INVESTIGATIONAL STUDY TO CHANGES OCCUR IN CONCENTRATION OF BLOOD SERUM PROTEIN DURING PREGNANCY IN IRAQI COW

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ABSTRACT

A study was conducted on (35) healthy Frisian cow aged (2-4) years and were grown in farms in Al-zubair region, in Basrah city This study was performed to find the effect of pregnancy on blood serum protein concentration (Total protein, Albumin, Globulin, Globulin fractions (α, β, γ).

The result revealed there was significant elevation ($P<0.01$) in concentration of Total protein, Albumin, Globulin, α, γ, Globulin between non pregnant and pregnant animal in 8^{th} month. And there was no significant change occur on β, Globulin concentration.

When compared the result between the 8^{th} and 9^{th} month of pregnant the result revealed very significant decrease ($P<0.01$) in the concentration of Globulin, α, γ, Globulin and significant decrease ($P<0.05$) in the concentration of Total protein, while significant increase in Albumin concentration, in the 9^{th} month of pregnant, and there was no significant change in β, Globulin concentration.

INTRODUCTION

The pregnancy have more clearly effect on concentration of blood proteins, which find significant effect to pregnancy in concentration on blood serum protein in all species of animal. 1,2,3,4. many researched study the effect of pregnancy on blood serum proteins, one of these studies (1) in mars which appear that there is a tendency for albumin to decrease on the one hand and a globulin increase in the other hand during pregnancy. and total serum protein increased during 2-3 weeks before parturition then suddenly decrease occur and continue gradually to reach limited levels through two week after parturition.

In other study the result show the similar effects of pregnancy which increase concentration of total serum protein in pregnant mars through second third of pregnant and (5).

In cows it seen increase in the concentration of total serum protein and globulin through pregnancy period (6). And it's the same result which appear in study of (2) which he note that the concentration of total protein increase through pregnancy period specially during two months before parturition and reach to high level during month before parturition the occur suddenly decrease in month of parturition, while the albumin reach to low limit through middle of pregnant the increase gradually to reach to the level which it concentration the normal limit and stay in this level until time of parturition.

In new studies give the same result study of (7) on Mozambique cows which appear that the concentration of total serum protein in high levels in pregnant cows in compare with non pregnant cows.

MATERIAL AND METHODS

This study consist of 35 Frisian cow aged 2-4 years grown in several farms in AL-Zubair region, Basrah city clear from clinical disease through veterinary diagnosis and administration drug against internal parasite and vaccine against disease.

The animal divided in to seven groups each group consist of five animal , the first group contain non pregnant animal, second group animal in the fourth month of pregnant, third group animal in the fifth month, fourth group animal in the sixth month of pregnant, fifth group contain animal in the seventh month, sixth group animal in the eighth month, seventh group animal in the ninth month of pregnant and use to measured the effect from the fourth month due to the fetus high development is begin in the fourth month as the third stage of pregnant which consist of three stages ovulation organs development and at last fetus development (8) .

Blood samples collected from the jugular vein in a mount 10ml put in sterilized test tube not contain anticoagulant and saved in cold container to prevent damage of samples until reach to the laboratory to make suitable analysis on it, the samples put in the centrifuge speed 1200 cycle/min to separated blood serum from other coagulant compounds .

The concentration of total protein and albumin measured in the serum by burite way (9) and globulin and its fractions by electrophoresis as come in (10).

The result of electrophoresis read by scanner which read the percentage of protein as in the equation:-

$$\text{amount of protein /1litter of serum} = \text{protein percentage\%} = \frac{\text{amount of total protein/1000 ml serum}}{1000}$$

statistical analysis:-

the result of studies sample analysis by statistical program SPSS(11)

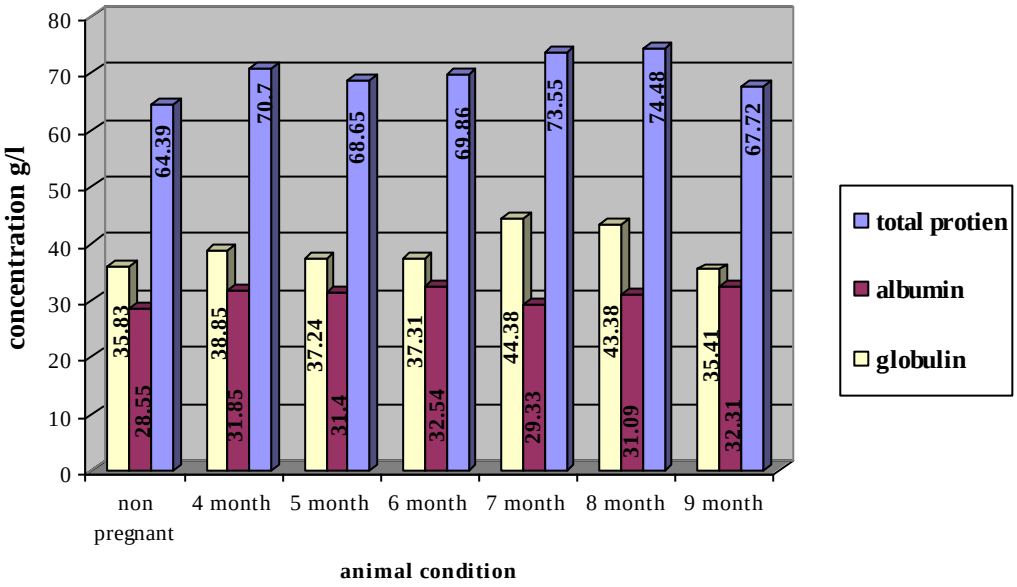
RESULTS

In general the result displayed significant a visible increase in concentration of serum proteins (Total protein, albumin, globulin, and globulin fractions (α, γ) particularly in the seventh and eighth month of pregnant, while never see any significant change in the concentration β-globulin, while in the ninth month of the pregnant the result displayed significant decrease in the concentration of serum proteins (Total protein, globulin, and globulin fractions (α, γ),except the albumin which displayed significant increase in the concentration and never see significant change in concentration of β-globulin Table(1), Fig(1,2).

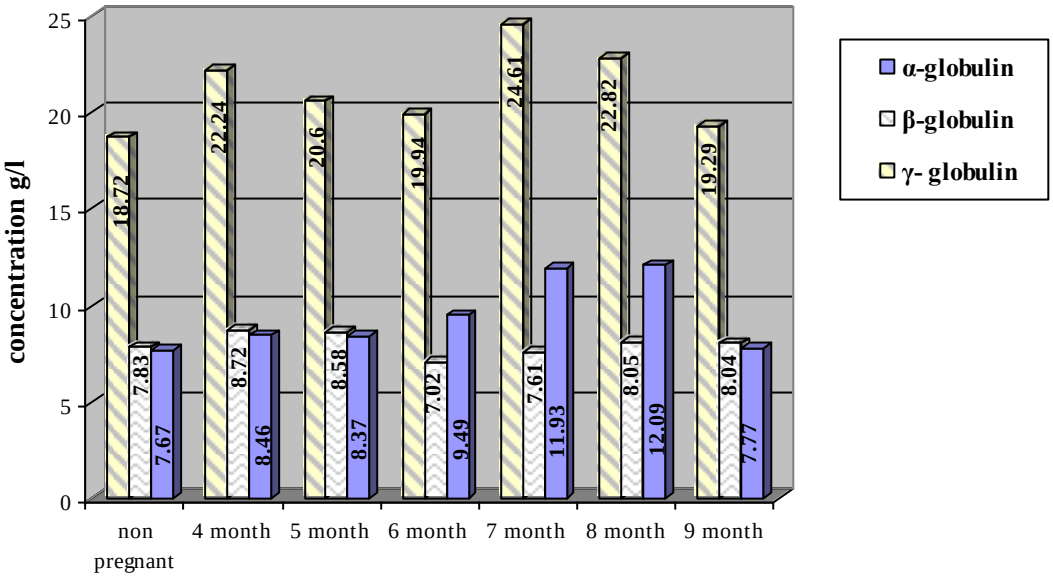
Table (1) The mean concentration of serum proteins g/l during studied pregnancy month for pregnant and non pregnant animal ± SD

parameters / Pregnant	protein	albumin	globulin	globulin fractions		
				α	β	γ
4 month	70.706^{abc} ±1.691	31.852^{ab} ±3.416	38.854^{abc} ±3.507	8.468^{b} ±.293	8.728 ±.767	22.246^{abc} ±2.568
5 month	68.652^{bcd} ±1.450	31.408^{abc} ±2.104	37.244^{bc} ±2.640	8.374^{b} ±.669	8.580 ±.350	20.606^{bc} ±3.393
6 month	69.864^{abc} 3.315	32.548^{a} 1.505	37.316^{bc} 3.817	9.498^{b} .968	7.026 ±1.279	19.940^{bc} ±2.391
7 month	73.554^{ab} ±3.497	29.330^{bc} ±.942	44.224^{a} ±3.809	11.934^{a} ±2.092	7.618 ±1.072	24.416^{a} ±5.455
8 month	74.480^{a} ±3.720	31.093^{abc} ±0.851	43.386^{ab} ± 4.458	12.094^{a} ±2.059	8.056 ±0.798	22.826^{ab} ±1.874
9 month	67.728^{cd} ±4.544	32.310^{ab} ±0.786	35.418^{c} ±4.458	7.778^{b} ±0.998	8.048 ±1.704	19.292^{bc} ±0.899
Total mean	70.830 ±3.036	31.423 ±1.600	39.407 ±3.781	9.691 ±1.179	8.009 ±0.995	21.554 ±2.763
Non pregnant	64.390^{d} ±1.224	28.556^{c} ±.221	35.834^{c} ±1.356	7.676^{b} ±0.404	7.830 ±0.745	18.722^{c} ±0.761

Fig(1) indecator of incraesing in mean concentration of blood protein parameters during studied pregnancy month



Fig(2) indecator of incraesing in mean concentration of globulin fractions during studied pregnancy month



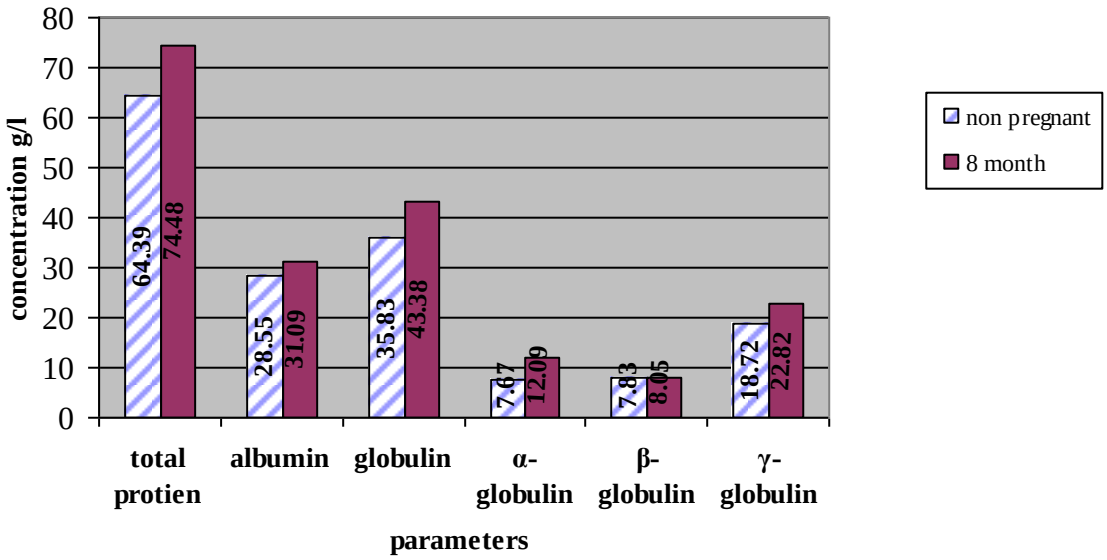
The mean values of total protein, albumin, globulin and globulin fractions (α, γ) of non pregnant animal and animal in the eighth month of pregnant are compared, it is evident that there are very significant differences in this parameters, whereas the differences in the concentration of β- globulin is not significant (Table 2, Fig 3)

Table (2) mean concentration of serum proteins in non pregnant animal and animal in the eighth months of pregnancy ± SD

parameters / Pregnant	protein	albumin	globulin	globulin fractions		
				α	β	γ
8 month	**74.480[a] ±3.720**	**31.093[a] ±0.851**	**43.386[a] ± 4.458**	**12.094[a] ±2.059**	**8.056 ±0.798**	**22.826[a] ±1.874**
Non pregnant	**64.390[b] ±1.224**	**28.556[b] ±.221**	**35.834[b] ±1.356**	**7.676[b] ±0.404**	**7.830 ±0.745**	**18.722[b] ±0.761**

*Different letters mean significant change P<0.01

Fig (3)indicator of change in concentration of blood serum protein between non pregnant and pregnant animal in the 8 month of pregnant



If the result obtained in the eighth and in the ninth months of pregnancy in the same way, it can be noted that in the ninth month of pregnancy the concentration of globulin ,α-globulin, γ-globulin a very significantly decrease in the concentration, the total protein concentration is significantly decrease, while the albumin concentration is significantly increase, and the change in the β-globulin concentration not significant.(Table 3,Fig 4)

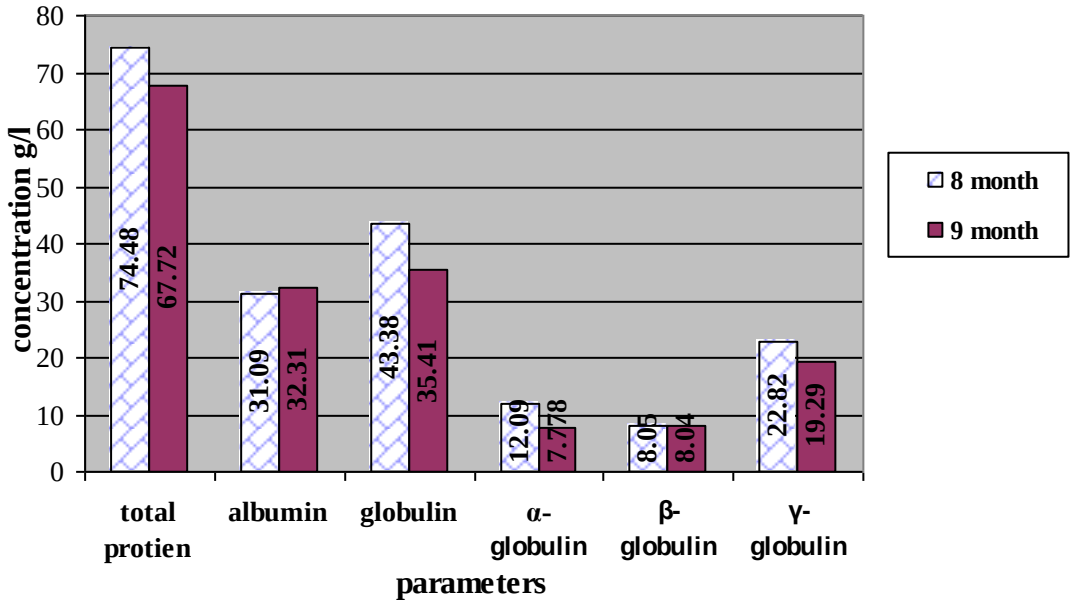
Table (3) mean concentration of serum proteins in animal and animal in the eighth and ninth months of pregnancy ± SD

parameters / Pregnant	protein	albumin	globulin	globulin fractions		
				α	β	γ
8 month	**74.480[a**] ±3.720**	**31.093[a**] ±0.851**	**43.386[a*] ± 4.458**	**12.094[a*] ±2.059**	**8.056 ±0.798**	**22.826[a*] ±1.874**
9 month	**67.728[b] ±4.544**	**32.310[b] ±0.786**	**35.418[b] ±4.458**	**7.778[b] ±0.998**	**8.048 ±1.704**	**19.292[b] ±0.899**

* Different letters mean significant change P<0.01

** Different letters mean significant change P<0.05

Fig (4) compair between mean concentration of blood protein parameters through 8 and 9 month of pregnant



DISCUSSION

The aim of this study was to investigate how the physiological condition (pregnancy) of cow affect the concentration of blood serum proteins and its fractions.

The result of this study appear significant increase in some serum protein (total protein, albumin, globulin and its fractions (α, γ-globulin) and there is no significant change in concentration of β-globulin, this result were agreement with result of other studies (2,6 ,7,12).

This increase in the concentration of serum protein through pregnancy refer to needs of mother to built fetus body tissues which consist in general from proteins so this push the mother body to increaser production to supply needs proteins (13), the animal need to support uterus tissue which increase gradually during pregnancy (14)

Also this study appear that the high increase in the concentration occur in the 7^{th} and 8^{th} month of pregnancy to total protein, globulin and it fraction(α, γ), refer to increase amino acids reach from tissue and muscles to blood in one hand and increase mother fed intake to balance between this operation due to high development of fetus in this stage (15,16), while there is decrease in the albumin concentration in the same period due to high globulin concentration(17) in this stage so work as balance between both and this result of this study will agreement with result of other studies on different species of animal in happen increase in serum protein concentration during pregnancy like study of (18) on buffalo and (19)on camels (20)on sheep.

When compare the result between 8^{th} and 9^{th} month of pregnancy the result appear significant decrease in the concentration of total protein, globulin and its fraction (α, γ) in 9^{th} month of pregnancy and this due to many reasons one of them the fetus high proteins requirement to built his tissue in the last month cause decrease protein concentration in mother blood(14), convert liver protein production to product milk proteins (21) (6), accumulation of globulin in colostrum as immunoglobulin which begin in accumulation of globulin in serum in the 8^{th} month of pregnancy and the accumulated in the udder mammary glands in the 9^{th} month in colostrum, which investigate of globulin in colostrums by analysis colostrum by electrophoresis which give clear picture to high concentration of globulin in colostrum .(6)

This result appear in other hand significant increase in the concentration of albumin as balance to decrease immunoglobulin in this period (17).

دراسة استقصائية للتغيرات الحاصلة في تركيز بروتينات مصل الدم خلال فترة الحمل في الأبقار العراقية

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الخلاصة

أجريت الدراسة على 35 بقرة بعمر 2-4 سنة نوع فريزيان مضربة ، خالية من الأمراض سريريا ومتواجدة في عدد من مزارع قضاء الزبير- مدينة البصرة لمعرفة تأثير الحمل في تركيز بروتينات مصل الدم البروتين الكلي (Total protein)، الألبومين (Albumin)، الكلوبيولين (Globulin) وأجزاءه (ألفا وبيتا وكاما- كلوبيولين) .

أظهرت النتائج ارتفاعا معنويا($P<0.01$) في تركيز كل من البروتين الكلي والألبومين والكلوبيولين وأجزاءه (ألفا وبيتا وكاما- كلوبيولين) بين الحيوانات غير الحوامل و الحوامل إلى الشهر الثامن من الحمل، بينما تركيز البيتا كلوبيولين لم تظهر النتائج أي تغيير معنوي فيه.

أظهرت نتائج مقارنة تركيز البروتين الكلي والألبومين والكلوبيولين وأجزاءه خلال الشهر الثامن والتاسع من الحمل وجود انخفاض معنوي($P<0.01$) في تركيز الكلوبيولين وألفا والكاما كلوبيولين وانخفاض معنوي($P<0.05$)في تركيز البروتين الكلي ،بينما كان ارتفاع معنوي($P<0.05$) في تركيز الألبومين في الشهر التاسع مقارنة مع الشهر الثامن من الحمل ولم تظهر النتائج أي اختلاف في تركيز البيتا كلوبيولين .

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