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THE EFFECT OF COCONUT OIL INTAKE ON THE MEAT FATTY ACID PROFILE OF PIGS

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ABSTRACT

The article deals with the effect of adding coconut oil to the diet of heavy pigs on the concentration of fatty acids in leg meat, back fat, and liver. Lauric acid has several positive effects on the consumer. However, the concentration of this fatty acid in pig meat is very low or absent. Coconut oil, which contains a high concentration of lauric acid, was added to the pigs´ diet (30 g per head per day) for 18 days before slaughtering. This dietary intervention increased the concentration of lauric acid in leg meat and back fat but had no effect on the lauric acid concentration in pig liver. Concentrations of margaric and arachidic acids in leg meat, oleic, arachidic, and sum of mono-unsaturated fatty acids in back fat, palmitoleic and sum of saturated fatty acids in pig liver were affected by the addition of coconut oil to the diet of pigs. The monounsaturation index C18:1/C18:0 in leg meat was higher in the coconut oil group. The intake of small amounts of coconut oil affected the concentration of some fatty acids and increased the concentration of lauric acid in the leg meat and back fat of pigs.

Keywords: pig meat, fatty acids, lauric acid, coconut oil

INTRODUCTION

Meat represents an essential source of high-quality protein and fat for a major part of the world's population. Meat in general, also contributes markedly to the consumption of a variety of trace nutrients, including iron, zinc, selenium, vitamin D, and vitamin B12 (**Kopčeková *et al.*, 2020**). However, they concluded that high consumption of meat, mainly pork and processed meat, seems to be associated with higher levels of total cholesterol, LDL cholesterol, and triglycerides (**Kopčeková *et al.*, 2020**). According to **Baum *et al.*** (**2012**), saturated fatty acids (SFA) are associated with risk of coronary heart disease. Monounsaturated fatty acids (MUFA), especially oleic acid, are associated with favorable effect on cardiovascular disease risk markers, a MUFA-rich diet has also been shown to increase arterial intima-media thickness, greater mortality in observational studies, and coronary artery atherosclerosis in intervention studies conducted in mice and non-human primates. Although the cardioprotective effect of n-6 and n-3 poly unsaturated fatty acids was reported by **Baum *et al.*** (**2012**). In addition, the fatty acids composition of pigs' meat and back fat are responsible for odor and flavor, as well the oxidative stability of meat (**Daza *et al.*, 2017**). Among the main factors affecting fatty acid composition in pig production are breed, gender, and nutrition (**Bučko *et al.*, 2015; Imrich *et al.*, 2016; Bahelka *et al.*, 2020; Bujňák *et al.*, 2021**). The profile of fatty acids in pig meat is influenced by nutrition by composition of the diet. Concretely, **Václavková *et al.*** (**2015**) added linseed to the pigs' diet and in back fat determined significant changes in poly unsaturated fatty acids (PUFA) concentration as well as the n-6/n3 PUFA ratio. It was published that consumption of the SFA-rich tropical oils, such as hydrogenated coconut oil, raise cholesterol level. Studies demonstrating this effect are often confounded by a developing essential fatty acid deficiency (**Elson, 1992**). Coconut oil consists of approximately 90% saturated fat and 9% unsaturated fat. The saturated fat in it, however, has a different composition from the saturated fats in animal products. More than 50% of the fat in coconut oil is lauric acid (C12:0). Coconut oil is the most concentrated plant-based source of lauric acid (**Boateng *et al.*, 2016**). Coconut oil has the potential to provide protection against not only heart disease but also a wide range of chronic health disorders such as diabetes and cancer. Coconut oil has also been used as a means of preventing and even treating infectious diseases, but evidence about coconut oil has been kept buried in medical magazines due to a widespread preconception against saturated fats. According to human epidemiological evidence, **Dayrit** (**2000**) found that coconut oil is safe. Coconut-eating people like the Polynesians and Filipinos have low cholesterol on average and a very low incidence of heart disease. The insight on coconut oil as a functional food was published by **Enig** (**1996**). He claimed that coconut oil is at worst neutral with respect to the atherogenicity of fats and oils and, in fact, is likely to be a beneficial oil for the prevention and treatment of some heart disease. Additionally, coconut oil provides a source of antimicrobial lipids for individuals with compromised immune systems and is a non-promoting fat with respect to chemical carcinogenesis. Lauric acid presents approximately 45 to 53% of the coconut oil overall fatty acid composition. Therefore, **Puyalto *et al.*** (**2016**) claimed that all the properties of coconut oil can indeed be attributed to the properties of lauric acid. Within this context, an experiment with the addition of coconut oil to the diet of fattened pigs was realized to gain pig meat with a higher concentration of lauric acid. The next aim of this research was to determine the effect of adding coconut oil to pigs' diets on the fatty acid composition of the pigs' tissues.

MATERIAL AND METHODS

TFor this experiment, 12 pigs (white large x duroc) were used. Housing conditions meet the requirements of pigs. The pen size for 3 pigs was 4 x 4 meters with a concrete floor. One pig accounted for 5.3 square meters of pen area. Each pen contained a nipple waterer and an iron sloped feeding trough with a length of 2.0 m and a width of 0.8 m. Feeding trough allow all pigs in the pen to receive feed at the same time. Pigs were fed twice a day (morning and afternoon feeding). Pigs were fattened to a very high live weight. Pigs were divided into two groups, the control group and the coconut oil group. Each group of pigs had an equal ratio of male and female pigs. The experiment as well as the addition of coconut oil to the diet in the coconut oil group (30 g per pig and day) started 18 days before slaughtering. The composition of the diet during the experiment is shown in Table 1. The diet was prepared twice a day, always before feeding. The diet components were mixed and fed in semi-liquid form. Access to water as well as to diet was *ad libitum*. After an 18-days long experiment, the slaughtered live weight was 198 ± 8.7 kg on average. Animal care throughout the whole experiment was in accordance with **Directive 2010/63/EU** on the protection of animals used for scientific purposes.

Table 1 Nutritional characteristic of the diets used during experiment

	Daily diet composition (kg)	
	Control group	Coconut oil group
Wheat	3.2	3.2
Barley	0.8	0.8
Dried bread	1.5	1.5
Dehydrated alfalfa	1.0	1.0
Vitamin-mineral premix[1]	0.005	0.005
Coconut oil	-	0.030
Total daily diet	6.505	6.535
	Calculated nutritional parameters	
	Control group	Coconut oil group
MEo (MJ/daily diet)	78.2	79.2
Crude protein (g/daily diet)	785.8	785.8
Crude fibre (g/daily diet)	438.5	438.5
Ether extract (g/daily diet)	118.3	146.8
Ash (g/daily diet)	398.2	398.2
Lysine (g/daily diet)	25.4	25.4
Phosphorus (g/daily diet)	15.6	15.6
Phosphorus digestible (g/daily diet)	5.5	5.5
Calcium (g/daily diet)	17.4	17.4
C6:0 (g/daily diet)	0	0.2
C8:0 (g/daily diet)	0	2.3
C10:0 (g/daily diet)	0	1.8
C12:0 (g/daily diet)	0.2	13.8
C14:0 (g/daily diet)	0.4	5.5
C16:0 (g/daily diet)	21.0	23.5
C16:1 (g/daily diet)	0.4	0.4
C18:0 (g/daily diet)	1.1	1.9
C18:1n-9 (g/daily diet)	16.9	18.8
C18:2 n-6 (g/daily diet)	63.3	63.8
C18:3 (g/daily diet)	10.6	10.6
C20:0 (g/daily diet)	0.4	0.4
C20:1 (g/daily diet)	1.2	1.2
C22:0 (g/daily diet)	0.1	0.1
C22:1 (g/daily diet)	0.5	0.5
C24:0 (g/daily diet)	0.1	0.1
SFA (g/daily diet)	23.1	49.5
MUFA (g/daily diet)	19.0	20.9
PUFA (g/daily diet)	73.9	74.4

[1] Mikros prasata/ošípané (Mikrop, Czech republic) contains in 1 kg: 280 g Ca; 65 g P; 36 g Na; 4,4 g Mg; 8,5 g L-lysine; 3,7 g threonine; 520 mg $CuSO_4.5H_2O$; 2700 mg Fe; 2000 mg ZnO; 800 mg MnO; 15 mg $CoSO_4.7H_2O$; 4 mg Na_2SeO_3; 130000 IU vitamin A; 15000 IU vitamin D_3; 130 mg vitamin E; 80 mg vitamin B_2; 300 µg vitamin B_{12}; 50 mg niacinamide; 25 mg butylhydroxytoluene; 5 mg butylhydroxyanisole; 50 mg ethoxyquin; 500 mg aromatic substances; MEp – metabolizable energy for pigs; C6:0 – caproic acid; C8:0 – caprylic acid; C10:0 – capric acid; C12:0 – lauric acid; C14:0 – myristic acid; C16:0 – palmitic acid; C16:1 – palmitoleic acid; C18:0 – stearic acid; C18:1 n-9 – oleic acid; C18:2 n-6 – linoleic acid; C18:3 – α-linolenic acid; C20:0 – arachidic acid; C20:1 – gondoic acid; C22:0; SFA – sum of saturated fatty acids; MUFA – sum of monounsaturated fatty acids; PUFA – sum of polyunsaturated fatty acids.

For fatty acid determination samples of meat from the leg (included randomly the three muscles *Biceps femoris, Semimembranosus, Semitendinosus*), back fat, and liver were taken 24 hours *post mortem* from each of the 12 pigs in the experiment. Samples of meat from the leg, back fat, and liver were as similar as possible. The obtained samples were freeze-dried and homogenized. From the fat gained from the samples, the fatty acids were determined similar to those in previous experiments (**Gálik *et al.*, 2018; Rolinec *et al.*, 2018**). To determine the concentration of fatty acids in fat from pigs' tissue samples, the triglycerides were hydrolyzed (saponified) to glycerol and free fatty acids. Fatty acids were derivatized into methylesters (FAMEs). After preparation, the FAMEs were fractionated by the carbon number and the unsaturation degree by gas chromatography (GC) with a flame ionization detector (FID). The determinations were carried out on an Agilent 6890A GC (Agilent Technologies, U.S.A.) analyzer with a flame ionization detector. Automatic split injection was carried on an Agilent auto sampler (Agilent Technologies, U.S.A.). FAMEs were separated on the DB-23 analytical column and identified by FID. For the identification of fatty acids, a 37-component mixture (Supleco 47885-U) was used.

The results were statistically processed with IBM SPSS v. 26.0 by ANOVA. Differences in means between the groups of pigs were tested by the T test. A P-value less than 0.05 was considered significant.

RESULTS

In the leg meat of pigs in the coconut oil group was lauric acid at a concentration of 0.09 g/100g FA. Whereas lauric acid was not detected in the control group. The addition of coconut oil to the diet increased the concentration of lauric acid also in back fat to 0.14 g/100g FA, which was almost double the value compared to the control group ($P<0.05$). The presence of lauric acid in the liver was not detected in booth groups (Table 2.). Liver of pigs that ingested diet containing coconut oil had the presence of margaric acid and eicosadienoic acid, whereas these fatty acids were not detected in the control group. Intake of coconut oil (30 g per head per day) within 18 days significantly increased arachidic acid in leg meat and SFA in liver, as well as decreased margaric acid in leg meat, oleic acid, arachidic acid, and MUFA in back fat and palmitoleic acid in liver ($P<0.05$). Other differences in fatty acid concentrations between the control and coconut oil groups were insignificant ($P>0.05$). Regardless of the group, oleic acid, followed by palmitic and stearic acid, were the fatty acids with the highest proportion in leg meat and back fat. In the liver of control pigs, oleic acid was followed by stearic and palmitic acid, and in the liver of pigs in coconut oil group stearic acid followed by oleic and palmitic acid were the fatty acids with the highest proportion. The highest MUFA/SFA ratio was detected in leg meat, whereas the highest PUFA/SFA ratio was detected in liver in booth groups, respectively (Table 3.). The thioesterase index, indicating catalysis of C16:0 synthesis from C14:0, and the elongase index, as an indicator of C18:0 synthesis from C16:0, were highest in fat from the liver. The monounsaturation index of C18:1/C18:0, C16:1/C16:0 was the highest in fat from leg meat. No n-3 fatty acid was detected in the liver samples. Therefore, the n-3/n-6 and n-6/n-3 ratios cannot be calculated for liver. A higher n-3/n-6 ratio had back fat, whereas a higher n-6/n-3 ratio had fat from leg meat. The values of the monounsaturation index C18:1/C18:0 in the fat of leg meat were significantly different ($P<0.05$).

DISCUSSION

Lauric acid is with a proportion of 41.31% the dominant fatty acid in coconut oil (**Hovorková *et al.*, 2018**). **Vojtaššáková *et al.* (2000)** published an even higher proportion of lauric acid (45.32%) in the coconut oil. On the other hand, the meat (**Pećina *et al.*, 2018**) and liver (**Daza *et al.*, 2017; Vojtaššáková *et al.*, 2002**) of pigs do not contain lauric acid. But, **Gan *et al.* (2020)** determined lauric acid in *longissimus dorsi* muscle in concentration of 0.17 to 0.29 g/100g. Back fat from pigs, as published by **Oteyola et al.** (**2022**) contains approximately 1.7 g/100g of lauric acid, which is much more than was detected in the back fat of pigs fed with the addition of coconut oil in this study. Since the pig is a monogastric animal and dietary fatty acids are absorbed intact in the small intestine, the dietary oil affects the fatty acids incorporated into lipid tissue (**Wood *et al.*, 1999**). Also, the results of this study (Table 2.) point out the possibility of increasing the concentration of lauric acid in the pig leg meat and back fat by adding a small amount of feed containing high concentration of lauric acid to the diet.

Table 2 Fatty acid profile of pigs meat according to group (g/100g of fatty acids)

Mean ± s.d.	Leg meat		Back fat		Liver	
	Control	Coconut oil	Control	Coconut oil	Control	Coconut oil
C12:0	n.d.	0.09 ±0.00	0.08 ±0.01	0.14 ±0.03*	n.d.	n.d.
C14:0	1.19 ±0.07	1.32 ±0.13	1.41 ±0.01	1.45 ±0.08	0.95 ±0.03	1.10 ±0.15
C16:0	22.93 ±0.55	23.08 ±0.68	23.92 ±0.41	23.60 ±0.76	21.37 ±1.67	22.47 ±0.77
C16:1	3.26 ±0.32	3.79 ±0.61	1.87 ±0.28	2.15 ±0.14	2.14 ±0.05	1.43 ±0.38*
C17:0	0.23 ±0.01	0.20 ±0.01*	0.34 ±0.07	0.43 ±0.16	n.d.	3.19 ±0.04
C18:0	9.83 ±0.17	8.99 ±0.61	13.53 ±0.42	12.56 ±1.41	22.41 ±5.76	26.90 ±0.41
C18:1 n-9 cis	50.48 ±0.85	50.38 ±0.85	45.76 ±0.13	45.07 ±0.08*	28.42 ±4.06	22.60 ±2.27
C18:2 n-6 cis	3.79 ±0.33	3.35 ±0.43	6.17 ±0.32	7.19 ±0.89	10.97 ±2.89	10.26 ±1.88
C18:3 n-3	0.26 ±0.03	0.26 ±0.04	0.44 ±0.04	0.65 ±0.21	n.d.	n.d.
C20:0	0.13 ±0.01	0.15 ±0.01*	0.19 ±0.01	0.17 ±0.00*	n.d.	n.d.
C20:1 n-9 cis	1.14 ±0.26	1.21 ±0.02	1.32 ±0.11	1.16 ±0.11	n.d.	n.d.
C20:2 n-6 cis	0.27 ±0.07	0.25 ±0.07	0.47 ±0.04	0.47 ±0.04	n.d.	1.52 ±0.02
C20:3 n-3 cis	n.d.	n.d.	0.14 ±0.00	0.16 ±0.03	n.d.	n.d.
C20:4 n-6	0.17 ±0.04	0.15 ±0.02	0.15 ±0.01	0.19 ±0.05	9.02 ±2.99	7.53 ±1.82
C24:1 n-9	n.d.	n.d.	n.d.	n.d.	3.66 ±0.91	3.24 ±0.39
SFA	34.31 ±0.78	33.84 ±0.21	39.48 ±0.08	38.35 ±1.90	44.26 ±3.56	52.07 ±2.37*
MUFA	54.88 ±0.80	55.38 ±0.08	48.94 ±0.29	48.37 ±0.18*	31.32 ±7.37	25.65 ±0.85
PUFA	4.49 ±0.46	4.01 ±0.40	7.37 ±0.40	8.66 ±1.22	19.99 ±5.87	18.55 ±2.85
Unidentified	6.32 ±0.46	6.78 ±0.25	4.21 ±0.18	4.62 ±0.50	4.44 ±2.10	3.73 ±1.13

s.d. – standard deviation; C12:0 – lauric acid; C14:0 – myristic acid; C16:0 – palmitic acid; C16:1 – palmitoleic acid; C17:0 – margaric acid; C18:0 – stearic acid; C18:1 n-9 cis – oleic acid; C18:2 n-6 cis – linoleic acid; C18:3 n-3 – α-linolenic acid; C20:0 – arachidic acid; C20:1 n-9 cis – gondoic acid; C20:2 n-6 cis – eicosadienoic acid; C20:3 n-3 cis – eicosatrienoic acid; C20:4 n-6 - arachidonic acid; C24:1 n-9 – nervonic acid; SFA – sum of saturated fatty acids; MUFA – sum of monounsaturated fatty acids; PUFA – sum of polyunsaturated fatty acids; n-3 – sum of ω-3 fatty acids; n-6– sum of ω-6 fatty acids; n.d. – not detected; * - difference between control and coconut oil group in that sample type is significant at P<0.05.

Table 3 Saturation, and monounsaturation, and quality index of pigs' meat according to group

Mean ± s.d.	Leg meat		Back fat		Liver	
	Control	Coconut oil	Control	Coconut oil	Control	Coconut oil
C16:0/C14:0	19.26 ± 0.69	17.52 ± 1.25	16.91 ± 0.14	16.23 ± 1.47	23.98 ± 0.71	20.74 ± 3.42
C18:0/C16:0	0.43 ± 0.00	0,39 ± 0.04	0.57 ± 0.03	0.53 ± 0.04	1.07 ± 0.35	1.20 ± 0.04
C16:1/C16:0	0.14 ± 0.01	0.16 ± 0.02	0.08 ± 0.01	0.09 ± 0.01	0.09 ± 0.00	0.06 ± 0.02
C18:1/C18:0	5.14 ± 0.17	5.62 ± 0.31*	3.39 ± 0.11	3.62 ± 0.41	1.37 ± 0.53	0.84 ± 0.08
MUFA/SFA	1.60 ± 0.06	1.64 ± 0.01	1.24 ± 0.01	1.26 ± 0.07	0.72 ± 0.22	0.49 ± 0.04
PUFA/SFA	0.13 ± 0.01	0.12 ± 0.01	0.19 ± 0.01	0.23 ± 0.04	0.45 ± 0.10	0.36 ± 0.07
n3/n6	0.06 ± 0.00	0.07 ± 0.02	0.09 ± 0.00	0.10 ± 0.02	n.d.	n.d.
n6/n3	16.25 ± 0.47	14.87 ± 4.00	11.65 ± 0.22	10.11 ± 1.75	n.d.	n.d.

s.d. – standard deviation; C14:0 – myristic acid; C16:0 – palmitic acid; C16:1 – palmitoleic acid; C18:0 – stearic acid; C18:1 – oleic acid; SFA – sum of saturated fatty acids; MUFA – sum of monounsaturated fatty acids; PUFA – sum of polyunsaturated fatty acids; n3 – sum of ω-3 fatty acids; n6– sum of ω-6 fatty acids; n.d. – not detected; * - difference between control and coconut oil group in that sample type is significant at P<0.05.

As published by **Puyalto *et al.*** (**2016**) and **Hovorková *et al.*** (**2018**), plant-based fatty acids, especially lauric acid have strong antimicrobial activity against gram-positive bacteria and some viruses and fungi, while at the same time having no effect on commensal bacteria like *Bifidobacterium* spp. and *Lactobacillus* spp.). The positive effect of coconut oil intake on the abundance of *Lactobacillus* spp. in the gastrointestinal microbiome was detected by **Rolinec *et al.*** (**2020**). In addition, **Oteyola *et al.*** (**2022**) published that coconut oil is less obesogenic than soybean oil. Another positive effect of adding lauric acid to the diet of monogastric animals was published by **Zeiger *et al*.** (**2017**). They demonstrated the possibility of reducing *Campylobaster* spp. on the meat by approximately 1 $\log_{10}$ cfu/g by adding lauric acid to the diet. The ability of lauric acid to reduce *Campylobacter jejuni* in an *in vitro* experiment was described by **Molatova *et al.*** (**2010).** Myristic acid is the fatty acid in coconut oil with the second highest proportion 15.56 to 17.09% (**Hovorková *et al.*, 2018; Vojtaššáková *et al.*, 2000**). Slightly and insignificant (P>0.05) increase was detected for myristic acid in all analyzed tissues of pigs in the coconut oil group compared to the control group. Whereas **Park *et al.*** (**2012**) published a significant effect of coconut oil supplementation in pigs diet on the myristic and palmitoleic acid levels in meat. In this study, similar tendencies were determined. Similar to the results of the experiment realized by **Bahelka *et al.*** (**2020**), the fatty acids with the highest proportion in leg meat were oleic, palmitic, and stearic acid. The order of fatty acids with the highest concentration in back fat (Table 2.) is similar to the results of **Daza *et al.*** (**2017**) who determined the fatty acid composition of different adipose tissues from heavy pigs. **Daza *et al.*** (**2017**) determined also fatty acid composition of fat from pig liver. They found a very similar proportion of four fatty acids with the highest concentration compared to the fat from the liver of control pigs (Table. 2). This suggests that the change in proportion and order of fatty acids in liver fat from pigs in the coconut oil group was caused by the addition of coconut oil to the diet. Similar to the results published by **Monziols *et al.*** (**2007**), external fat (leg meat and back fat) had higher unsaturation compared to internal fat in liver. According to **Dean and Hilditch** (**1933**), this gradation can be explained by the possibility that adipose tissue has the adaptability to temperature changes in an effort to maintain appropriate physical fluidity of lipids in different adipose tissues. This would cause an increase in the melting temperature of the fat from subcutaneous fat to internal sites. The results of this study indicate higher monounsaturation and unsaturation indexes in the leg meat and back fat compared to the liver fat. The same finding was detected by **Daza *et al.*** (**2017**). Also, **Daza *et al.*** (**2007**) in Iberian pigs, **Domínguez and Lorenzo** (**2014**) and **Domínguez *et al.*** (**2014**) in Celta breed pigs, **Bee *et al.*** (**2008**), **Bee *et al*.** (**2002**), **Bee** (**2001**) in improved white pigs find that intramuscular fat is in fact more monounsaturated than internal and external subcutaneous back fat and omental fat. Nevertheless, **Lluch *et al.*** (**1993**) found that intramuscular fat was less monounsaturated than subcutaneous fat, even though they used heterogeneous samples of male and female pigs. **Franco *et al.*** (**2006**) found in Celta breed pigs that the MUFA/SFA ratio in intramuscular fat and subcutaneous back fat was not statistically different, but that intramuscular fat tended to have less C18:1n-9 compared to subcutaneous back fat. Liver fat was the most polyunsaturated. Also, **Daza *et al*.** (**2017**) and **Domínguez *et al*.** (**2014**) found that liver fat was the most polyunsaturated compared with subcutaneous fat and *Longissimus dorsi* intramuscular fat. Lauric acid, the fatty acid most abundant in coconut oil was after dietary intervention not detected in liver fat. This is not consistent with the findings published so far. According to **Otten *et al*.** (**1993**) liver has a low capacity for fatty acid synthesis, thus the fatty acids utilized in lipid synthesis are primarily obtained from circulating fatty acids released by adipose tissue or the diet (especially linoleic acid). The majority of triglycerides that are produced in the liver are esterified or stored, and so the lipid composition reflects those fatty acids in the blood, particularly from ingested feed. Low values of n-6/n-

3 ratio, high values of the PUFA/SFA and MUFA/SFA ratios are related to the nutritional values of adipose tissues. As published by **Daza *et al.*** (**2017**) the highest n6/n3 ratio was determined in leg meat, followed by back fat. However, the n-6/n-3 value determined in this study is higher than recommended value, less than 4:1. **Daza *et al.*** (**2017**) also realized experiment with heavy pigs. And explained the high n-6/n-3 fatty acid ratio by the fact that pigs were fed a concentrate rich in carbohydrates and linoleic acid. MUFA/SFA and PUFA/SFA ratios in the liver fat of pigs in coconut oil were lower compared to those published by **Daza *et al.*** (**2017**). But MUFA/SFA and PUFA/SFA ratios in leg meat and back fat, regardless of the group, were comparable to **Daza *et al.*** (**2017**), **Domínguez and Lorenzo** (**2014**) and **Domínguez *et al.*** (**2014**). In order to achieve appropriate meat quality in terms of the meat maturation process, pig fat tissue must contain more than 12% stearic acid as well as less than 12% linoleic acid (**Mourot and Hermier, 2001**). Back fat and liver, regardless of the group in this experiment, met these requirements on stearic and linoleic acid.

CONCLUSION

After dietary treatment with coconut oil, the pigs' meat contains lauric acid, whereas the control group does not, and the back fat contains more lauric acid compared to the control group. The intake of small amounts of coconut oil also affected the concentration of some other fatty acids. Increased concentration of arachidic acid in leg meat and margaric, eicosadienoic as well as sum of saturated fatty acids in the liver were detected. Decreased concentrations of margaric acid in leg meat, oleic, arachidic and sum of monounsaturated fatty acids in the back fat, and palmitoleic acid in the liver were detected. The monounsaturation index C18:1/C18:0 in leg meat was higher in the coconut oil group.

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