

## **EFFECT OF SEASON ON SOME HEMATOLOGICAL, BIOCHEMICAL AND SOME HORMONE OF LOCAL IRAQI BLACK FEMALE GOATS**

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### **ABSTRACT**

This study was conducted at animal farm / Collage of Agriculture, Basrah University, during the period from April to December . A total of 8 blood samples were taken from dry female goats at (2.5-3.5) years old during first day of April , July , October , December months .The aim of this study to evaluate the effect months of year on blood (WBC , RBC, PCV and Hb) and biochemical parameters (Fe , Phosphate, Albumin, Total protein, Cholesterol and Glucose in addition to some hormones like Estrogen and thyroxin. The present study resulted that there were significant ( $P<0.05$ ) increase in blood red cell count , total white blood cell number , and monocytes percentage in summer compared with spring and winter . Hemoglobin concentration and PCV percentage were significantly ( $P<0.05$ ) increased in summer compared with other seasons. Iron concentration was highly significantly ( $P<0.05$ ) increased in summer and autumn in comparison with other seasons. The results also showed that there were significant ( $P<0.05$ ) increase in Estrogen and decrease in thyroxin hormone concentration in summer compared with other seasons.

### **INTRODUCTION**

Goat is a multipurpose animal; it produces milk, meat, skin and fiber (9) . Seasonal heat and cold stress have profound effects on some hematological and serum biochemical parameters (16). Heat stress causes depression in feed intake and utilization, disturbance in the metabolism of water, protein, energy and mineral balances, enzymatic reactions, hormonal

secretions and blood metabolites (12,15). In addition to assess the metabolic condition of animals, hematological and biochemical parameters could be affected by many factors including: sex, age and reproductive status (2,4) .

Thyroid gland is one of the most sensitive organs to the ambient heat variation. It has been shown that thyroid hormones are important modulators of developmental processes and general metabolism (16). Changes in environmental temperature stimulate alterations in thyroid stimulating hormone (TSH) secretion and in the serum concentrations of thyroid hormones and their metabolism (22).

The aim of this study was to determine the changes in blood parameters in seasons in Iraqi black local goats because the hematology and serum biochemistry are becoming increasingly important diagnostic tools.

## **MATERIALS AND METHOD**

The present trial carried out at the animal's farm of Agriculture Collage of Basrah University . Iraq for different seasons .Eight dry female goats were used aged (2.5- 3.5) years . Blood samples were collected at the end of April , June , October and December . Seven ml of blood was taken from each animal two ml was poured in sterile test tube with anti-coagulant EDTA ( Ethylene Diamine Tetra Acetic Acid ) used for hematological analysis , other blood (5 ml) was centrifuged to isolate blood serum to estimate biochemical and hormones measurement .

Included Red Blood Cell (RBC) count with help of hematocytometer (Neubaure – Improved double) Hemoglobin (Hb) concentration with help of Sahle opposes and Packed Cell Volume (PCV) by use method of (19) . The total and different number of White Blood Cell (WBC) count were determined by the use of method of (5) .

Included the total cholesterol , total protein concentration were determined by used chemical kit of ( bio merieux – France) concentration of albumin , ferrous , phosphate were determined by using chemical kit of ( biochemical – Germany ) . Glucose concentration by using chemical kit of (plasmatic – England) .

The thyroid and estrogen hormone were determined by using chemical kit (Monobind Inc – USA) by using the procedure associated with the kit .Data was statistically analyzed by using SPSS program (20).

## RESULT

Table (1) showed significant ( $P<0.05$ ) increase in erythrocytes count in summer compared with spring and winter , hemoglobin concentration was significantly ( $P<0.05$ ) increased in summer and autumn compared with other seasons . The significant ( $P<0.05$ ) increase of packed cell volume in summer compared with other seasons .

Table (1): Effect of season on blood parameters of Iraqi black local goats (Mean  $\pm$  SE)

Trails Season	RBC (ml/ 10 <sup>6</sup> )	Hb (g/100ml)	PCV (%)
Spring	5.62 bc 0.16 $\pm$	6.31 b 0.18 $\pm$	23.00 b 0.18 $\pm$
Summer	7.22 a 0.36 $\pm$	9.02 a 0.48 $\pm$	29.75 a 1.22 $\pm$
Autumn	6.38 ab 0.18 $\pm$	8.23 a 0.26 $\pm$	25.80 b 0.69 $\pm$
Winter	4.65 c 0.14 $\pm$	5.56 b 0.39 $\pm$	15.39 c 0.41 $\pm$

Different later within the Colum means significant difference ( $P<0.05$ ) between season.

RBC: Red blood cell

Hb: Hemoglobin

PCV: Packed cell volum

Table (2): Effect of season on White Blood Cell (RBC) count and different number in serum of Iraqi black local goats (Mean  $\pm$  SE)

trails season	WBC (ml/10 <sup>3</sup> )	Lymphocytes (%)	Monocytes (%)	Granulocytes (%)
Spring	5.18 b 0.12 $\pm$	54.35 0.77 $\pm$	14.61a 0.08 $\pm$	31.04 0.28 $\pm$
Summer	6.88 a 0.23 $\pm$	55.20 1.85 $\pm$	15.05 a 0.70 $\pm$	29.74 1.33 $\pm$
Autumn	6.90 a 0.32 $\pm$	61.92 1.27 $\pm$	12.29 a 0.26 $\pm$	25.78 1.42 $\pm$
Winter	5.31 b 0.88 $\pm$	62.50 0.66 $\pm$	7.10 b 0.17 $\pm$	30.30 1.82 $\pm$

Different later within the Colum means significant difference ( $P<0.05$ ) between season

The table (2) shows significant ( $P<0.05$ ) increase in total count of leukocytes in summer and autumn compared with other seasons. The monocytes decreased significantly ( $P<0.05$ ) in winter compared with other seasons.

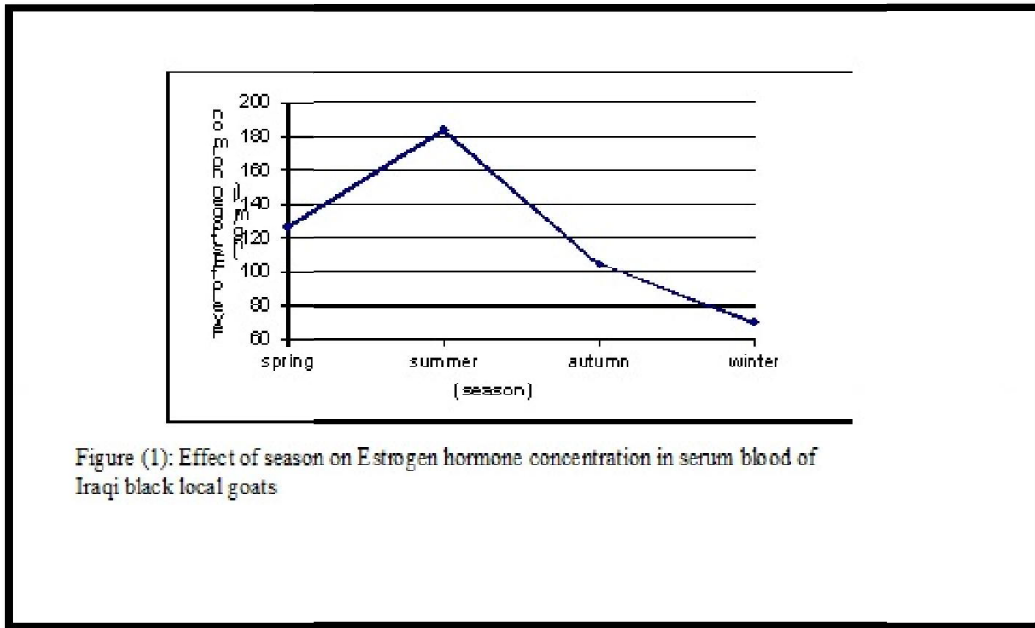
Table (3) shows the value of Fe which was significantly higher ( $P<0.05$ ) in spring compared with other seasons. The value of cholesterol significantly ( $P<0.05$ ) increased in summer compared with spring and winter . The glucose value was significantly ( $P<0.05$ ) decreased in spring compared with summer and autumn.

**Table (3): Effect of season on biochemil parameters in serum of Iraqi black local goats (Mean  $\pm$  SE)**

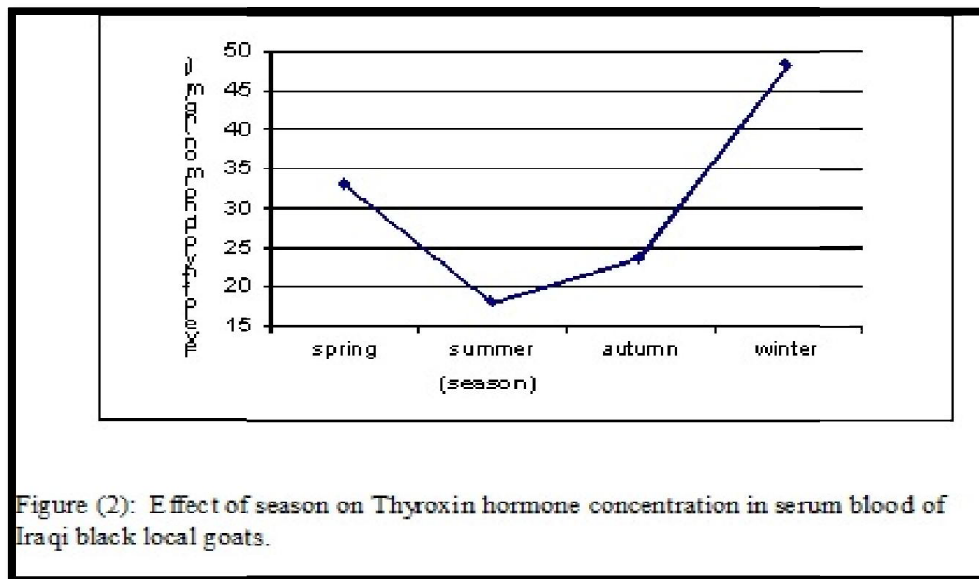
Trails Season	Fe $\mu\text{g} / 100\text{ml}$	Phosphat e $\text{mg/l}$	Albumin $\text{g}/100\text{ml}$	Total protein $\text{g}/100\text{ml}$	Cholesterol $\text{mg}/100\text{ml}$	Glucose $\text{mg}/100\text{ml}$
Spring	128.30 a 9.82 $\pm$	40.12 5.48 $\pm$	3.71 0.29 $\pm$	6.06 0.62 $\pm$	35.39 c 6.38 $\pm$	83.17 b 6.31 $\pm$
Summer	89.56 b 16.98 $\pm$	44.56 5.73 $\pm$	4.45 0.67 $\pm$	5.38 0.94 $\pm$	74.97 a 9.71 $\pm$	106.92 a 12.31 $\pm$
Autumn	102.85 b 14.90 $\pm$	37.75 2.65 $\pm$	3.33 0.37 $\pm$	5.42 0.61 $\pm$	64.75 ab 5.11 $\pm$	104.70 a 3.83 $\pm$
Winter	83.39 b 17.02 $\pm$	37.44 8.01 $\pm$	4.26 0.95 $\pm$	5.91 0.84 $\pm$	53.05 b 10.62 $\pm$	90.42 ab 8.24 $\pm$

Different later within the Colum means significant difference ( $P<0.05$ ) between season

Estrogen hormone curve (Figure 1) shows that concentration of hormone was highly significant ( $P<0.05$ ) in spring and summer compared with both autumn and winter seasons . This value of concentration increased significantly ( $P<0.05$ ) in summer when compared with other seasons.



Thyroxin hormone concentration curve in figure 2 observe highly significant increase ( $P < 0.05$ ) value present in winter and spring in comparison with both summer and autumn seasons.



## DISCUSSION

The increased erythrocytes and hemoglobin concentration and PCV due to hypoxemia in summer season produced low oxygen concentration in air, the absolute O<sub>2</sub> concentration changes a few percent from day to day with changes in barometric pressure and temperature. As barometric pressure decreases, or as temperature increases, air expands and the number of O<sub>2</sub> molecules per unit volume decreases, the physiological polycythemia occur where the atmospheric oxygen is low, so the blood forming organ automatically produce large quantities of extra red blood cells ( 11 )

Many reporters suggested that in summer season increase blood oxygen carrying capacity changing erythrocyte numbers and hemoglobin concentration (8). The higher value of hematocrit has been reported to be an adaptive mechanism to provide water necessary for evaporations and cooling process ( 7).

The increased total white blood cells (WBC) count in summer and autumn compared with spring and winter seasons was mainly attributed to hot season (14) . Pathogens during hot season may contribute in blood viscosity which leads to allergic effects that induce WBC production ( 17).

The increase in monocytes in hot season may be associated with the increase in cortisol secretion, monocytes response to elevation of cortisol steroid concentration in blood (1).

Increase in Fe concentration in spring season compared with other seasons may be due to availability of green food and the animal take enough quantity of food, these warm season perennial grasses start growing in spring as air and soil temperatures increase (3).

Increase in blood cholesterol concentration during summer season may be due to variations in thyroidal activity at different seasons, as exposure to low environmental temperature stimulates the secretion of thyroxin. These results are similar to those of (6) on dairy cattle.

Glucose concentration increased in summer compared with its concentration in spring. (21) suggested that the increase in plasma glucose during hot conditions may be due to the decrease in the glucose utilization, depression of both catabolic and

anabolic enzyme secretions and subsequent reduction metabolic rate, or may be heat and cold stress increased cortisol secretion , primary functions was to increase blood sugar through gluconeogenesis suppress the immune system and aid in fat, protein and carbohydrate metabolism (13).

The increase of estrogen concentration in summer as present due to positive correlation relationship between season that had long photo period and increasing gonadotropin hormone in serum (10). Many investigators have reported that the higher body temperature during exposure to heat stress is associated with depression in thyroid gland activity resulting in a lowering of thyroid hormones level (18,22).

## Conclusion

From our results , we concluded that summer season cause stress on goats , where , increase in blood parameters and some of biochemical parameters as cholesterol and glucose , while decreased Thyroxin hormone . Spring season improved Fe concentration and Thyroxin hormone in blood of Iraqi black local goats.

## تأثير الموسم على بعض المعايير الدموية والكيميائية وبعض الهرمونات لاناث الماعز المحلي الأسود العراقي

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## الخلاصة

اجريت الدراسة في الحقل الحيواني / كلية الزراعة ، جامعة البصرة في الفترة بين نيسان و كانون الاول. جمعت عينات من ثمانية اناث الماعز المحلي الاسود العراقي جافة تراوحت اعمارها بين (2.5- 3.5) سنة عند الاول من اشهر نيسان ، تموز ، تشرين الاول و كانون الاول . هدفت الدراسة لمعرفة تأثير اشهر السنة في المعايير الدموية ( كريات الدم الحمر ، خلايا الدم البيض ، حجم الخلايا المرصوص وتركيز الهيموجلوبين ) وتركيز بعض المعايير الكيميائية ( عنصر الحديد ، الفوسفات ، الاليومين ، البروتين الكلي ، الكولسترول ، الكلوكوز ) فضلا عن بعض الهرمونات كالاستروجين والثايروكسين. اظهرت نتائج الدراسة وجود زيادة معنوية ( $P<0.05$ ) في كريات الدم الحمر ، العدد الكلي لخلايا الدم البيض ونسبة الخلايا الاحادية في الصيف بالمقارنة مع الشتاء . زاد معنويا" ( $P<0.05$ ) تركيز الهيموجلوبين ونسبة حجم الخلايا المرصوص في الصيف

بالمقارنة مع المواسم الاخرى . تركيز عنصر الحديد كان اعلى معنويا" ( $P<0.05$ ) في الصيف والخريف مقارنة مع المواسم الاخرى . اظهرت النتائج ايضا" حصول زيادة معنوية ( $P<0.05$ ) في تركيز الاستروجين وانخفاض معنوي ( $P<0.05$ ) في تركيز الثايروكسين في الصيف بالمقارنة مع المواسم الاخرى .

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