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Normal Blood and Some Hormonal Parameters (Thyroxine, Triiodothyronine ,Progesterone) In Iraqi Cows

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***Abstract*—this study about normal blood parameters carried on 60 cross breed Iraqi cows in Kerbela – Al-Hindia from two to ten years of age, clinical apparently health state . the aim of study was to evaluate normal hematological parameters and estimate of some body hormone (Thyroxine, Triiodothyronine & Progesterone) in cross Iraqi breeds cows in Kerbela – Al-Hindia .**

10ml blood samples were collected from each cow to measure of the following parameters: hemoglobin concentration (Hb), volume of red blood cells in the blood (MCV) , hematocrit (PCV), average and mean corpuscular hemoglobin (MCH) , red blood cells (RBC), mean corpuscular hemoglobin concentration (MCHC) and total number of leukocytes (WBC). Also, estimation some hormones values: thyroxin(T4), Triiodothyronine(T3), progesterone. the leukocytes are show increase in value. the erythrocytes, PCV, Hb, lower and MCV, MCH, MCHC in normal range. Thyroid Hormones: thyroxine(T4), triiodothyronine(T3) normal, Progesterone was in normal level in local Iraqi cows in Kerbela – Al-Hindia.

***Keywords* — Iraqi cows, hematological parameters, progesterone, thyroxine, triiodothyronine, physiological stage**

I. INTRODUCTION

Blood is a special type of connective tissue composed of formed elements in a fluid Plasma is the fluid portion called serum when depleted of fibrinogen matrix (1). The formed elements include erythrocytes (red blood cells), leukocytes (white blood cells) and platelet (2). Hence, The variability in these blood parameters can be used in the diagnosing and monitoring animals' physiological states and diseases (3). The hematological values in various physiological conditions are essential for diagnosing diverse pathological and metabolic illnesses that can negatively impact the productive and reproductive performance of cows, resulting in significant economic losses (4). Numerous hematological parameters are affected by various factors, including breed, age, sex, seasonal fluctuations, lactation, pregnancy, health, and nutritional status. (5). In cows, the total number of WBCs decreases with age (6). No effects of sex, stress, interactions were observed for white blood cell. The hematological profile is crucial for assessing the health status of animals and for the clinical interpretation of laboratory data, serving as a prerequisite for diagnosing various pathophysiological and infectious disorders in cattle. All animals included in the study were clinically healthy, exhibiting no signs of disease and were free from internal and external parasites. Their health status was assessed based on rectal temperature, heart rate, respiration rate, hunger, fecal consistency, and hematological profile. Normal values for different blood cell characteristics are acknowledged to differ not only among species but also between breeds within a species (8).

Breeds of cattle of lraq: AL-Janubi,AL-Shurabi,AL-Restaki, AL-Karadi . Thyroid hormones have many functions in the body(9). About 90% of the hormones released by the thyroid gland are T4, whereas only 10% are T3, the latter being a biologically active hormone (10). .Thyroid hormones are essential for fertility, embryonic development, tissue differentiation, and fetal growth (11,12). Progesterone is a steroid hormone predominantly produced by the corpus luteum and placenta (13,14). .Progesterone is produced from pregnenolone in the corpus luteum (15,16) and the placenta during pregnancy. The timing of ovulation is crucial in reproductive management in cattle, as it signifies the optimal period for mating or insemination (17, 18).

II. MATERIALS AND METHODS

A. Collection of Blood Samples

sixty (10 ml/cow) fasting blood samples were collected from cross breed cows in Kerbela Al-Hindia from jugular vein by sterile disposable syringe and then that samples were divided in two tubes each tube contain 5ml of blood sample. Samples were chilled and subsequently processed in the laboratory for analysis. The tubes were centrifuged at 3,500 rpm for 10 minutes, and the resultant sera were kept at -20°C until analysis.

B. Hematological analysis

5 ml put into EDTA tubes used for blood analysis, including RBC, Hb, MCV &MCHC, mean thrombocytes volume, Thrombocytes count, thrombocytes distribution width, , PCV and total leukocytes count ,5 ml put into another tubes used for hormonal analysis (progesterone, T3,T4).

Complete thorough clinical examination of all cows under investigation was performed according to the method described by (Kelly, 1984). Including temperature, pulse, respiration and ruminal movement. Also, Periodical rectal examination was applied to detect the expected parturition date on all cows under investigation according to the method described by (David et al., 2001).

We use veterinary thermometer to measure the body temperature of cows from rectal temperature and We use veterinary Stethoscope to estimate the respiratory rate and heart rate from cardiac dullness area.

III. Results and Discussion

A. Clinical Signs

Table 1: the normal signs appear on the tested cows

Signs	Result
Temperature	38-39℃
Respiratory rate	15-25
Parasite	Free
Mucous membrane	Bright pink
Mazzle	Moist
Skin	Clean , bright and elasticity
Skin fold	Return less than 2 seconds
Hair	Bright to ward one direction

B. Blood count results (Hematological Parameters of Iraqi cows)

Table 2: Mean ±SE of Hematological Parameters of Iraqi cows:

Blood count	Mean ±SE
RBC 106/µl	6.474±1.25
PCV %	23.11±0.32
Hb g/dl	10.39±1.41
MCV (fl)	35.824±0.56
MCH(pg)	14.88±0.43
MCHC(G/dl)	43.94±0.83
WBC 103/ µl	13.585±1.62

B. Hormonal analysis result

Table 3: Mean ±SE for Hormonal Parameters of Iraqi cows

Hormone	Mean ±SE
T3 ng/ml	1.638±0.54
T4 ng/ml	57.868±0.33
Progesterone ng/ml	4.5465±0.87

IV. Discussion

This study were preform in kerbela Al- hindia on cows 2-10 years of age that were clinically healthy with normal signs as in the table (1) and feed on green grass , the leukocytes are show in normal range as in the table (2).the packed cell volume(PCV),hemoglobin(Hb), in the normal range as in the table (2). the mean corpuscular volume (MCV), the mean corpuscular hemoglobin (MCH), the mean corpuscular hemoglobin concentration (MCHC) normal range as the table (2). put there were some different in hematologic parameters in Iraqi cows when compered to cows from another country that found in many research such as Turkish cattle This may be attributed to mechanical factors (transportation, calving methods, storage conditions of blood samples, and various blood analysis devices), physiological factors (age, nutrition, pregnancy, and breed of livestock), as well as the influences of feeding types, breed characteristics, age of cows, pregnancy status, seasonality, and transportation on parameters reported in diverse studies. In our study, we examined the hematological characteristics of cows in Iraq compared to those in Turkey. In this investigation, we obtained blood samples from calves aged two to ten years, which may account for the variation in hematologic parameters based on age. Red blood cell indices exhibited lower levels during the summer season compared to winter (19). As the temperature escalated, the body temperature of the animals likewise elevated, typically correlating with an increase in water consumption and a decrease in feed intake (20). Variations in blood parameters of cows may arise from discrepancies in storage conditions for blood samples and blood analysis instruments (21).

Blood cell characteristics and hemoglobin content exhibit minimal seasonal variation. Hemoglobin concentration, MCV, MCH, and MCHC increase during summer, but hematocrit value decreases during winter (22, 23).

MCV and MCHC decreased in response to elevated temperature; however, no alterations were observed in white and red blood cell counts, hematocrit value, or hemoglobin concentration. During the summer season, MCV and MCHC exhibited variations; however, there were no alterations in red and white blood cell counts. The pasture time resulted in a little rise in red blood cell count, white blood cell count, hemoglobin concentration, and hematocrit value. Hematological markers exhibit elevated levels during the confinement phase, when animals are restricted indoors and lack access to pasture. MCV can be utilized in hematological assessments of cattle's reaction to temperature and humidity stress (24)

Thyroid Hormones: thyroxine (T4), triiodothyronine (T3) not increase (25) as the table (3). Thyroxine concentrations were elevated in non-pregnant individuals compared to those in the pregnant state (26, 27). Indicated that cyclic heifers exhibited elevated blood concentrations of T3 and T4 (28). At cold temperatures, the basal metabolism of animals elevates to produce heat by enhancing T3 production. At elevated temperatures, the contrary occurs (29).

Serum T3 levels in adapted or introduced bovines in tropical settings (30) were lower than those in bovines from temperate regions, suggesting that a hot environment may lead to reduced production of thyroid hormones as a mechanism for thermoregulation (31). Cows in tropical highlands,

characterized by high altitude and low temperatures, exhibit elevated T4 levels compared to those in warmer tropical locations (32). A substantial increase in progesterone (33) is indicated in table (3). Owing to variations in sample frequency, seasonal and climatic conditions during sampling, as well as the age and physiological status (lactating or non-lactating) of the animals (34). Numerous investigations have indicated that progesterone concentrations during heat stress may be elevated, diminished, or comparable to those observed under cooler conditions in seasonal analyses (35). The reduction in plasma progesterone concentration was directly correlated with heat load and not necessarily attributable to dietary or metabolic alterations generated by heat stress (37).

CONCLUSION

This study was determine the normal levels of RBC and WBC. In addition measurements some hormone (T3,T4 and Progesterone) in iraqi cow and compare the result with turkish cow. RBC lower than normal level, WBC higher than normal level, Thyroid hormones (T3,T4) normal and Progesterone normal .

Also This work consider as a source for researcher about normal blood parameters in different season, comparative study between Iraqi and turkish cows in normal blood parameters and comparative study between cow and bull.

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