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The Effect of Machine Milking on Fiber Diameter and Some Plasma Parameters

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Abstract: This study was conducted to investigate the impact of machine milking on fibre diameter and some plasma parameters such as cholesterol, triglycerides and total protein of lambs and their dams in early lactation period. In this study, 20 Karayaka lambs and 20 their dams were used. The sheep were numbered with ear tags and equally distributed into machine milking and suckling groups having similar live weights (56.80 vs 55.75 kg). Fibre diameters and plasma cholesterol, triglycerides and total protein levels of lambs and their dams did not differ between machine milking and suckling group at the first week and weaning period. We find that there is not any effect of machine milking on fibre diameter in early lactation period.

Key words: Machine milking, fibre diameter, cholesterol, triglycerides, total protein

INTRODUCTION

Sources of fiber diameter variation in clips of wool include among fleeces, among body regions, among fibers within staple, and among points along fibers. Average fibre diameter and its variation are both important in wool quality and processing. Mean fiber diameter is the single most important quality character of wool and is directly related to the monetary value of wool[1,2]. Variations in fibre diameter are the result of variations in either the environment or the inherent characteristics of the animal[3]. Therefore, determination of effective factors on variations of fibre diameter would help enlighten the topic regarding of fiber diameter. Genetics and environment influence both the quantity and quality of the fibre and this then affects the commercial value of the fibre[4]. Abrupt environmental changes tend to be more critical than those occurring over a long period[5]. The effects of lactation on wool growth may be attributed to the first month of lactation[6]. Some negative factors such as the deficiency of nutrients for higher levels of milk production in early lactation negatively effect on mean fibre diameter[7] and plasma parameters of ewes.

There are numerous studies on blood parameters such as; cortisol, oxytocin, and prolactin, however, there is no research reported on some blood parameters (cholesterol, triglycerides, and total protein) with machine milking. There is no research reported on relationships between machine milking and fibre diameters. There is a need for more information on effective factors on fibre diameter of ewes in early lactation period. In this research, the impact of machine milking on fibre diameter and above mentioned plasma parameters in this critical lactation period were studied.

MATERIALS AND METHODS

In this study, 20 Karayaka lambs and their two-year-old mothers[20] were used. The sheep were numbered with ear tags and equally distributed into machine milking and suckling groups having similar live weights (56.80 vs 55.75 kg). Mid rib fleece samples were taken from each animal for analysis at the end of the first and the tenth week (weaning). Fibre diameters were measured using a calibrated ocular micrometer in the microscope (Olimpus Cx41). The jugular blood samples were collected from lambs and their dams at last day of both period (first week and weaning). The samples were collected and stored at 4 °C until analysis for determination of parameters. The following techniques were used to determine the biochemical parameters: An enzymatic colorimetric test for total plasma cholesterol (mg dL^{-1}; Boehringer Mennheim CHOD-PAP method) and triglycerides (mg dL^{-1}; Boehringer Mennheim GPO-PAP method) and total protein using automated calorimetric procedures.

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All of the data are indicated as mean ± SEM. Comparisons were done by using independent samples t-test with help of the SPSS[8].

RESULTS AND DISCUSSION

The fibre diameters of sheep in this study were in general agreement with those in the literature[9,10]. The fibre diameter of Karayaka sheep varies considerably from 39 to 43 µm[11] and the present data falls within this range. The fibre diameter of Karayaka sheep are intermediate and comparable to carpet-wool breeds, 31 µm for Barki sheep[12], 26.2 µm for Arabi sheep[13], 35.4 µm for Ossimi, and 31.5 µm for Rahmani[14].

As shown the Table 1, fibre diameters of lambs in machine milking and suckling group were similar for the first week and the tenth week (weaning period). There is no significant effect of machine milking on fibre diameters for the first week and the weaning period.

There were no significant differences in fibre diameters of dams between machine milking and suckling group for the both periods (Table 2). Similar to the finding results in lambs, machine milking was not significant on fibre diameters of dams for the first week and the tenth week (weaning period). It is known that fibre diameters were affected by nutrition and stress factors. The results of this study suggest that machine milking did not cause any stress level which may affect fiber diameter.

The results in Table 3 and 4 have shown that plasma parameters of lambs in machine milking and suckling group were similar for the first and the tenth week. These results are in agreement of reported values for normal sheep[15].

As shown the Table 5 and 6, there were no significant differences in plasma parameters of dams between machine milking and suckling groups for the first and the tenth week. These results are also in agreement of reported values for normal sheep[15].

Cetin *et al.*[16] reported that there is no difference in total protein between machine milking and suckling groups. The findings of Cetin *et al.*[16] support our finding related to total protein for both groups.

Although some studies have examined the effects of lactation on fleece characteristics by goat, the studies on sheep is sparse in literature. In addition to the parameters investigated in this research, investigation of other blood parameters would be important contribution on deficient information on lactation physiology. There is a lack of information on the effect of machine milking on fleece characteristics. Therefore, conducting studies on other fleece characteristics as well as fibre diameters would be valuable.

Table 1: Fibre diameter (µm) of lambs

Period	Machine milking	Suckling	P
1 st week	34.14±0.35	33.61±0.44	0.23
Weaning	37.10±0.84	36.40±1.76	0.43

Table 2: Fibre diameter (µm) of dams

Period	Machine milking	Suckling	P
1 st week	38.12±0.82	38.60±0.36	0.27
Weaning	38.56±0.79	37.17±1.19	0.39

Table 3: Plasma parameters of lambs in first week

	Machine milking	Suckling	P
Triglyceride, mg dL^{-1}	13.41±0.68	12.61±0.46	0.44
Cholesterol, mg dL^{-1}	37.30±1.79	38.31±1.69	0.31
Total protein, g dL^{-1}	8.1±1.40	8.2±0.66	0.41

Table 4: Plasma parameters of lambs in tenth week

	Machine milking	Suckling	P
Triglyceride, mg dL^{-1}	14.21±0.55	13.60±1.41	0.55
Cholesterol, mg dL^{-1}	39.33±1.24	38.10±1.09	0.33
Total protein, g dL^{-1}	8.7±1.00	8.8±0.56	0.71

Table 5: Plasma parameters of dams in first week

	Machine milking	Suckling	P
Triglyceride, mg dL^{-1}	15.40±0.84	14.84±0.56	0.31
Cholesterol, mg dL^{-1}	39.22±1.89	40.27±0.89	0.39
Total protein, g dL^{-1}	7.7±0.50	7.8±1.45	0.75

Table 6: Plasma parameters of dams in tenth week

	Machine milking	Suckling	P
Triglyceride, mg dL^{-1}	17.48±0.94	16.44±1.16	0.50
Cholesterol, mg dL^{-1}	37.20±1.01	38.28±0.82	0.49
Total protein, g dL^{-1}	7.1±0.40	7.2±1.05	0.60

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