significance ($P$ value < 0.00). (Table 1). At the same time, there was a high mean of LYM before and an average mean after ($39.517 \pm 0.103$ vs $79.18 \pm 0.515$) with statistical significance ($P$ value < 0.00). (Table 1). Although of MID mean was higher than the normal value, it was more after ($17.80 \pm 0.360$ vs $38.15 \pm 0.308$) with statistical significance ($P$ value < 0.00). (Table 1). Also, the same result for GRAN when before was less than after, but both values were below the normal range (Table 1)

**Table 1:** WBCs finding by hematology analysis reporting

| Parameters | | No | M | SD | Sig |
|---|---|---|---|---|---|
| WBCS (10^3/ulu) | Before | 12 | 19.10 | 0.522 | 0.000 |
| | After | 12 | 21.51 | 0.103 | |
| LYM (%) | Before | 12 | 39.517 | 0.103 | 0.000 |
| | After | 12 | 79.18 | 0.515 | |
| MID (%) | Before | 12 | 17.80 | 0.360 | 0.000 |
| | After | 12 | 38.15 | 0.308 | |
| GRAN (%) | Before | 12 | 3.12 | 0.154 | 0.000 |
| | After | 12 | 22.57 | 0.103 | |

Regarding the RBCs count and it's related, there were low values in RBC, HGB, HCT and MCV below the normal range in both before and after effort as (. $0.17 \pm 0.05$ vs $0.14 \pm 0.02$, $8.12 \pm 0.154$ vs. $8.04 \pm 0.051$, $0.80 \pm 0.005$ vs $0.90 \pm 0.005$ and $54.41 \pm 1.75$ vs $54.20 \pm 0.73$) respectively, with statistical significance except in HCT not significance as in table 2. At the same time, MCH Showed a high value in both before and after effort significantly, as in Table 2.

**Table 2:** RBCs and their related findings by hematology analysis reporting

| Parameters | | No | M | SD | Sig |
|---|---|---|---|---|---|
| RBCs (10^6/ulu) | Before | 12 | 0.17 | 0.05 | 0.00 |
| | After | 12 | 0.14 | 0.02 | |
| HGB (g/dl) | Before | 12 | 8.12 | 0.154 | 0.017 |
| | After | 12 | 8.04 | 0.051 | |
| HCT (%) | Before | 12 | 0.80 | 0.005 | 0.32 |
| | After | 12 | 0.90 | 0.005 | |
| MCV (FL) | Before | 12 | 54.41 | 1.75 | 0.001 |
| | After | 12 | 54.20 | 0.73 | |
| MCH (Pg) | Before | 12 | 587.5 | 91.39 | 0.001 |
| | After | 12 | 465.8 | 4.90 | |

## RESULTS AND DISCUSSION

Blood is considered one of the important tissues of the animal due to the dynamism by which it is classified, and by virtue of its continuous and organized movement, it senses the changes that occur in the various cells and tissues of the body and that these changes can be an accurate indicator of the animal's health or physiological condition.

Table (1) There are goats hmetic differences in the number of white blood cells between the first group in the state of rest and the group of stressed goats .Note that the normal values of white blood cells for healthy black Arab goats' range between (12 - 18) x 10$^3$ cells/mcl (Shahab et al., 2017). Recent research indicated an increase in the number of white blood cells in the blood, which may be the reason for the increase in the number of immature and inactive neutrophils due to the body's need for them, and they have a longer life span than healthy cells (Olowakandis *et al*., 2020). The results indicate an increase in the percentage of lymphocytes after exposure to transport stress due to the rise in the level of corticosteroid hormones in the blood and, thus, an increase in lymphocytes (Sarangi, 2018). White granulocytes are a function and a good measure of physiological changes. They are an excellent measure of knowing the harmful effect of prolonged stress on the immune system. They are characterized by their short life and high mobility. They represent 40-70% of the total white blood cells. In cases of stress, the number of ageing and incomplete cells will increase and accumulate on the walls of the arteries, which may lead to their closure in cases of severe anxiety (Bassem & Mohammed, 2012). Table (2) indicates arithmetic differences in the number of red blood cells for the group of goats at rest and the group of stressed goats .At the same time, the normal values of red blood cells in healthy black Arab goats are (11-17) x 10$^6$ cells/μl (Shahab et al., 2017). When the animal is exposed to stress, the animal resorts to reducing feed consumption, and nutritional deficiency leads to specific diseases such as iron deficiency. Because stress causes malabsorption in the intestines of nutrients and their loss and leads to weak resistance (Mili & Chutia, 2023). The results of the RBC examination show that the values are affected when animals are exposed to stress as a result of environmental stress, and their number decreases outwardly. It may be a result of iron deficiency, or it may be a lack of vitamins and minerals. It is known that the ability of mammalian red cells to change their shape under a level of stress without tearing is a cellular characteristic Determined by the geometric and physical properties of the cell membrane. As a result of the lack of cholesterol and phospholipids in the cell membrane due to a lack of nutrition and unbalanced diets in terms of protein and energy, it may be a reason for a decrease in their number (Habeeb *et al*., 2018). The formation of the GLO enzyme may not be completed in states of stress, which leads to a decrease in the production of vitamin C and may cause anemia due to the importance of ascorbic acid, which is synthesized in the liver (Nazir et al., 2018). As for the average hemoglobin values in Table (2) for the first group at rest and the second group stressed, we did not find significant arithmetic differences between the two groups. They were within the normal ranges for healthy black local goats and ranged between (8.4-11) g/100 ml (Shahab et al., 2017). The arithmetic difference may be due to the same reason as above, from iron deficiency.

## Conclusions and Recommendations
Conclusions: Through the study, we can conclude the following:
1. The stress of transportation, especially during periods of elevated temperatures, is one of the main factors that hinder animal production because it negatively affects the quality of meat.
2. The effect of transport on animals and the cause of stress. Differences appeared in the estimation of blood parameters between the groups in the resting state and the stressed ones.
3. It is possible to provide care for goats during transportation to reduce the effects of stress as a result of changing environmental conditions and to detect anemia in local goats.

Determining the various productive and adaptive responses are important indicators to reflect both production and adaptation to environmental conditions.

## Recommendations
Based on the findings of research and previous experiences, we recommend the following:
1. They are urging scholars and researchers to conduct experiments and studies to deal with the problem of transportation and heat stress.
2. Preparing a program to improve local breeds to adapt to climate changes.
Laboratory diagnosis of internal health.

## Thanks, and appreciation.

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