COMPENDIUM [KEYNOTE & LEAD PAPERS]

20th BIENNIAL INTERNATIONAL CONFERENCE OF ANIMAL NUTRITION SOCIETY OF INDIA ON SUSTAINABLE ANIMAL NUTRITION FOR GLOBAL HEALTH AND PRODUCTION: INNOVATIONS AND DIRECTIONS

NABARD

20th BIENNIAL INTERNATIONAL CONFERENCE
OF
ANIMAL NUTRITION SOCIETY OF INDIA
ON
SUSTAINABLE ANIMAL NUTRITION FOR GLOBAL HEALTH AND PRODUCTION: INNOVATIONS AND DIRECTIONS

23rd to 25th January, 2024

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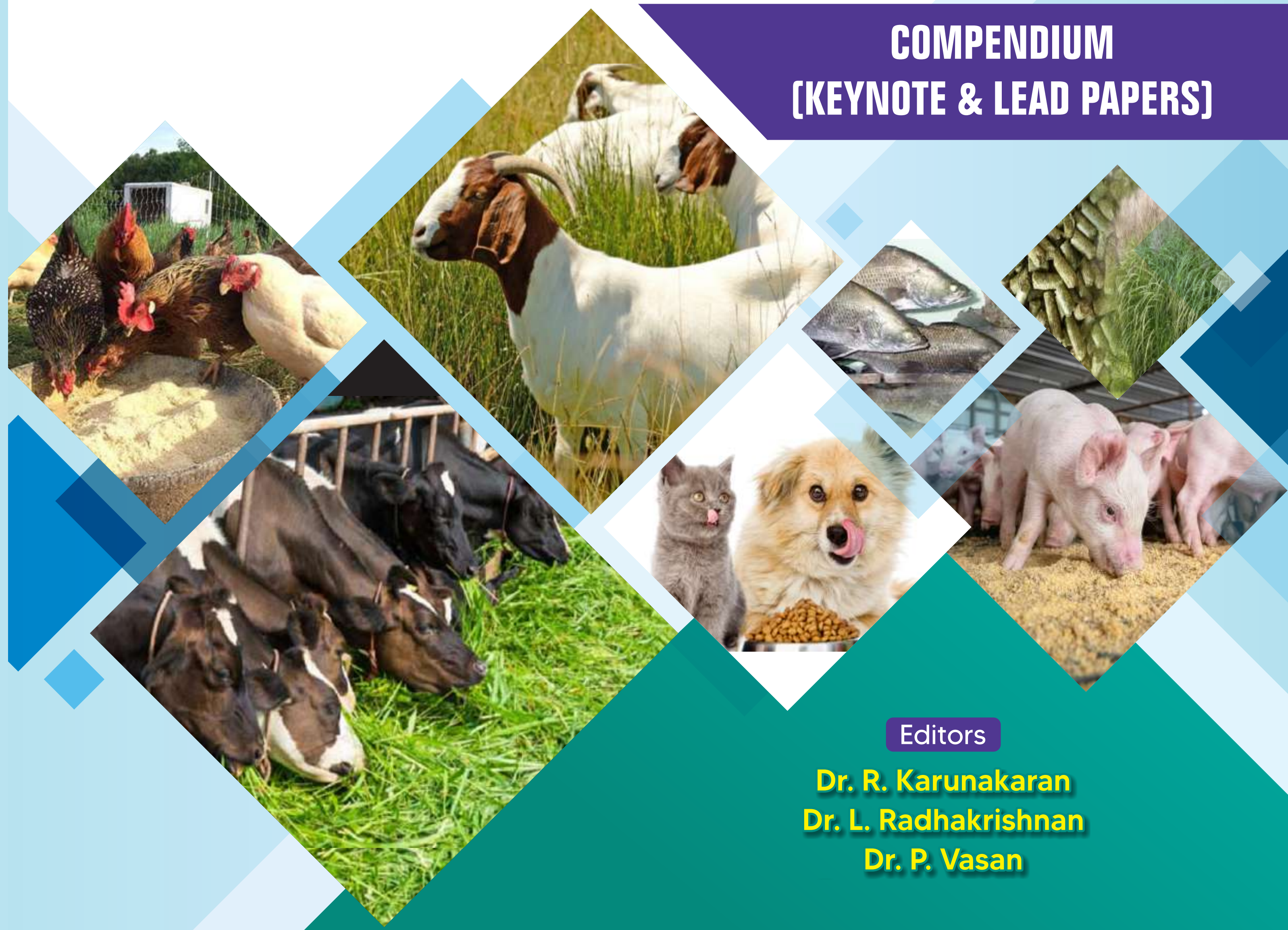

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The Use of Different Fat Sources in Broiler Feed and the Effect on Production Performance and Meat Quality

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Introduction

Meat and meat products are high-quality food, and have pronounced nutritional and biological properties. In addition to the quantitative increase in meat production in the world, it is necessary for the meat to have impeccable quality and long-term sustainability.

Success in broiler production depends on genetics, production conditions, but to the greatest extent on nutrition, which must fully satisfy all the needs for nutrients that enable good health as well as proper growth and development of broilers. Feed with a high energy value is used when preparing meals, primarily cereals, but also other sources of energy, such as animal fats or vegetable oils. In the production of poultry meat as well as other foodstuffs of animal origin, the opinion of the consumer who demands a safe and healthy product is increasingly respected. Compared to the meat of other animals, broiler meat is considered healthier, that is, with a relatively lower fat content.

Fats of animal origin (beef tallow, swine fat, fish oil, etc.) or vegetable origin (sunflower oil, linseed oil, corn oil, coconut oil, etc.) can be added to commercial broiler feed as a source of fatty acids and energy. The aim of this supplementation is to influence the fatty acid composition and quality of broiler meat, and finally the health of people as consumers. Numerous medical findings show that the relationship between two groups of polyunsaturated fatty acids (PUFA) in the diet has a significant role in the development of cardiovascular and other chronic diseases in humans: omega-6 acid, whose main representative is linoleic acid (C18:2 n-6) and omega -3 acid, whose main representative is alpha linolenic acid (C18:3 n-3). Due to the many potential benefits of the presence of omega-3 fatty acids in the diet, consumer demands for omega-3 enriched foods of animal origin are also growing (Sanders, 2000).

Numerous studies have shown the influence and relationship between the content of fatty acids in feed and tissues, especially in breast meat and drumsticks with thigh.

The concentration of n-3 PUFA in broiler tissues depends mainly on fatty acids from the feed. PUFA fatty acids (n-3) reduce pro-inflammatory eicosanoids and inflammatory biomarkers in broiler chickens (Schwab and Serhan, 2006). Vegetable oils (eg linseed oil) are rich in alpha linolenic acid (ALA), which is the metabolic precursor of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Numerous studies confirm the possibility of enriching the human diet with n-3 fatty acids by modifying poultry rations with the end result of affecting human health.

Material and Methods

The experiment protocol was approved by the Ethical Commission for the Protection of the Welfare of Experimental Animals of the Faculty of Veterinary Medicine, University of Belgrade, and the Ministry of Agriculture, Forestry and Water Management - Veterinary Administration (Decision No. 323-07-00364/2017/05/2).

In this trial, a total of 240 day-old broilers of both sexes and of the same provenance (Cobb 500) were used over a period of 42 days. Broilers were randomly assigned to one of four dietary treatments (control and three experimental groups), each with 6 replications (10 birds in each replication). The birds were housed in a room with controlled conditions (population density, 5 cm thick sawdust on the floor, temperature, humidity, lighting). Water and food were given ad libitum.

From the beginning of the study, each group of broilers was fed one of four different diets, which consisted of the same (Table 1) basal diet (C- control group of broilers), but the experimental groups differed only in the added fat source (swine fat - lard and linseed oil) (Table 2). The basal diet was formulated to meet the maintenance and growth needs of the broilers used in the study. Broilers were fed from day 1 to day 42 in three phases with three nutritionally different complete mixtures, namely starter mixture (up to 10 days), grover (11-21 days) and finisher (22-42 days). Broilers in the control group received a diet without added fat or linseed oil. The other three experimental groups (Table 2) received the same diet as the control group (C group), but were supplemented with swine fat (SF group), linseed oil (Lo group) (commercially prepared linseed oil (GranumR, Serbia) or a mixture of SF and linseed oil (SF+Lo group) (Milanković, 2021).

The nutrients and chemical composition (calculated analyses) of the basal ration are listed in Table 1.

All meal components were analyzed for moisture, crude protein, total lipids, ash, crude fiber, calcium and phosphorus. The content of nitrogen-free extractives was determined by the formula: BEM = 100 - (% moisture + % ash + % cellulose + % protein + % fat) (Milanković, 2021).

Production performance of broilers was calculated (body weight, gain, consumption and conversion) during the experimental period of 42 days. Feed conversion (FCR) was calculated as the amount of feed consumed per unit of body weight gain. At the end of the study, the animals were transported to the slaughterhouse and then individually weighed, stunned with electric current and immediately slaughtered by severing the jugular veins. Afterwards, the animals were processed according to standard industry techniques. For chemical analysis of meat, 24 h post mortem, 6 drumsticks (i.e. muscle) and 6 breast meats from each experimental group were bagged for analysis of moisture (ISO 1442), lipid (ISO 1443), protein (ISO 937) and ash (ISO 936).

Fatty acid profiles in feed are shown in Table 3. Total lipids for fatty acid determination were extracted from homogenized samples (feed and carabatak drumsticks) with a mixture of hexane/isopropanol by accelerated solvent extraction (ASE 200, Dionek, GmbH, Idstein, Germany). After evaporation of the solvent to dryness, total lipids were converted to fatty acid methyl esters (FAME). FAMEs were determined using a gas chromatograph Shimadzu 2010. Fatty acid quantification was determined relative to the internal standard, heneicosanoic acid, C21:0. The level of fatty acids is expressed as a percentage (%) of the total identified fatty acids. According to Fuchs et al. (Castelini, 1998), lipid quality indices (atherogenic index (AI), thrombogenicity index (TI) and hypocholesterolemic/ hypercholesterolemic fatty acid ratio (h/H)) were calculated using the following equations:

$$AI = (C12{:}0 + 4 \times C14{:}0 + C16{:}0)/(\Sigma n\text{-}3\ PUFA + \Sigma n\text{-}6\ PUFA + \Sigma MUFA)$$

$$TI = (C14{:}0 + C16{:}0 + C18{:}0)/(0.5 \times \Sigma MUFA + 0.5 \times \Sigma n\text{-}6PUFA + 3 \times \Sigma n3PUFA + \Sigma n\text{-}3PUFA/\Sigma n\text{-}6PUFA)$$

$$h/H = (C18{:}1n\text{-}9 + C18{:}2n\text{-}6 + C20{:}4n\text{-}6 + C18{:}3n\text{-}3 + C20{:}5n\text{-}3 + C22{:}6n\text{-}3)/(C14{:}0+C16{:}0).$$

For the determination of malondialdehyde (MDA), the TBK test was used, which is based on the spectrophotometric determination of the pink complex formed after the reaction of MDA with two molecules of 2-thiobarbituric acid. The TBK test determines the so-called TBK-reactive substances (TBARS), and the test result is collectively expressed as the TBK-number (Tarladgis et al., 1969).

Statistical analysis of the results was performed using GraphPad Prism software version 6.00 for Windows (GraphPad Software, San Diego, CA, USA, www.graphpad.com). All parameters are described using basic statistical parameters. Determining the existence of a statistically significant difference between the experimental groups was done using the ANOVA test, and the individual Tukey test was used to determine which groups had a statistically significant difference ($p<0.05$).

Table 1. Raw material composition of feed mixtures for broilers (%) and calculative values of metabolic energy as well as the content of lysine, methionine+cysteine and tryptophan

Ingredients (%)	Starter		Grover		Finisher	
	C	SF Lo SF+Lo	C	SF Lo SF+Lo	C	SF Lo SF+Lo
Corn	50.85	49.85	44.15	41.65	44.95	39.95
Wheat	-	-	10.00	10.00	15.00	15.00
Soybean Fulfate	15.00	15.00	17.00	17.00	20.00	20.00
Soybean meal	12.40	12.40	1.00	1.00	1.00	1.00
Soybean cake	17.00	17.00	23.30	23.30	14.70	14.70
Monocalcium phosphate	1.20	1.20	1.00	1.00	0.90	0.90
Chalk	1.60	1.60	1.60	1.60	1.60	1.60
Salt	0.35	0.35	0.35	0.35	0.35	0.35
Premix	1.00	1.00	1.00	1.00	1.00	1.00
Lysine	0.20	0.20	0.20	0.20	0.10	0.10
Methionine	0.20	0.20	0.20	0.20	0.20	0.20
Adsorbent	0.20	0.20	0.20	0.20	0.20	0.20
Added fat*	-	1.00	-	2.50	-	5.00
Parameter	Calculated value					
Metabolic energy MJ/kg	12.69	12.71	13.01	13.03	13.11	13.13
Lysine	1.50	1.49	1.42	1.42	1.17	1.17
Methionine+cysteine	0.81	0.81	0.80	0.80	0.76	0.76
Tryptophan	0.31	0.31	0.29	0.29	0.27	0.27

Mineral-vitamin premix added per kilogram of mixture: Vitamin A 12,999 IU, Vitamin D3 4,950 IU, Vitamin E 75 mg, Vitamin K3 3 mg, Vitamin B1 3 mg, Vitamin B2 7.95 mg, Vitamin B6 4.05 mg, Vitamin B12 0.0195 mg, Vitamin C 19.95 mg, Biotin 0.15 mg, Niacin 60 mg, Calcium pantothenate 15 mg, Folic acid 1.95 mg, Iodine 1.0005 mg, Selenium 0.3 mg, Choline chloride 399.9 mg, Iron 39.99 mg, Copper 15 mg, Manganese 99.9 mg, Zinc 99.9 mg, Methionine 2100 mg, Lysine 1200 mg. *Added fat - add swine fat and linseed oil according to the quantities from table 2.

Table 2. Presentation of different contents (%) of swine fat and linseed oil added in three experimental groups

Additive (%)	Starter			Grower			Finišer		
	SF	Lo	SF+Lo	SF	Lo	SF+Lo	SF	Lo	SF+Lo
Swine fat	1.00	-	0.50	2.50	-	1.25	5.00	-	2.50
Linseed oil	-	1.00	0.50	-	2.50	1.25	-	5.00	2.50
Total	1.00	1.00	1.00	2.50	2.50	2.50	5.00	5.00	5.00

Legend: C - control group - neither swine fat or linseed oil was added; SF - added swine fat; Lo – added linseed oil; SF+Lo – added swine fat and linseed oil in a ratio of 1:1;

Results and Discussion

In the described study, the effects of adding different sources of fat in the diet of broiler chickens on the production results and the chemical composition of drumstick meat with thigh, in broiler chickens, were studied.

Table 3 shows the results of chemical analysis for total saturated, total monounsaturated and total polyunsaturated fatty acids, as well as the content of n-3, n-6 fatty acids and their ratio n-6/n-3 in the feed mixtures of the examined groups of broilers. According to the addition of different sources of fat in the feed for broilers, the content of SFA, MUFA and PUFA in the feed differed among the broiler groups. The mixture of the control group had the highest content of n-6 MK, and the lowest content of n-3 MK. Consequently, the highest ratio of n-6/n-3 was precisely in that group, which leads to the conclusion that recipes with an increased content of grain have a higher ratio of n-6/n-3 fatty acids, and that consequently the meat of chickens fed with such mixtures could have an unfavorable n-6/n-3 MK ratio. The most favorable n-3 fatty acid content as well as the most favorable n-6/n-3 ratio of fatty acids was in the group with the addition of linseed oil (Lo). As a result, the profile of fatty acids, that is, the content of n-3 fatty acids and the most favorable ratio of n-6/n/3 fatty acids in the meat of drumsticks with corabatak will have the same trend among the examined groups of broilers (Table 5), which confirms the fact that the profile of fatty acids from the meal has repercussions on the profile of fatty acids in the meat (Milanković, 2021).

Table 3. Content (%) and ratios of fatty acids in complete mixtures (starter, grower, finisher) for feeding broilers

		Group			
		C	SF	Lo	SF+Lo
Starter	SFA,%	17.37	22.38	16.40	16.82
	MUFA,%	25.89	35.23	26.10	26.82
	PUFA,%	56.74	42.39	57.50	56.36
	n-3	3.87	7.36	11.52	7.80
	n-6	52.87	35.03	45.98	48.56
	n-6/n-3	13.66	4.76	3.99	6.23
Grover	SFA,%	18.37	22.96	14.62	18.04
	MUFA,%	26.02	34.57	25.84	29.39
	PUFA,%	55.61	42.47	59.54	52.57
	n-3	3.89	7.61	11.96	6.05
	n-6	51.72	34.86	47.58	46.52
	n-6/n-3	13.30	4.58	3.98	7.69

Finisher	SFA,%	15.99	25.53	13.53	18.43
	MUFA,%	27.90	35.84	27.93	29.58
	PUFA,%	56.11	38.63	58.54[a]	51.99
	n-3	3.63	6.28	10.39	6.41
	n-6	52.48	32.35	48.15	45.58
	n-6/n-3	14.46	5.15	4.63	7.11

Table 4 shows the body weight, growth, consumption and conversion of the examined groups of broilers. In the group of broilers with the addition of linseed oil, a significantly higher final body weight was recorded than in the other groups. The increase for both periods (1-21st and 1-42nd day) was higher in the group with the addition of linseed oil. Broilers fed only basic feed showed worse conversion (1st to 21st, and 1st to 42nd day) than those with the addition of linseed oil and/or swine fat (Milanković, 2021).

Many studies indicated no difference in broilers growth performance parameters when the animals were fed with different fat sources (Ghazalah i Ali, 2008; Poorghasemi i sar., 2013**)**. Also, Andreotti *et al.* (2013) demonstrated no effects on performance when broiler chickens were fed from days 21 to 49 with diets containing swine fat. The growth performance of broilers fed on n-3 PUFA-enriched diets (linseed oil) was not different from those fed on a control diet. These results are in agreement with several previous studies (Mandal i sar., 2014; Mirshekar i sar., 2015; Kanakrii sar., 2016).

The results of the chemical composition of breast meat (proteins, lipids, moisture and ash) show that the group with the addition of a mixture of fat and linseed oil had significantly the highest fat content, and the group that received swine fat added to feed had the significantly highest protein content. In the meat of drumsticks with thigh, the content of both lipids and proteins was significantly higher in the group with the addition of a mixture of linseed oil and swine fat (Table 4). Zelenka et al. (2006) noticed no variation in chemical composition of meat from drumsticks with thighs due to dietary incorporation of linseed oil in broiler chicken diet.

Table 4. Production results and chemical composition of meat

Parameter		**Group**			
		C	**SF**	**L_O**	**SF+L_O**
BW, 42. day, g		2452±194.29[b]	2433±163.66[b]	2551±162.96[a]	2405±173.90[b]
WG, g	1-21	1034.60±88.46	1050.44±66.47	1061.24±78.41	1048.95±83.87
	1-42	2403.68±194.34[b]	2383.31±163.38[b]	2500.01±163.06[a]	2356.20±180.59[b]
FCR, kg	1-21	1.51[a]	1.44[b]	1.47[b]	1.49[a]
	1-42	1.86[a]	1.77[b]	1.79[b]	1.81[a]
Consumption, g	1-21	1562.24	1512.63	1560.02	1562.93
	1-42	4379.55	4167.50	4450.96	4278.48
Breast chemical content, (%)	Moisture	74.00±0.66[b]	73.17±0.67[c]	73.71±0.59[b]	75.41±0.55[a]
	Lipid	1.24±0.29[a]	0.66±0.04[c]	0.96±0.15[b]	1.33±0.19[a]
	Protein	23.70±0.71[b]	25.12±0.70[a]	24.28±0.71[b]	22.25±0.44[c]
	Ash,	1.07±0.01[a]	1.05±0.03[a]	1.05±0.04[a]	1.02±0.01[b]

Thigh chemical content, (%)	Moisture	77.21±1.12^{b}	77.83±0.56^{c}	77.78±0.51^{b}	77.75±0.57^{a}
	Lipid	4.63±0.23^{a}	4.24±0.28^{c}	4.74±0.76^{b}	4.76±0.02^{a}
	Protein	17.79±0.39^{b}	17.66±0.56^{a}	17.11±1.03^{b}	17.84±0.54^{c}
	Ash	0.82±0.01^{b}	0.84±0.06^{b}	0.85±0.02^{b}	0.90±0.03^{a}

Legend: different letters in a row - ^{a,b,c}– $p<0.05$

The fatty acid composition of the meat (i.e. muscle) of drumsticks with thigh in relation to the added fat in the feed is shown in table 5. It was observed that the fatty acid composition of the meat of drumstick with carabatak reflects the fatty acid profile of the meal. A significant increase in the concentration of total SFA and MUFA was found in broilers fed with added swine fat compared to the other groups. PUFA was increased in the drumstick meat of the control group (without supplements). In the meat of drumsticks with thigh, the total content of n-6 PUFA was reduced with the addition of swine fat compared to other groups. Dietary supplementation with linseed oil, a rich source of n-3 PUFA, improved total n-3 PUFA in meat (SF< C< SF+Lo < LO).

The concept of synergism between animal fats and vegetable oils has been recognized for many years (Glaser i sar., 2004). Animal fats such as swine fat are rich in long-chain saturated fatty acids. Most vegetable oil sources have a high content of unsaturated fatty acids. Sanz et al. (2000) observed the effect of sunflower oil and a mixture of bovine tallow and swine fat on fatty acid profiles of broiler chicken meat. These results were similar to ours in the current study. Comparison of fatty acid profiles in drumsticks with thighs evidences changes in the preferential localization of SFA, MUFA and PUFA according to the dietary fat and oil sources. The maximal MUFA contents were observed in drumsticks with thighs of swine fat fed groups. In the current study, broiler chickens fed with supplemented fat and oil (SF+LO) showed similar high PUFA contents in muscle from drumsticks with thighs.

Supplementation with swine fat in broiler chicken diets caused increases in the n-6/n-3 fatty acid ratio in drumsticks with thighs compared with other experimental groups. However, the most favorable n-6/n-3 fatty acid ratio in drumsticks with thighs was found in broiler chickens fed linseed oil (2.67). The proportion of total n-6/n-3, fulfilling the demands of health-conscious consumers, should be from 1 to 5, so the best oil supplement in broiler chickens diets in other studies were linseed oil, followed by the mixture of linseed oil and swine fat (Ibrahim i sar.,2018; Kanakri i sar., 2018). The dietary incorporation of linseed oil and swine fat during starter, grower and finisher phases can enrich broiler chickens meat with n-3 PUFA. This study has clearly shown that linseed oil in broiler nutrition provided the best n-6/n-3 ratio.

The influence of nutrition on the health of the cardiovascular system has always been known. Ulbricht and Southgate (1991) presented lipid indices to science, i.e. formulas that can be used to calculate or predict a certain risk of cardiovascular disorders, if the fatty acid composition of the diet is known. Lipid indices include: atherogenic index (AI), thrombogenic index (TI) and hypo/hypercholesterolemic index (h/H). The concentrations of myristic and palmitic acids (C14:0 and C16:0) are important for the calculation of the AI and h/H indices, while the concentration of stearic acid (C18:0) from saturated fatty acids is also important for the calculation of the TI index. The concentration of n-3 fatty acids is very important for obtaining the most favorable value of lipid indices, and especially for obtaining a favorable thrombogenic index.

Significant differences were observed among treatments in the atherogenic index (AI), thrombogenicity index (TI) and ratio of hypocholesterolemic/hypercholesterolemic fatty acids (hH) of drumstick meat with carabid meat in this study (Table 5). A lower thrombogenic index was calculated for the meat of animals supplemented with linseed oil with a higher n-3 level [28]. In the current study, a significantly lower hypocholesterolemic/hypercholesterolemic fatty acid (hH) ratio of drumstick meat with carabata was found in the swine fat group (p<0.05). Thus, in the group with swine fat, a significantly higher atherogenic index (AI) was found compared to the control group (Milanković, 2021). Lower values of the atherogenicity index and the thrombogenicity index indicate a healthier relationship in relation to the higher content of fatty acids that inhibit platelet aggregation and reduce the potential for coronary diseases. Conversely, a higher ratio of hypocholesterolemic/hypercholesterolemic fatty acids indicates a more nutritionally appropriate fatty acid profile.

It has been shown that increased intake of ZMK, cholesterol and food with an increased atherogenic and thrombogenic index has negative consequences on health (Attia et al., 2017). By replacing red meat with chicken meat, the risk of developing cardiovascular diseases decreases by 19% (Attia *et al.*, 2017).

Table 5. Fatty acid profile, lipid indices and MDA content in drumstick meat with thigh

		Group			
		C	**SF**	**Lo**	**SF+Lo**
Thigh Fatty acd profile	SFA,%	25.44 ± 1.335^{c}	30.09 ± 0.350^{a}	25.25 ± 1.579^{c}	28.48 ± 1.296^{b}
	MUFA,%	32.05 ± 1.618^{d}	43.02 ± 1.536^{a}	37.20 ± 0.867^{c}	39.54 ± 0.900^{b}
	PUFA,%	42.51 ± 1.935^{a}	26.89 ± 1.489^{d}	37.55 ± 1.608^{b}	31.98 ± 1.788^{c}
	n-3	3.24 ± 0.251^{c}	2.23 ± 0.331^{d}	10.25 ± 0.708^{a}	6.11 ± 0.484^{b}
	n-6	39.27 ± 1.877^{a}	24.66 ± 1.430^{b}	27.31 ± 0.983^{c}	25.50 ± 1.337^{b}
	n-6/n-3	12.18 ± 1.024^{a}	11.24 ± 1.671^{a}	2.67 ± 0.122^{c}	4.18 ± 0.183^{b}
Lipid indices	AI	0.28^{a}	0.36^{b}	0.27^{a}	0.32^{b}
	TI	0.13^{a}	0.12^{a}	0.10^{b}	0.12^{a}
	h/H	3.80^{a}	1.40^{b}	3.61^{a}	2.87^{b}
MDA content	In fresh meat	0.20^{a}	0.16^{b}	0.17^{ab}	0.16^{b}
	After 3 months	0.26^{a}	0.21^{b}	0.26^{a}	0.23^{a}
	After 6 months	0.40^{a}	0.30^{b}	0.39^{a}	0.38^{a}

Legend: different letters in a row - ^{a,b,c,d}– p<0.05

When adding oil with a high NFA content to broiler mixtures, as a rule, meat prone to oxidation processes is obtained. Lipid peroxidation is one of the most common causes of quality reduction and spoilage of meat, which is usually characterized by a change in the organoleptic properties of meat, as well as a reduction in nutritional value (Todorović, 2014). The oxidation process in meat is best monitored by determining the content of malondialdehyde (MDA) in fresh meat and meat after storage. MDA is a dialdehyde with three carbon atoms and is a secondary product of PNFA oxidation, which is characterized by relatively high stability (Amaral et al., 2018). The content of MDA is expressed as TBK-number.

Lipid peroxidation is naturally more intense in meat with a higher fat content, which is why it was monitored in this work. Storage at low temperatures does not stop this process, on the contrary, during storage, a certain amount of peroxide is formed, as primary products of peroxidation, which after thawing can lead to the formation of a larger amount of secondary products of lipid peroxidation (Todorović, 2014; Hansen et al., 2004). In this work, the concentration of MDA in fresh meat and in meat after storage at -20 °C for a period of 3 and 6 months was monitored. With the extension of storage time, the content of MDA in drumstick meat also increased, and with it the statistical significance of the difference between the groups.

In the experiment conducted for the purposes of this research, not a single antioxidant was added to broiler feed, only the influence of linseed oil on the increase in the process of lipid peroxidation was monitored, i.e. on the concentration of MDA in broiler meat.

The average content of MDA on the zero day of the test in the meat (fresh) of drumsticks with corabatak of the control group was higher ($p<0.05$) compared to the average content of MDA of the experimental groups of broilers (table 5). In the meat of drumsticks with corbatak after three months of frozen storage, the average content of MDA was higher ($p<0.05$) in the control group and the group fed with linseed oil. After six months of frozen storage, the average content of MDA in the meat of drumsticks with corabatak of the group fed with the addition of swine fat was lower ($p<0.05$) compared to the other investigated groups.

Conclusion

Adding different sources of fat to feed for broilers results in differences in the fatty acid composition of the feed between the examined groups of broilers, which also affects the chemical or fatty acid composition of the meat, especially drumstick meat with carabatak because it contains more fat compared to breast meat. These differences in the total content of SFA, MUFA, PUFA, total n-6, n-3 fatty acids affect a more favorable n-6/n-3 ratio of fatty acids important for the health of humans as the ultimate consumer of chicken meat. Also, different treatments of adding different sources of fat showed differences in AI, TI and h/H indices as well as MDA content, which affects the length and possibility of keeping broiler meat.

The chemical composition and quality of broiler meat can be influenced by modifying poultry rations.

Literature

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