

## EFFECT OF PARITY NUMBER ON SOME CHEMICAL COLOSTRUM CONSTITUENTS THROUGH COLOSTRAL DAY AMONG LAMBING EWES.

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### ABSTRACT

To study the influence of lambing number on some chemical compositions of colostrum through three colostral day. The current work has been conducted in the ruminant station rearing\ agricultural research department by using 20 pregnant Awassi ewes in the two parities first and fourth parity. According to their parity, ewes were divided into two groups. 10 ewes for each group have been subjected to the same management of nutrition, housing and veterinary care. Colostrum were collected from each ewe two hours after lambing which considered as first day of the gathering. The second and third samples were collected in second and third day after lambing at the same time of first collection.

Colostrum components were analyzed using Milkoscan device for indicated levels of fat, protein, solid nonfat and lactose in the three colostral days.

Results show mathematically increase in the first day than other colostral day in levels of fat, protein and solid nonfat. However lactose was decline mathematically in the first day.

Significant elevation  $P < 0.05$  had been detected in fat and protein at first than fourth parity

It had been concluded that Chemical composition level of colostrum (fat, protein, SNF and lactose) of Awasse ewes at first day in the primiparous and multiparous ewes with the line of pervious studied.

. No significant changes of these constituents among colostral day.

Yield of colostrum affect composition causing significant elevation in the fat and protein level in the first parity.

## INTRODUCTION

Ennobled creations will produces colostrum just before birth. It is the first milk after lambing with full value of nutritional factors, immune factors and growth factors. Blood contents are the sources of its constituents (1,2) Colostrum is astoundingly loaded in proteins which involved immunoglobulin (Ig), casein and albumin, vitamin A, and sodium chloride, with a small quantities of carbohydrates, lipids, and potassium than mature milk. (3, 4) The most relevant bioactive constituents in colostrum are antimicrobial factors and growth factors. Its paramount for newborns at the birth with lacking in passive immunity wherein placenta prior birthing (5) The antibodies in colostrum provide passive immunity, while growth factors trigger the motivates of the gastrointestinal tract. They are transit to the newborn and equip the primary defiance against pathogenic microorganisms. Ig concentration the highest at parturition and decrease immediately with each milking. (6,7) Since the intestine losses its ability to absorbed immunoglobulin after 48 hours will ingest it as protein, the neonatal must drink colostrum within six hours after birth immediately to maximal absorption of antibodies (8).

The composition of colostrum from growth factors insulin-like growth factors (IGF-I & IGF-II) and growth hormone (GH). IGF-I, as natural components of colostrum, make it good source for build lean muscle. (9).

Colostrum quality depends on its content from immunoglobulin, and this varies doubtless among different breed, individual animal, parity which is important factor for variation in immunoglobulin. Muller and Ellinger (1981) conclude the first calf heifer contain low concentration of immunoglobulin and its increase with progress parity. (10,11). Beside the parity the research conclude weight of first-milking colostrum to be the most important discerning between colostrum of low (<50 g/L) and high ( $\geq 50$  g/L) IgG1 concentrations.

The major immunoglobulin in the colostrum are IgG which act as primary transferring the passive immunity to newborn, IgA act as protection of mucosal intestine from microorganism attacking the surface cell (12) and IgM act as primary protective mechanism against septicemia fixes complement and is the major agglutinating antibody. (13).

The express altering in their composition level appears through three or four days after parturition. The differences in the chemical composition concentration of colostrum relies to species, breed, parity, age health status, litter size, period of dryness and. Seasonal changes are associated with feeding in the cattle. (1,14,15). In broadly, its protein concentration higher than in milk. While Fat concentration is substantially higher in colostrum than in milk in some species, e.g. sheep (16) and horses, (17,18) but lower in colostrum than in milk in some other



species, e.g. camels(17) and humans.(9) Fat concentration in bovine colostrum is extremely variable.(11)

The purpose of this study to determine the impact of lambing order on some chemical compositions of colostrum through three colostrum days.

## MATERIAL AND METHODS

### Animals

This study was carried out at ruminants rearing station, Department of State Board for agricultural researches in Baghdad. Twenty pregnant ewes at first and fourth parity were selected randomly from flock of 50 ewes. Their gestation periods were 120- 135 day.

Ewes were divided according to their parity into two groups. 10 animals for each group, which housed in half-open yards in an area of 25 m<sup>2</sup> they have been subjected to one environmental condition and food.

### Animal's nutrition

Group feeding methods were used in two equal meals every 12 hours. This feeding was divided into concentrated feed (14% protein) and roughage. Concentrated feed were provided to animals at the ratio of 2% of body weight. It consists of 37% barley, 20% Yellow corn, 5% soya meal, 35% wheat bran, 2% limestone and 1% salt. While roughage consists of good sufficient quantities of hay.

The salt licks were present to animals always. Studying animals were freely grazing for 2- 3 hours daily in the pastures for exercise and exposure to sunlight to cover food requirements.

### Colostrum collection

Colostrum samples (approximately) 50 ml from each ewe collected by hand milking into plastic bottles after two hours of lambing (19), which considered first sample, as well as after 24 hours and 48 hours of birth. Samples were taken in same technique.

Milkoscope - Julie Z7 Europe .Scope Electric was used to determine colostrum fat, total protein, solid nonfat (SNF), and lactose within 3 days to compare the effect of parity on colostrum composition.

### Statistical analysis

Collected data were tabulated and statistical analyses were done using the computer data processing (SPSS, version 18). A probability value (P) of < 0.05 was considered to be statistically significant.

T test analysis accreditate in this study to compare differences between the means of colostrum constituents (fat, protein, solid nonfat, and lactose) within three days among two parities under study.

## RESULTS

Result of chemical composition of colostrum at first day was show in the table 1 which emerges the mean level of fat and protein (12.963 and 7.713) of first parity appears significant differences  $P < 0.05$  than those of fourth parity (11.189 and 6.4800) respectively.

While the level of lactose in the first parity and fourth parity was 3.051 and 0.571 respectively. So SNF level was 19.031 and 17.815 of first and fourth parity respectively which appears no statistical differences between these compositions of colostrum.

**Table 1: Effect of parity on chemical composition of colostrum at first day of colostral days among ewes.**

colostrum composition%	parity	mean	s. d	T test	P value
Fat	1 <sup>st</sup> parity	12.963	3.90047	2.750	0.022 *
	4 <sup>th</sup> parity	11.189	2.274		
Lactose	1 <sup>st</sup> parity	3.051	0.818	0.123	0.903
	4 <sup>th</sup> parity	3.012	0.571		
SNF	1 <sup>st</sup> parity	19.031	4.35046	0.901	0.391
	4 <sup>th</sup> parity	17.815	3.14184		
Protein	1 <sup>st</sup> parity	7.713	1.0997	2.797	0.021 *
	4 <sup>th</sup> parity	6.4800	1.29080		

\* mean significant differences at level of  $P \leq 0.05$  between the two parities in the same object.

Table 2 shows mean level of fat 12.485 of first parity appears high significant differences  $P < 0.01$  than fat of fourth parity (9.032), whilst the level of lactose, SNF and protein of first parity were 3.270, 15.583 and 5.195 respectively compared to their levels in the fourth parity 3.102, 12.726 and 4.729 respectively, which records no significant differences between these composition of colostrum in the second day among ewes.



**Table 2: Effect of parity on chemical composition of colostrum at second day of colostral days among ewes.**

Colostrum Composition %	parity	mean	s. d	T test	P value
Fat	1 <sup>st</sup> parity	12.485	3.486	2.987	0.007 **
	4 <sup>th</sup> parity	9.032	1.097		
Lactose	1 <sup>st</sup> parity	3.270	0.869	0.874	0.393
	4 <sup>th</sup> parity	3.102	0.44		
SNF	1 <sup>st</sup> parity	15.583	4.26978	0.621	0.550
	4 <sup>th</sup> parity	12.726	1.86874		
Protein	1 <sup>st</sup> parity	5.195	0.999	1.097	0.064
	4 <sup>th</sup> parity	4.729	0.98746		

\*\* mean high significant differences at level of  $P \leq 0.01$  between the two parities in the same object.

The table 3 shows high significant differences  $P < 0.01$  in the level of colostrum fat lactose and protein of first parity (12.06, 3.785 and 5.784) respectively than those of fourth parity (8.087, 3.420 and 4.187) in the third day of colostrum days among studying ewes, whilst no significant differences between studying parities in the level of SNF.

**Table 3: Effect of parity on chemical composition of colostrum at third day of colostral days among ewes.**

Colostrum composition %	parity	mean	s. d	T test	P value
Fat	1 <sup>st</sup> parity	12.06	3.072	2.993	0.0078 **
	4 <sup>th</sup> parity	8.087	2.85998		
Lactose	1 <sup>st</sup> parity	3.785	0.702	3.851	0.001 **
	4 <sup>th</sup> parity	3.420	0.299		
SNF	1 <sup>st</sup> parity	14.163	2.60983	0.198	0.847
	4 <sup>th</sup> parity	11.346	0.99769		
Protein	1 <sup>st</sup> parity	5.784	1.3749	3.5503	0.0023 **
	4 <sup>th</sup> parity	4.187	0.36475		

\*\* mean high significant differences at level of  $P \leq 0.01$  between the two parities in the same object.

At the total mean of colostrum composition shown in the Table 4 which emerges the mean of level of fat and protein (12.502 and 6.230) of first parity appears significant differences  $P < 0.05$  than those of fourth parity (9.436 and 5.132), while there is no statistical differences between others colostrum composition of colostrum days.

**Table 4: Effect of parity on chemical composition of colostrum through three colostral days among ewes.**

Colostrum Composition%	parity	mean	s. d	T test	P value
Fat	1 <sup>st</sup> parity	12.502	3.486	2.391	0.0314 *
	4 <sup>th</sup> parity	9.436	2.07		
Lactose	1 <sup>st</sup> parity	3.435	0.794	0.786	0.442
	4 <sup>th</sup> parity	3.211	0.436		
SNF	1 <sup>st</sup> parity	16.259	3.73	1.718	0.109
	4 <sup>th</sup> parity	13.962	1.99		
Protein	1 <sup>st</sup> parity	6.230	1.15	2.407	0.0285 *
	4 <sup>th</sup> parity	5.132	0.87		

\* mean significant differences at level of  $P \leq 0.05$  between the two parities in the same object.

## DISCUSSION

The table 1 shows high level of fat, SNF and protein at the first day of colostral days in the both parities 12.963- 11.189, 19.031- 17.815, 7.713- 6.480, 6.68- 6.19 respectively, with the line of (20) reported the high level of fat in the early postpartum in the ewes 13%. Likewise the mean of fat SNF, and protein agree with (21) deduction in the first day of colostral days 11.52, 7.36 and 19.82 respectively. While (22) consists mean of fat and protein 10.1 and 15.6 respectively in the ewes. This fact authenticates by (23) finding the level of colostrum compositions are high in the first day of colostrum days in the cow.

The pattern of fat decreasing disagrees with (23) because of the variability in the level of fat trend to some factors affect its content in milk like species, breed, season of parturition, nutritional status, type of feed, individual variation, age of animal, health status, time of sampling and intervals between milking.

High level of colostrum protein at the day of calving indicates to concentration of immunoglobulin needed by neonatal to build passive immunity which declines immediately with each subsequent milking (7, 6, 24, 25). The pattern of protein decline agrees with (23). The result of protein and its decreasing pattern agrees with (21).



Solid nonfat also agree with the level clarified by(21) at first day of lambing and in its decreasing pattern. In spite of most of the studies detected the total solids in the colostrum so the result of present study agree with (26) in the study on total solid he fined ewe total solid 32.8% at first hour postpartum and decrease after 6 hours by 8.3 and 8.5 %.(26) So its agree with (27) found that bovine colostrum contain about 27.6% total solid (27) and agree with (23) The lactose content in the study appears in minimum level in the first day 3.051- 3.012 of first and fourth parity as shown in the table 1, these value with the range reported by (22) in the colostrum of Awassi ewes 3.3%. The pattern of lactose changes through colostrum days agree with (22, 23, 28).

This pattern of changing to ensure high viscosity and prevent diarrhea in newborn because of lactose effects osmosis causes more water to influx to milk. (23).

The means of fat and protein recorded significant increase in the first parity than four parity this results agree with (23) whilst protein result agree with (22).

Although the amount of colostrum was not estimated but multiparous ewes produce large amount of colostrum. (29) dependent on the interaction between age and other factors affecting the production, such as nutrition, management and control of the disease and the degree of animal acclimatization, as well as increasing age accompanied by complete maturity of the mothers, their evolution and high feed conversion efficiency as a result of the evolution of the gut, which leads to increased production and component, while in competence maturation of gut and udder lead to augment production in small age dam, so its explain the high level of protein accompanied with small amount of colostrum in the first parity. Its mean as a product of colostrum low the colostrum composition will perfect. (28, 30)

The superiority of first parity in the mean of fat, protein agree with (31, 23, 32) who consist effect of age and parity on the colostrum composition. As (30) reported the parity influence colostrum composition and conclude the second parity was higher in protein than fourth lactation. Also agree with (22) reported significant increases in the level of protein among primiparous ewes.

## CONCLUSION

The amount of colostrum produced from ewes act as important factor influence colostrum composition therefore the first parity appears significant increase in the level of fat and protein.

Chemical composition of colostrum (fat, protein, solid non fat and lactose) of Awasse ewes at first day with the line of pervious studied, but there are no significant changes of these constituents among colostrum day.

### تأثير عدد مرات الولادة في بعض مكونات اللبأ الكيماوية خلال ايام اللبأ في النعاج الوالدة

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#### الخلاصة

لغرض دراسة تأثير عدد مرات الولادة في بعض مكونات اللبأ الكيماوية خلال الايام الثلاثة الاولى بعد الولادة اجريت هذه التجربة باستخدام 20 نعجة حامل برقم الولادة الاول والرابع. قسمت نعاج التجربة اعتمادا على رقم الولادة الى مجموعتين كل مجموعة تتكون من 10 نعاج خضعت الحيوانات الى نفس الادارة والرعاية الغذائية والصحية اخذت عينات اللبأ من النعاج الوالدة بعد ساعتين من الولادة واعتبر اليوم الاول واخذت العينتين الثانية والثالثة بعد 24 و72 ساعة وفي نفس وقت العينة الاولى. استعمل جهاز ملكوسكان لقياس مستويات الدهن والبروتين والجوامد غير الدهنية واللاكتوز في ثلاثة ايام. النتائج: اظهر مستوى الدهن والبروتين ارتفاعا معنويا في حيوانات الولادة الاولى على حيوانات الولادة الرابعة. بينما لم يؤثر رقم الولادة في مستوى اللاكتوز والجوامد غير الدهنية.

وتفوق اليوم الاول من ايام اللبأ الثلاثة تفوقا حسابيا على اليومين الثاني والثالث في مستويات الدهن والبروتين والجوامد الغير دهنية بينما كان مستوى اللاكتوز الاقل حسابيا في اليوم الاول.

الاستنتاجات: تؤثر كمية اللبأ المنتج في مستويات الدهن والبروتين معنويا وتعد حيوانات الولادة الاولى الاكثر تفوقا في نسبة البروتين والدهن. وان تراكيز الدهن والبروتين والجوامد غير الدهنية واللاكتوز في حيوانات رقم الولادة الاولى والثانية في اليوم الاول متقاربة مع دراسات سابقة ولم تؤثر ايام اللبأ بمستويات مكونات اللبأ الكيماوية.

الكلمات المفتاحية: لبأ النعاج، ايام اللبأ، رقم الولادة، المكونات الكيماوية، بروتين، دهن، الجوامد غير الدهنية، اللاكتوز.

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