قسم . الانتاج الحيواني - كلية الزراعة - جامعة أسيوط
رئيس القسم : أ . د . / حاتم الحمادى .

بعض المكونات في الدم ومدى استعمالها في الانتخاب لانتاج اللبن في ماشية الفريزيان في منطقة مصر العليا

ابراهيم سالم ، حسن دغش

أوضحت النتائج أنه هناك ارتباط معنوى سالب بين محصول اللبن في أبقار الفريزيان وبين نسبه الليبيدات الكلية في سيرم الدم بينما وجد ارتباط معنوى موجب مع ألفا حلوبيولين ، الكالسيوم ونسبه الفوسفور العضوى .

ومن الجانب الآخر وجد أن محصول اللبن في الحاموس مرتبط ارتباط معنوى موجب مع الألفا حلوبيولين وسالب مع كل ماحاما جلوبيولين والفوسفور الغير عضوى . نسبة الدهن في لبن الفريزيان مرتبط ارتباط معنوى وسالب مع الألفا حلوبيولين بينما كان الارتباط موجبا مع الفوسفور الغير عضوى . أما في الجاموس فقد وجد ارتباط معنوى سالب بين نسبة الدهن والألفا جلوبيولين ونسبة الألبيومين الى الجلوبيولين ، الكالسيوم وكذلك النسبة بين الكالسيوم والفوسفور بينما كان الارتباط موجبا مع جاما جلوبيولين ، هذا ولم يلاحظ أى ارتباط معنوى بين محصول الدهن في الحاموس ومكونات الدم بينما وجد ارتباط معنوى موجب بين محصول الدهن في لبن الفريزيان مع الليبيدات الكلية والكالسيوم وكان الارتباط سالبا مع نسبة كلا من بروتين سيرم الدم وكذلك البيتا جلوبيولين .

معامل الارتباط بين نسبة بروتين لبن الفريزيان ونسبة الألفا حلوبيولين في سيرم الدم كان سالبا بينما كان موجبا في حالة نسبة جاما جلوبيولين . كذلك أوضحت النتائج أن هناك ارتباط معنوى سالب بين نسبة بروتين اللبن في الجاموس والليبيدات الكلية في السيرم ، الفا جلوبيولين ، نسبة الألبيومين الى الجلوبيولين وكذلك نسبة الكالسيوم / الفوسفور الغير عضوى . محصول البروتين في لبن الجاموس لم يرتبط بأى من مكونات الدم بينما وجد ارتباط معنوى سالب بين محصول البروتين في لبن الفريزيان وبين الليبيدات الكلية في سيرم الدم ونسبة البيتا جلوبيولين بينما كان الارتباط موجبا مع كلا من سيرم الكالسيوم وكذلك نسبة الفوسفور الغير عضوى .

Dept. of Anim. Prod.,
Faculty. of Agric., Assiut University.
Head of Dept. Prof. Dr.

SOME BLOOD PARAMETERS AS POSSIBLE SELECTION CRITERIA FOR MILK PERFORMANCE OF BOTH FRIESIAN COWS & BUFFALOES IN UPPER EGYPT

(With One Table)

By
I.A. SALEM and H.A. DAGHACH

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SUMMARY

Milk yield of friesian cows showed a significant negative correlation coefficient with total blood lipids but a positive one with blood alpha-globulin, calcium and inorganic phosphorus. Buffaloes milk yield, on the other hand, showed a significant positive correlation with alpha-globulin but a negative one with gamma-globulin and inorganic phosphorus. Fat percentage in friesian milk was found to have a significant negative correlation with alpha-globulin but a significant positive one with inorganic phosphorus. Buffaloes milk butterfat percentage also showed a significant negative correlation with blood alpha-globulin, albumin globulin ratio calcium and calcium phosphorus ratio, but a significant positive correlation with blood gamma-globulin. Milk fat yield of buffaloes cows had no significant correlation with any of the blood components. Friesian milk fat yield, on the other hand, was found to have a significant positive correlation with blood total lipids and calcium but a significant negative ones with serum total proteins and beta-globulin. The correlation coefficient between milk protein percentage of friesian cows and blood alpha-globulin was significantly negative but with gammaglobulin was significantly positive. Buffaloes milk protein showed a significant negative correlation with blood total lipids, alpha-globulin, albumin/globulin ratio and calcium/phosphorus ratio. Protein yields in buffaloes milk was not correlated with any of the blood components. Friesian milk protein yield, on the other hand, was a significantly negative incorrelation with blood total lipids and beta-globulin but significantly positive with serum calcium and inorganic phosphorus.

INTRODUCTION

Early prediction of milk secreting ability of dairy cattle is important to improve the productivity of a herd. Many experiments have shown that the variation, among animals, in the blood levels of many inter mediary metabolites is to some extent under genetic control (ROWLANDS et al., 1974 and FREEMAN et al., 1978). Recently, many investigators used certain blood metabolites level in dairy cattle to predict milk performance with the assumption that feed constituents become a part of the blood before being converted into milk (LIPECKA et al., 1966; HEIDLER and KORIATH 1969; PROZOROV, 1973; PAVLICHENKO, 1974; HASSAN and ROUSSEL, 1975; KITCHENHAM et al., 1975; LEGOSHIN and OBUKOVA, 1975 and ZHEBROVSKI and SOMINICH, 1978). Other investigators had failed to find any significant association between different blood constituents and both milk yield and composition.

Therefore, the present study was carried out to gain more information concerning the nature of relationships between certain blood constituents and milk production and composition with the ultimate goal of predicting productive capacity of the animal by means of assuring certain blood parameters in both Friesian and buffaloes.

MATERIAL and METHODS

Animals feeding and Management:

Twelve lactating Holstein Friesian cows and twenty five lactating buffaloes, belonging to the Experimental station of Assiut University, were used throughout the lactation period. Animals were fed according to the standard recommended by GHONEIM, 1958). Animals were subjected to the same enivirommental conditions and also were kept in open yards with a provisions for shade and feeding.

Data and sampling collection:

a) Milk:

Average weekly milk production of each animal were obtained from the Experimental Station farm records. Representative monthly milk composite samples from four successive milkings were collected from each animsl through the experimental period. Samples were immediately used for the determination of total milk protein by the Kjeldahl method recommended by OGG et al.(1948), and fat percentages by the Gerber method as described by LING (1963).

b) Blood:

Blood samples were collected from the jugular vein of each animal into clean test tubes at monthly interval during the experimental period. The blood sample was allowed to clot at room temperature to obtain a clear blood serum. The blood serum was then used for the determination of total lipids by using the test kits supplied by Merk, Darmatadt (Germany) which employing the method described by ZOLLNER and KIRSCH (1962), total blood serum protein by Ab-refrac tometer method as described by MACFATE (1972) and its electrophoretic fractions by the paper electrophoresis method described by BLOCK et al. (1958). Serum calcium according to the method of LUTSKI (1970) and serum inorganic phosphorus by using the method of FISKA and SUBBROW (1925). Data were analysed statistically according to SNEDECOR and COCHRAN (1969).

RESULTS and DISCUSSION

Table (1) indicated that total lipids of blood serum had a significant negative correlation ($P/\_\_$ 0.01) with friesian milk yield and insignificant positive correlation with that yield of buffaloes. Milk butter fat percentage, on the other hand, was positively correlated with blood serum total lipids. These finding agreed with those of POSPELOV (1975). Fat yield in friesian milk, on the other hand, was positively correlated with blood serum total lipids ($P/\_\_$ 0.05). The correlation for buffaloe's fat yield was insignifecantly negative. Milk protein percentage and yield for both animals were negatively correlated with blood serum total lipids. However, values were significant only for buffaloes milk protein percentage ($P/\_\_$ 0.01) and friesian milk protein yield ($P/\_\_$ 0.05).

Results also indicate that blood serum proteins of lactating freisian cows had a negative correlation coefficients with milk yield as wll as with fat and protein yields. The correlation was only significant (P/ 0.01) with milk fat yield. On the other hand, although the correlation of total blood serum proteins of lactating buffaloes with milk yield was positive, the correlations with fat and protein yield were negative. Non of these correlation coefficients was statistically significant. Previous results, however, reported inconsistance correlations between total blood serum proteins and milk yield. Thus, HEIDLER (1968) and RAKO et al. (1971) found a positive correlation which supports the findings of the present study for buffaloes but disagree with the negative correlation found for friesian cows. The negative correlation between friesian milk yield and blood serum proteins, however, is supported by the finding of AREPEV et al. (1977). These contradectory results, however, may be due to a breed and/or a genus differences. The negative correlation coefficients between blood serum proteins and fat and protein yields were not in agreement with most studies reported previously (ROUSSEL, et al., 1972; BONDARENKO et al., 1976 and ZHEBROVSKIL and SOMINICH, 1978).

Albumin fraction of blood proteins was negatively but insignificantly correlated with milk yields and its fat and protein content except with buffaloe's milk yield where the correlation was possitive. The possitive correlation with buffaloe's milk yield was supported by the finding of RAKO et al. (1971), DANILENKO and FEDOTOV (1973) and KITCHENHAM, et al. (1975). Other negative correlation were agreed with that found by PROZOROV (1973)and KITCHENHAM, et al. (1975).

Total serum globulins was also insignificantly correlated with milk yield and its fat and protein content. However, with milk yield of both genus, the correlation was negative. The correlations with fat percentage and milk yield were negative for friesians but positive for buffaloes. The correlation, on the other hand, with milk protein percentage was positive for friesian and negative for buffaloes and vis-a-vis with protein yields.

Alpha-globulin, one of the blood serum globulin fractions, was significantly correlated with milk yield of both genera and both milk fat and protein percentages. Howver, the correlation was positive with milk yield but negative with fat and protein percentages. The correlations of alpha-globulin with milk fat and protein yields were positive but not significant.

With blood serum beta-globulin, milk yield of friesian cows was insignificantly and negatively correlated but that of buffaloes cows was also insignificant but positive. A negative correlation coefficients between milk yield and blood serum beta-globulin was found by GURYANOVA (1971), PROZOROV (1973) and KITCHENHAM, et al. (1975). Milk fat and protein percentages were not significantly correlated with beta-globulin fraction of blood serum. On the other hand, milk fat and protein yields of friesian cows had a significant (P/ 0.05) negative correlation with blood serum beta-globulin. For buffaloes the correlation were insignificantly negative.

The correlation coefficient of blood serum gamma-globulins with milk yield of both genus were negative but only significant with milk yield of both genus were negative but only significant (P/ 0.01) for buffaloes. These results, however, disagree with results by MANTA et al. (1964) and SZULO (1975). Milk butter fat percentages of both genera were positively correlated with blood serum gamma-globulin but value was only significant for buffaloes. A similar positive correlations between milk fat percentage and gamma-globulin were reported also by KARMANOVA and NIKOLAEVA (1969) and ROUSSL et al. (1972). Milk fat yield of both genera on the other hand, was negatively but insignificantly correlated with blood serum gamma-globlin. Milk protein percentage of both genera was positively correlated with gamma-globulins but significant only for friesian cows. Results also showed that blood serum gamma-globulin was not significantly correlated with milk total proteins yield. However, value of the correlation coefficient was positive for friesians and negative for buffaloes.

Results also indicated that blood albumin-globulin ratio (A/G) was positively correlated with milk yield of buffaloes which is in agreement with that found by ROUSSEL et al. (1972). For freisian cows, on the other hand, the correlation was insignificantly negative. It was also found that blood serum albumin-globulin ratio was negatively correlated with protein and fat percntages as well as milk yields. The correlation, however, was significant only for fat and protein percentages and fat yield of buffalo cows.

The correlation coefficients of milk yield of both genera with their blood serum calcium levels were positive but significant (P/__ 0.01) only for friesian cows. This may be due to the higher milk yield of friesian cows if compared with buffaloes yield. The correlations of milk butterfat percentages with blood serum calcium of both genus, on the other hand, were negative and significant only for buffaloes. This results were excpected since calcium in blood had a positive correlation with milk yield on one hand, and milk yield was found to have a negative correlation with fat percentage on the other hand (RICE et al., 1962). The siginficant correlation for buffaloes probably due to the higher fat percentage in buffaloes milk than in friesian milk. Milk fat yield, showed insignificantly positive correlation with blood serum calcium. However the correlation was only significant with friesian cows. This may be due to the higher fat yield in friesian cows milk reflecting their higher milk yield if compered with buffaloes yield. Milk protein percentages for both genera had insignificant negative correlation with blood serum calcium levels. The yield of milk protein, on the other hand, was positively correlated with calcium levels in blood and significant (P/__ 0.01) only for friesian cows. This may be due to the higher casein content in friesian milk than buffaloes milk as casein is mostly present as calcium caseinate in milk.

Blood serum inorganic phosphorus was positively (P/__ 0.01) correlated withmilk yield of friesian cows but negatively (P/__ 0.05) with that of buffaloes. The correlation coefficients between blood phosphorus level and milk fat percentages and yields of both genera were positive and significant only for friesian milk fatpercentage. With regard to protein in milk, resuflts indicated that the percentage of protein was regatively correlated with freisian blood serm inorganic phosphorus but positively with that of buffaloes. Milk protein yield, on the other hand, showed a significant (P/__ 0.05) positive correlation with blood inorganic phoisphorus of friesian cows but with insignifcantly negative with that of buffaloes.

Clacium/phosphorus ratio in the blood serum of buffalo correlated positively (P/__ 0.05) with the milk yield and negatively (P/__ 0.01) with fat and protein percentages. The correlation of blood serum inorganic phosphorus with fat and protein yields in buffaloes milk were possitive but not significant. On the other hand, friesian milk yield, milk fat and protein percentages were correlated positively but not significant with blood serum inorganic phosphorus of these animals. The correlation between milk fat and protein yields and serum inorganic phosphorus of friesian cows were insignificantly negative.

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SOME BLOOD PARAMETERS AS POSSIBLE SELECTION CRITERIA

Table (1)

The extent of relationships between blood constituents and both milk yield and composition

Items	Blood constituents Genus	Total lipisa	T. blood serum protein	Albumin (A)	Globulin (G)				A / G	Calcium	Inorg. phosphorus (P)	Ca / P
					Total	Alpha	Beta	Gamma				
Milk Yield	Friesian	-0.664*	-0.267	-0.261	-0.120	0.466*	-0.335	0.072	-0.233	0.712**	0.597**	0.403
	Buffaloes	0.094	0.054	0.206	-0.108	0.487	0.296	-0.800	0.431	0.350	-0.468	0.462*
Fat %	Friesian	0.311	-0.067	-0.204	-0.247	-0.774**	0.094	0.026	-0.121	-0.305	0.517*	0.492
	Buffaloes	0.400	-0.077	-0.393	0.142	-0.500*	-0.398	0.902**	-0.625**	-0.609**	0.590	-0.600
Fat yield	Friesian	0.681*	-0.623**	-0.394	-0.418	0.335	-0.445*	-0.127	-0.071	0.693**	0.408	0.188
	Buffaloes	-0.541	-0.033	-0.364	0.206	0.305	-0.225	-0.083	-0.460*	0.049	0.38	0.036
Protein %	Friesian	-0.265	0.350	-0.104	0.322	-0.572**	-0.017	0.627**	-0.180	-0.293	-0.257	0.138
	Buffaloes	-0.883**	-0.197	-0.426	-0.097	-0.612**	-0.333	0.422	-0.527**	-0.370	0.217	-0.506*
Protein Yield	Friesian	-0.714*	0.221	-0.249	-0.028	0.314	-0.495*	0.118	-0.321	0.766**	0.464*	-0.253
	Buffaloes	-0.621	-0.002	-0.295	0.211	0.431	-0.049	-0.295	-0.322	0.187	-0.115	0.104

* : Significant at 5% level.

**: Significant at 1 % level.