Saint-Petersburg State University of Veterinary Medicine, Russia
Department of Biochemistry and Physiology

Antioxidant system characteristics in Saanen goats depending on performance

Bokhan P.D., Bakhta A.A., Karpenko L. Yu., Kozitcyna A.I., Balykina A.B., Enukashvili A.I., Polistovskaya P.A., Ershova O.N., Anipchenko P.S.

Abstract

Dairy goat breeding is worldwide widespread. Goat milk and other derivative products are an important part of dietetics nutrition. The dairy products are the most valuable part of goat breeding therefore lactation performance is a relevant issue. The purpose of this study was to evaluate antioxidant system characteristics in Saanen goats depending on lactation performance.

Materials and methods

The experiment was conducted in the north-western region of Russian Federation, in laboratory of biochemistry and physiology department, FSBEI of Higher Education «SPbSAVM». The three experimental groups included 30 Saanen goats each, 2nd-3rd lactations, selected using matched pairs method.

1st group included low milk producing ability goats (<600 kg per year), 2nd group included average milk producing ability goats (600-800 kg per year), 3rd group included high milk producing ability goats (>800 kg per year).

The blood samples were taken once – at peak lactation performance (45 days after parturition). The blood levels of lipid peroxygenation markers (malondialdehyde, dienketone and conjugated dienes) and superoxide dismutase and catalase activity were assessed by standard methods. Results presented as mean±standard error of the mean. Student's t-test was used after proving normal distribution. Level of significance is labeled as $p<0.05$.

References

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Results

Table 1. Free-radical oxidation intensity in Saanen goats depending on lactation performance (M±m)

	Diene conjugates, U	Dienketone, U	Malondialdehyde, umol/l
Low milk producing ability goats (<600 kg per year) (n=30)	0.08±0.01	0.10±0.01	2.75±0.30
Average milk producing ability goats (600-800 kg per year) (n=30)	0.09±0.01	0.17±0.03	3.30±0.4
High milk producing ability goats (>800 kg per year) (n=30)	0.11±0.02*	0.18±0.02*	5.50±0.25*

* P < 0.05, comparing average milk producing ability goats

Table 2. Anti-oxidizing enzymes activity in Saanen goats depending on lactation performance (M±m)

	Catalase, U	Superoxide dismutase, U/min
Low milk producing ability goats (<600 kg per year) (n=30)	1.58±0.5	15.2±1.3
Average milk producing ability goats (600-800 kg per year) (n=30)	2.2±0.75	14.3±1.2
High milk producing ability goats (>800 kg per year) (n=30)	5.45±1.25*	20.5±3.80*

* P < 0.05, comparing average milk producing ability goats

Conclusion

After analyzing the received data of antioxidant system characteristics there were revealed high intensity of free-radical oxidation in high milk producing ability goats. This results in oxidative stress development. Activity of anti-oxidizing enzymes was elevated; therefore free-radical oxidation is intensive. Consequently this data allows taking into consideration exogenous anti-oxidizing agents administration in high milk producing ability goats in order to reduce oxidative stress.