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Effect of dietary coconut oil supplementation on some blood biochemical indices in yearling rams

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Abstract.
The research set out to examine how adding coconut oil to the diet of yearling rams affected a number of clinically significant biochemical variables in their blood. The experiment used nine male Blackhead Pleven yearling rams, with an average starting weight of 45.2 kg. A two-period experimental design was used. The first group of yearling rams were given 1 kilogram of barley and 1 kg of grass hay (ration I) during the first period. The second group got 0.800 kg of barley, 0.200 kg of sunflower meal, and 1 kg of grass hay (ration II). The third group also received 0.800 kg of barley, 0.200 kg of sunflower expeller, and 1 kg of grass hay (rating III). As part of the morning feeding routine throughout the trial, all groups received 0.02 kg of coconut oil via cannulas. Including coconut oil in ration II led to higher blood total and HDL cholesterol 2.5 hours after consumption ($p<0.001$). Despite the increased rumen lipid content, serum triglyceride levels in animals given Rations I and II were unaffected. Coconut oil significantly reduced blood ASAT activity in all three diets, both before and after feeding ($p<0.05$ and $p<0.001$, respectively). Animals given ration II had a reduction in serum alkaline phosphatase both before ($p<0.001$) and after feeding ($p<0.05$) after the addition of coconut oil.

Keywords: yearling rams, blood serum enzymes, cholesterol, total lipids, triglycerides

Introduction Although fats make up a very modest percentage of animal diets, they serve a crucial function as a concentrated source of energy and vital fatty acids. According to Palmquist (1988) and Todorov et al. (2004), fats help the body absorb vitamins that are soluble in fat, use energy more efficiently, and consume feed more efficiently. There has been a recent uptick in the practice of supplementing the diets of very productive animals with lipids, even though animals can naturally produce these substances. Factors contributing to this include higher production rates, which necessitate diets with a high energy concentration, improved energy utilization with an optimal diet's fat content, feed supplementation with fat and so-called cry fat, and lastly, the fact that rumen-synthesized fatty acids and dietary fats have a potentiating effect on ruminant metabolism and human health (Palmquist, 1988; Bauman et al., 2006).
In particular, dietary fat is used by the body as a source of necessary fatty acids and as building blocks for the production of milk fat (Γodorov, 2003). Several biochemical parameters varied between sheep breeds, according to research by Binev et al. (2006). Nutritional supplements have attracted increasing attention in the last ten years due to their potential to modify digestion in ruminants' forestomachs (Nedeva et al., 2008). More accurate nutrition standards and current information on feed composition and nutritive value on animal production and consumption are necessary to meet animal nutritional demands. Nine male Blackhead Pleven rams, averaging 45.2 kg in weight, were studied to determine the effects of adding coconut oil to their diet. The animals were split into three groups, each consisting of three animals. They were brought up indoors, in separate cages, with a steady supply of water and salt licks. Cannulae were surgically implanted into the dorsal sac of the rumen using the Aliev (1960) procedure twenty days before the experiment. Two 10-day intervals were included within the

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experimental design for the purpose of collecting samples. The animals were given a 10-day window between cycles to acclimate to their new diets. The first set of lambs were given a diet of 1 kilogramme of barley and 1 kilogramme of grass hay during the first period; the second set received 0.800 kilogramme of barley, 0.200 kilogramme of sunflower meal, and 1 kilogramme of grass hay; and the third set received 0.800 kilogramme of barley, 0.200 kilogramme of sunflower expeller, and 1 kilogramme of grass hay. The second round of experiments continued with the same diet. Additionally, animals were given 20 g of coconut oil daily via the rumen cannula. You may get medium-chain fatty acids from coconut oil. Capric acid makes up 7.59 percent, lauric acid 50.65 percent, myristic acid 17.9 percent, palmitic acid 10.47 percent, stearic acid 3.59%, oleic acid 8.33 percent, and linoleic acid 1.47%. The ration schedule included two meals every day, at 8:00 AM and 1:00 PM. Tables 1-4 show the amounts and chemical compositions of the diets given to the three groups throughout the first period. Before feeding and 2.5 hours after feeding, blood samples were taken from v. jugularis externa to measure levels of total lipids, total cholesterol, HDL cholesterol, triglycerides, L-aspartate, 2-oxoglutarate aminotransferase (ASAT), L-alanine, 2-oxoglutarate

Table 1. Chemical composition of the feeding forage, (%)

	Chemical composition (%)				
Feed	DM*	CP	Cfb	CF	Ash
Meadow hay	88.20	9.03	28.30	1.90	1.00
Barley	89.90	9.60	5.00	1.70	1.30
Sunflower meal	88.80	32.50	27.50	1.50	5.70
Sunflower expeller	89.70	31.10	16.90	8.80	6.20

*DM – dray matter , CP – crude protein, CFb – crude fiber, CF – crude fat

		DM, kg	CP	Cfb	CF	Ash
Meadow hay	1.000	0.882	90.3	283	19	19
Barley	0.800	0.719	77.0	40	14	14
Sunflower expeller	0.200	0.179	62.0	34	18	18
Total		1.780	229	357	51	51

Results and discussion

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AP, or alkaline phosphatase. A licensed total lipids, cholesterol, and triglycerides laboratory in Sliven, Bodylab Ltd., ran all the tests using an automated biochemistry analyzer SYNCHRON CX9 PRO. All of the procedures followed in the lab wereAccording to Sivkova (2007), the total lipid concentrations in the blood serum are shown in Table 5. Experimental animals' total cholesterol, HDL cholesterol, and triglyceride levels were statistically significant. conducted using Statistica for Windows, developed by StatSoft Inc. in 1994.Ration II's total and HDL cholesterol levels were elevated when coconut oil was added. The study was conducted while closely monitoring the cholesterol levels 2.5 hours after eating (p<0,001). The following regulations apply: the European Convention for the Protection of Vertebrate Animals, the Law on Animal Protection in the Republic of Feeding, and the concentrations of total and HDL cholesterol 2.5 hours after feeding, as well as total cholesterol prior to May 16, 1986, and ration III coconut oil for experimental and other scientific purposes (Strasburg/). No changes were seen in blood serum triglycerides levels when animals were given Bulgaria (part II, chapter VII: Animal experiments, issued meals I and II. in Official Gazette 13/2008 and 36/2008).Little gain before eating and a large gain after

Table 5. Effect of coconut oil on most important blood lipid parameters in yearling rams

			Total HDL cholesterol (mmol/l)		
ration I	12	1.63	0.17	1.3	0.09
ration I + coconut oil	12	1.67	0.20	1.47	0.14
ration II	12	1.49	0.06	1.29	0.04
ration II + coconut oil	12	1.60	0.12	1.89***	0.08
ration III	12	1.64	0.22	1.82	0.22
ration III + coconut oil	12	2.52*	0.32	2.59*	0.24
			HDL cholesterol (mmol/l)		
ration I	12	0.88	0.11	0.67	0.06
ration I + coconut oil	12	0.89	0.09	0.77	0.08
ration II	12	0.77	0.04	0.64	0.03
ration II + coconut oil	12	0.70	0.08	0.88***	0.05
ration III	12	0.89	0.13	0.98	0.12
ration III + coconut oil	12	1.30	0.16	1.4*	0.12
			Triglycerides (mmol/l)		
ration I	12	0.42	0.05	0.34	0.04
ration I + coconut oil	12	0.42	0.07	0.31	0.05
ration II	12	0.35	0.02	0.29	0.03
ration II + coconut oil	12	0.29	0.05	0.30	0.05
ration III	12	0.36	0.04	0.30	0.01
ration III + coconut oil	12	0.50	0.11	0.68***	0.09
Total lipids (g/l)					
ration I	12	1.98	0.15	1.75	0.13
ration I + coconut oil	12	2.02	0.24	1.47	0.19
ration II	12	1.70	0.09	1.77	0.11
ration II + coconut oil	12	2.01	0.18	1.49	0.25
ration III	12	2.23	0.29	2.67	0.74
ration III + coconut oil	12	2.97	0.28	2.58	0.29

*- comparison of results between control and experimentally group; *- p<0,05; ** - p<0,01; *** - p<0,001

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This result was achieved when ration III was administered ($p<0.001$). Among all infarction patients, there were no statistically significant changes in total blood lipids, thrombi, or the risk of atherosclerosis or cardiac problems (Williams, 2000). groups. Lipids are a class of naturally occurring chemical molecules that includeLipid and phospholipid breakdown is catalyzed by an enzyme with distinct structural features but shared physicochemical characteristics - a reaction. Biomembranes use phospholipids as an energy source, along with triglycerides, fatty acids, free and ester cholesterol, and phospholipids. Phosphatidylcholine, sphingomyelin, lysophosphatidylcholine, and energy derived from carbs might be partially substituted by this energy. Phosphatidylethanolamine, glycolipids, fat-soluble vitamins (A, D, 3.5% ether extract, 43% fatty acid, 17% wax, E, and K), carotenoids, and bile acids are all components of a dairy cow's diet. Results from analyses of total and HDL cholesterol in the blood provide the most crucial information, which accounts for about 19% of the total, 4% of galactose, and other chemicals (Palmquist and Jenkens, 1980).

triglycerides.Enzymes in serum
Essential fatty acids must be non-saturated, particularly omega-3.Enzymes found in cells are abundant and have vital roles in medicine. They are essential for the body because they are first building blocks for prostaglandins, which are released into the bloodstream when cellular membranes are permeable. Following cell and tissue death, metabolic regulators lower hyperenzymaemia and cholesterol levels, and the immune system plays a key role in fat circulation and changes. Triglyceride concentrations, aminotransferase analysis, and the prevention of platelet aggregation are all routinely done and have significant diagnostic and therapeutic implications. These findings

Conclusion

The cytoplasm and cell membrane are the sites of ASAT, ALAT, GGT, and AP levels in yearling rams' blood. Table 6 displays the information. The results showed that liver lowered blood serum ASAT activity in yearling rams before and after feeding ($p<0.05$ to $p<0.001$), and that coconut oil increased enzyme activity for all three rations. This was found by Kaneko (1989). Blood ALAT concentrations were found to be substantially lower when coconut oil was added to diets I and II in both samples. Ratios II and III resulted in higher GGT concentrations 2.5 hours post-meal.

with the use of coconut oil ($p<0.001$). Acidic blood serumBefore ruminants changed blood biochemical parameters as follows: ($p<0.001$) and after feeding ($p<0.05$), the administration of coconut oil in the rumen of tiny phosphatase in animals given diet II was much lower.The blood enzyme concentrations that were investigated (Table 2) stayed within the reference limits after adding coconut oil to ration II. Although the investigated enzymes are ubiquitous throughout the body, their activity peaks in the liver. Those people are

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