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Using Rapeseed Cake to Improve Fatty Acid Composition of Turkey Meat

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ABSTRACT

Rapeseed is the most widely used oil crop in Europe and it is an ideal raw material for the production of biodiesel. Because of a high nutritional value and a relatively high omega-3 fatty acids content, rapeseed cake can be used in poultry nutrition for the enrichment of meat and eggs. Therefore, the aim of this study was to determine the possibility of using rapeseed cake in diets for turkeys for the purpose of enriching turkey meat with omega-3 fatty acids. In the study, 120 male day-old Nicholas 700 turkeys were used and randomly divided into 3 groups, each group with 4 replications (n= 10). The control groups of turkeys were fed on compound feed without rapeseed cake and the experimental groups were fed with 5 or 10% share of rapeseed cake in compound feed. Based on the results obtained, we can conclude that the share of rapeseed cake of 5 or 10% in the compound feed did not cause any adverse impact on the performance of turkeys. Also, we established that there was an increase of the amount of omega-3 fatty acids with increased share of rapeseed cake and there was a positive trend of a decrease of the ratio of omega-6/omega-3 polyunsaturated fatty acids. Positive financial effect of fattening can be expected, because rapeseed cake is a cheaper source of protein in comparison with the commonly used soybean meal. Therefore, rapeseed cake can be recommended in fattening of hybrid turkeys, with a share up to 10% in the compound feed.

Keywords: Growth performance, Omega-3 fatty acids, Rapeseed cake, Turkey.

INTRODUCTION

In the recent years, an increase in the price of soybean meal has been recorded on the world market, which together with the ban on the use of processed animal protein leads to a substantial increase in the prices of feeds in poultry nutrition. Therefore, great efforts of nutritionists and feed producers are aimed at finding a favourable source of protein in poultry nutrition that would partially or completely replace the abovementioned feeds. During the past decades, by-products in the production of biodiesel have been used as an alternative source of protein in poultry nutrition.

Rapeseed is the most widely used oil crop in Europe, because of its relatively low cost compared to the other oil crops and good adaptability to various growing conditions; and it is an ideal raw material for the production of biodiesel. Rapeseed cake, as a by-product in biodiesel production, is characterized by high nutritional value, consisting of approximately 35.0 to 45.0% crude protein, 14.0-15.0% of crude fat, 1,736 kcal kg^{-1} of metabolic energy, 8.0-9.0% of omega-3 (PUFAn3) and 20.0-24.0% of omega-6 (PUFAn6) fatty acids. It

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contains less protein compared to fish meal, but the amounts of omega-3 and omega-6 acids are approximately equal (Proskina *et al*., 2011). However, the limiting factors for higher share in feed mixtures are high amount of crude fibre (Chibowska *et al*., 2000), and antinutritional factors like glucosinolates, erucic acid, tannin, and phytates (Smulikowska *et al*., 1998).

In recent years, nutritionists pay more and more attention to the ratio of omega-6/omega-3 polyunsaturated fatty acids (PUFAn6/PUFAn3), and state that this ratio is an important factor in the occurrence of cancer and coronary heart disease, especially in creating blood clots that lead to heart attack. Therefore, it is advised that this ratio should be 4 and even lower (Enser, 2001). In the diet of modern man, this ratio is several times higher primarily due to the use of vegetable oils in the diet like sunflower and soybean oil, which are a rich source of omega-6 fatty acids (Simopoulos, 1991). According to Pfeuffer (2001), extremely unfavourable ratio reduces endogenous synthesis of long chain PUFA like docosahexsaenoic (DHA, C22:6n3) and eicosapentaenoic acid (EPA, C22:5n3), which are considered to be extremely important in the prevention of cardiovascular disease. The enrichment of poultry meat with EPA and DHA has been proposed as a potential vehicle for increasing dietary intakes of long chain n-3 PUFA in the human diet by Gibbs *et al*. (2010) and Rymer and Givens (2005). Therefore, the reduction of this ratio would significantly contribute to the maintenance and improvement of human health.

The fatty acid profile of poultry meat is related to the composition of the bird's diet and, as such, dietary alterations can be used to modify the proportion of PUFA in chicken meat (Rymer and Givens, 2005). Because of that, numerous researches on the impact of different feedstuffs in poultry nutrition on fatty acid profile of meat were conducted, but different types of oils were mainly used for changing the fatty acids profile (Lopez-Ferrer *et al*., 1999; Ivanković *et al*., 2004; Valavan *et al*., 2006). In each of these studies, PUFAn3 content was increased and the PUFAn6/PUFAn3 ratio was decreased. Some of the studies (Lopez-Ferrer *et al*., 1999) claim that the most effective is fish oil but its use in higher concentrations than 1-2% in food can cause undesirable organoleptic changes in meat (taste and odour of fish). Some researches are aimed at enhancing the natural production of n-3 long chain PUFA in chickens by incorporating vegetable oils rich in n-3 PUFA precursor, like alpha-linolenic acid (ALA,18:3n3), in their diets. Vegetable oils such as flaxseed and rapeseed oil are rich sources of ALA and other PUFAn3 fatty acids (Kartikasari *et al*., 2012), so the increase of PUFAn3 fatty acids in turkey meat can be achieved by addition of rapeseed oil in diet (Salamatdoustnobar, 2010). Previous research showed that higher amount of rapeseed meal in diet for turkeys increased the concentrations of polyunsaturated fatty acids in breast muscle, including linoleic and linolenic acids. Also, the PUFAn6/PUFAn3 ratio significantly decreased (Mikulski *et al*., 2012). Similar to that, inclusion of rape seed (Rahimi *et al*., 2011) and rapeseed cake (Bedeković *et al*., 2012) significantly increased the concentration of omega-3 fatty acids in broiler meat while the PUFAn6/PUFAn3 ratio was significantly decreased. Furthermore, an increase of unsaturated fatty acid content in lipid tissue (abdominal fat) of turkeys fed with rapeseed cake was observed by Saadi *et al*. (1993). Therefore, the aim of this study was to determine the possibility of using rapeseed cake in diets of turkeys for the purpose of enriching turkey meat with omega-3 fatty acids.

MATERIALS AND METHODS

In this study, 120 male day-old Nicholas 700 turkeys were used and randomly divided into 3 groups, each group with 4 replications (n= 10). Each group was placed in a cage with a floor grazing throughout the test duration of 65 days. The trial facilities at Faculty of Agriculture, University of Zagreb, were thoroughly cleaned and disinfected a few days before poults entered. The day before, cages were heated to a temperature of 27°C (in the occupied zone 35°C). The floor area of the cages was covered with a thick layer of wood shavings of 10cm, which was covered with construction paper. The control groups of turkeys were fed on feed mixture that did not contain any rapeseed cake (T-0) and the experimental groups were fed with mixtures that contained rapeseed cake ("double low" cultivar) in the proportion of 5 and 10% (T-5 and T-10). Turkeys were fed on prestarter (PS) feed mixture during the first four weeks; the next three weeks on starter (ST) feed mixture, and then, until the end of the study, on grower (GR) feed mixture. The feed ingredients of diets for turkeys are shown in Table 1. Diets were formulated as isoenergetic and isonitrogenous according to National Research Council (1994). Calculative values of feed mixtures are shown in Tables 2 and 3. Chemical composition of rapeseed cake (Table 2) used in our study were analyzed according to HRN ISO 6496 (2001), HRN ISO 5984 (2004), HRN EN ISO 5983-2 (2010), HRN ISO 6492 (2001), HRN EN ISO 6865 (2001), HRN ISO 6491 (2001) and HRN ISO 7485 (2001). Prior to amino acids analyses, the samples were hydrolysed in 6 N HCl at 110°C for 22 h. Amino acid concentrations were determined by HPLC after postcolumn derivatization (AOAC, 2000; method 994.12). All analyses were performed in duplicate.

Turkeys were fed "ad libitum" during first seven days from the floor feeders, and then, until the end of the study, from round hanging feeders. Water was given to the turkeys from the round plastic watering containers in the first seven days, and then from hanging automatic round watering containers, which were regularly washed and disinfected. One-day old poults were

Table 1. Feed ingredients of diets for turkeys.

Ingredients (%)	Treatment								
	T-0 [a]			T-5 [b]			T-10 [c]		
	PS [d]	ST [e]	GR [f]	PS	ST	GR	PS	ST	GR
Corn	39.40	46.00	50.75	38.00	44.10	48.95	36.20	42.20	47.00
Soybean toasted	5.00	6.00	6.00	5.00	6.00	6.00	5.00	6.00	6.00
Soybean meal	42.50	34.50	30.00	38.50	32.00	27.00	35.50	29.50	24.00
Rapeseed cake	0.00	0.00	0.00	5.00	5.00	5.00	10.00	10.00	10.00
Protein Gold [g]	8.00	9.00	6.00	8.50	8.50	6.00	8.50	8.00	6.00
Oil	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00
Monocalcium phosphate	2.20	2.00	1.90	2.20	2.00	1.80	2.20	2.00	1.85
$CaCO_3$	1.60	1.20	0.80	1.50	1.10	0.70	1.30	1.00	0.60
Salt	0.30	0.30	0.20	0.30	0.30	0.20	0.30	0.30	0.20
Premix [h]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DL methionine	0.00	0.00	0.20	0.00	0.00	0.20	0.00	0.00	0.20
Lysine	0.00	0.00	0.15	0.00	0.00	0.15	0.00	0.00	0.15

[a] Feed treatment without rapeseed cake; [b] Feed treatment with 5% of rapeseed cake; [c] Feed treatment with 10% of rapeseed cake; [d] Prestarter feed mixture; [e] Starter feed mixture; [f] Grower feed mixture
[g] Nutrient content, Crude protein: Min. 50%; Moisture: Max. 13%; Crude fibre: Max. 4,5%; Methionine+ Cystine: Min. 2,5%; Lysine: Min. 4%, ME: Min. 3,250 kcal kg^{-1}.
[h] Vitamin and mineral premix provided per kilogram of diet, Vitamin A: 1,500 IU; Vitamin D3: 3,000 IU; Vitamin E: 30 mg; Vitamin K3: 2 mg; Biotin: 0.2 mg; Thiamine: 3 mg; Riboflavin: 10 mg; Pantothenic acid: 20 mg; Pyridoxine: 4 mg; Niacin: 70 mg; Vitamin B12: 0.02 mg; Choline: 1,500 mg; Folic acid: 1 mg; Mn:100 mg; Fe: 50 mg; Zn: 80 mg; Cu: 7 mg; I:1 mg, Se: 0.3 mg.

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Table 2. Chemical composition of rapeseed cake and calculative values of control diets.

Nutrient	Rapeseed cake	Treatment T-0 [a]		
		PS [b]	ST [c]	GR [d]
Moisture (%)	72.27	9.93	9.93	10.00
Crude protein	299.84	28.14	26.17	23.09
Crude fat	79.72	2.99	3.24	6.86
Crude fibre	112.40	3.72	3.34	3.59
Ash	71.12	7.56	6.74	5.76
Ca	11.97	1.38	1.22	1.16
P	10.57	0.95	0.89	0.87
Na	0.38	0.17	0.18	0.17
Arginine	1.87	1.70	1.49	1.36
Methionine	0.66	0.55	0.54	0.65
Cystine	0.64	0.37	0.34	0.32
Lysine	1.54	1.76	1.62	1.49
Threonine	1.56	1.13	1.05	0.92
ME (kcal kg-1) [e]	1642.23	2694.18	2796.89	3021.40

[a] Feed treatment without rapeseed cake; [b] Prestarter feed mixture; [c] Starter feed mixture; [d] Grower feed mixture, [e] Metabolic energy.

Table 3. Calculative values of experimental diets.

Nutrient	Treatment T-5 [a]			Treatment T-10 [b]		
	PS [c]	ST [d]	GR [e]	PS	ST	GR
Moisture (%)	9.69	9.79	9.82	9.51	9.65	9.63
Crude protein	28.08	26.13	23.13	28.12	26.09	23.16
Crude fat	3.28	3.52	7.14	3.56	3.79	7.40
Crude fibre	4.00	3.70	3.90	4.34	4.06	4.22
Ash	7.62	6.78	5.73	7.58	6.82	5.84
Ca	1.40	1.22	1.15	1.38	1.21	1.17
P	0.98	0.92	0.87	1.01	0.94	0.91
Na	0.18	0.17	0.17	0.18	0.17	0.17
Arginine	1.66	1.50	1.36	1.65	1.51	1.35
Methionine	0.56	0.54	0.66	0.57	0.54	0.67
Cystine	0.38	0.36	0.34	0.40	0.38	0.36
Lysine	1.76	1.62	1.50	1.76	1.61	1.50
Threonine	1.14	1.06	0.93	1.15	1.07	0.95
ME (kcal kg^{-1}) [f]	2708.51	2794.50	3028.57	2718.07	2794.50	3030.95

[a] Feed treatment with 5% of rapeseed cake; [b] Feed treatment with 10% of rapeseed cake; [c] Prestarter feed mixture; [d] Starter feed mixture; [e] Grower feed mixture, [f] Metabolic energy.

weighed at arrival on electronic scales with precision measurements of ±1 g which was also used for weight control throughout the whole study. At the age of 14, 28, 50, and 65 days, turkeys' weight was checked. Residues of feed mixtures were also weighed, and then conversion of feed mixtures on the basis of consumption and weight gain was calculated. Mortality of turkeys was monitored and recorded daily.

At the end of the study, all turkeys were sacrificed, of which 5 turkeys from each feeding treatment were randomly chosen and samples of pectoral muscle were taken for the determination of fatty acid composition. The dried lipid extract was methylated according to Hartman and Lago (1973). Fatty acid methyl esters were separated on a gas chromatograph (Philips, PU 4550) equipped with a split injector (100: 1), fused silica capillary column (50 m×0.25 mm id, 0.20 μm film thickness of polyethylene glycol (CP-SIL 88, Crompak, Netherlands), flame ionisation detector, and work station (Borwin, France). The fatty acids were identified by comparison of the retention times of the sample with those of the standards, and by co-chromatography.

All data collected during the study were statistically analyzed by analysis of variance (ANOVA) using the GLM procedure in the SAS software package (SAS 9.2, 2008).

RESULTS AND DISCUSSION

The average production results of turkeys are shown in Table 4. The average body weight of turkeys at the age of 1 and 14 days did not differ between dietary treatments. At the turkeys age of 28 days, significantly ($P< 0.05$) lower body weight was determined for group T-10 in which the turkeys were fed on feed mixture containing 10% of rapeseed cake compared to the turkeys from groups T-0 and T-5. At the age of 50 days, significantly ($P< 0.05$) higher weight was established for group T-5 compared to group T-10, while the average weight of group T-0 was not significantly ($P> 0.05$) different from the other two groups of turkeys. However, final body weight at the age of 65 days did not differ significantly between groups, although the average weight of group T-10 was 2.8 and 1.3% lower than the average weight of group T-5 and T-0, respectively. Feed conversion, mortality rate, and dressing percentage were not significantly different between treatments. Although not calculated, but a positive financial effect of fattening on rapeseed cake could be also expected, because the utilized rapeseed cake was a cheaper source of protein in comparison with the commonly used soybean meal.

Similar study was conducted by Vymola *et al*. (1996) who replaced a part of soybean meal in feed mixtures for fattening turkeys with rapeseed "00" cakes in the amount of 5, 10, and 15%. The authors found balanced weights on the 56th day of age, without any relationship to dietary rapeseed cake content. However, these authors established that extended fattening led to differences in weight gain since male turkeys in group fed on 5% rapeseed cake at the age of 98 days showed higher weight, while groups fed on 10 and 15% rapeseed cake showed lower weight against the control group. They also found that experimental treatments did not influence feed conversion and dressing percentage as it was

Table 4. Production results of turkeys fattening.

Production trait		Treatment		
		T-0 [a]	T-5 [b]	T-10 [c]
Weight (g)	Day 1	59.57±0.65	59.76±0.65	60.23±0.66
	Day 14	394.15±5.66	397.24±5.55	378.67±5.66
	Day 28	1257.88^{a} ±14.94	1272.5^{a} ±14.94	1188.68^{b} ±14.94
	Day 50	4338.75^{ab}±56.98	4397.50^{a} ±56.98	4147.44^{b} ±57.71
	Day 65	6598.72±65.29	6701.25±64.47	6510.53±66.14
Feed conversion (kg kg^{-1})	PS [d]	1.86±0.07	1.92±0.07	2.00±0.07
	ST [e]	1.76±0.05	1.79 ±0.05	1.81 ±0.05
	GR [f]	2.54±0.13	2.37±0.13	2.34±0.13
	total	2.03±0.03	2.00±0.03	2.02±0.03
Mortality rate (%)		2.5	0	5
Dressing percentage (%)		78.93±0.33	79.46±0.33	78.70±0.34

[a] Feed treatment without rapeseed cake; [b] Feed treatment with 5% of rapeseed cake; [c] Feed treatment with 10% of rapeseed cake; [d] Prestarter feed mixture; [e] Starter feed mixture; [f] Grower feed mixture; In the same row values with different letters are significantly different ($P\leq 0.05$).

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found in our study. Another similar study was performed by Mikulski *et al.* (2012) who replaced a part of soybean meal with rapeseed meal and noted that addition of 60 and 120 g kg^{-1} of rapeseed meal in feed mixture did not affect turkey performance (weight, conversion, mortality), while addition of 180 g kg^{-1} of rapeseed meal led only to the significantly higher conversion ratio. Considering these finding and the results obtained in our study, we are in agreement with the statement that the inclusion of the rapeseed feeds into compound feeds is particularly determined by the glucosinolates content (Jeroch et al., 2008). According to Zeb (1998), double zero rapeseed cultivars, which were used in our study, contain less than 2% of erucic acid and less than 30 μmoles glucosinolates in their defatted meal. Based on that, we can assume that small amount of antinutritional factors led to slight reduction of production results (body weight and mortality rate) in our study, although not significantly. Therefore, additional efforts must be directed at lowering impact of antinutritional factors in rapeseed cake on animal performance. Also, it must be mentioned that an increase of rapeseed cake content in feed consequently leads to an increase of fibre content, which can also have negative effect on animal performance, as was previously established by Mikulski *et al.* (2012).

The fatty acid composition in samples of breast muscle of sacrificed turkeys from all three feeding treatments is shown in Table 5. The shares of fatty acids were not significantly different between treatments, except for the total amount of PUFAn3 and PUFAn6/PUFAn3 ratio. The share of PUFAn3 increased with increasing the share of rapeseed cake in the feed mixtures, however, a statistically significant difference was found only between T-0 and T-10 treatments. Accordingly, statistically significant lower PUFAn6/PUFAn3 ratio in T-10 treatment in relation to T-0 and T-5 treatments was also determined. Previous research on using rapeseed products showed increased amount of omega-3 fatty acids in poultry meat (Lopez-Ferrer *et al.*, 1999; Salamatdoustnobar, 2010; Rahimi *et al.*, 2011; Mikulski *et al.*, 2012; Kartikasari *et al.*, 2012; Bedeković *et al.*, 2012). These researchers established that rapeseed products like oil, meal, or cake could be used for the enrichment of poultry products with omega-3 fatty acids, as was observed in our study.

Similar to our study, Mikulski *et al.* (2012) conducted a trial on growing turkeys Large White BIG-6 which were fed isoenergetic and isonitrogenous diets containing 0, 60, 120, and 180 g kg^{-1} of rapeseed meal. No significant differences were found in the fatty acid profile of breast meat between groups fed with diets containing 0 and 60 g kg^{-1} of rapeseed meal. However, groups fed with 120 and 180 g kg^{-1} of rapeseed meal had significantly lower levels of saturated fatty acids, including myristic acid (C14:0) and palmitic acid (C16:0), and significantly higher concentrations of oleic acid (C18:1) and polyunsaturated fatty acids, including linoleic acid (C18:2) and linolenic acid (C18:3). This modification of fatty acid composition led to higher PUFAn3 acids content and, consequently, lower PUFAn6/PUFAn3 ratio. Contrary to this, there were no significant differences in individual fatty acid content between treatments in our study. On the other hand, significant differences were found only for the total PUFAn3 content and PUFAn6/PUFAn3 ratio leading to the conclusion that inclusion of rapeseed cake could have only slight positive effect on nutritive value of fatty acids of turkey meat.

Based on the results obtained (final body weight, conversion, mortality rate), it can be concluded that addition of rapeseed cake of 5 and 10% in feed mixtures did not have any undesirable impact on turkey performance compared to the control treatment, although turkeys fed with 5% of rapeseed cake had the best production results. Also, there has been an expected increase of PUFAn3 fatty acids with increased share of rapeseed cake in feed mixtures and, accordingly, there has been a positive trend of decreasing ratio of

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Table 5. Fatty acid composition (% of the total fatty acids) of turkey breast muscle.

Fatty acid (%)	Treatment			SE [d]
	T-0 [a]	T-5 [b]	T-10 [c]	
C14:0	0.42	0.39	0.38	0.02
C14:1	0.05	0.02	0.04	0.01
C15:0	0.11	0.12	0.12	0.01
C16:0	21.25	19.27	19.9	0.53
C16:1	1.00	0.81	0.88	0.18
C17:0	0.35	0.34	0.31	0.02
C18:0	12.52	11.39	11.70	0.80
C18:1n9t	0.34	0.30	0.30	0.03
C18:1n9c	17.23	20.65	20.10	1.57
C18:2n6	30.96	33.45	31.95	1.11
C18:3n3	1.18	1.52	1.40	0.17
C18:3n6	0.08	0.08	0.08	0.01
C20:1	0.18	0.21	0.23	0.01
C20:3n3	0.06	0.05	0.05	0.01
C20:3n6	0.73	0.54	0.63	0.09
C20:4n6	6.87	5.53	6.32	0.77
C20:5n3	0.10	0.09	0.10	0.01
C22:0	0.20	0.19	0.19	0.02
C22:5n3	0.73	0.61	0.72	0.09
C22:6n3	0.43	0.34	0.49	0.08
C24:0	0.08	0.06	0.06	0.01
C24:1	0.16	0.11	0.11	0.06
Unidentified [e]	4.97	3.91	3.94	0.78
SFA [f]	34.94	31.76	32.67	1.30
MUFA [g]	18.96	22.09	21.65	1.67
PUFAn3 [h]	2.49^{b}	2.60^{ab}	2.76^{a}	0.07
PUFAn6 [i]	38.64	39.60	38.98	0.48
PUFAn6/PUFAn3	15.56^{a}	15.25^{a}	14.17^{b}	0.29

[a] Feed treatment without rapeseed cake; [b] Feed treatment with 5% of rapeseed cake; [c] Feed treatment with 10% of rapeseed cake; [d] Standard Error; [e] The sum of the fatty acids below the limit of quantitation; [f] Saturated Fatty Acids; [g] MonoUnsaturated Fatty Acids; [h] n3 PolyUnsaturated Fatty Acids; [i] n6 PolyUnsaturated Fatty Acids; In the same row values with different letters are significantly different (P≤ 0.05).

PUFAn6/PUFAn3. Therefore, rapeseed cake can be recommended in fattening of hybrid turkeys with a share up to 10% in the compound feed in order to produce turkey meat enriched with highly important omega-3 fatty acids and to achieve more positive financial effect.

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کاربرد کنجاله کلزا برای بهبود ترکیبات اسید های چرب گوشت بوقلمون

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چکیده

از میان گیاهان روغنی، کلزا بیش از همه در اروپا مصرف می شود و ماده خام مطلوب برای تولید بیودیزل (biodiesel) است. به لحاظ داشتن ارزش غذایی بالا و مقدار زیادی اسید چرب امگا-۳، کنجاله کلزا را می توان در تغذیه طیور به منظور غنی کردن گوشت و تخم مرغ به کار برد. بنا بر این، هدف پژوهش حاضر تعیین امکان استفاده از کنجاله کلزا در خوراک بوقلمون به منظور غنی کردن امگا-۳ گوشت آن بود. در این بررسی، ۱۲۰ بوقلمون یک روزه از نژاد Nicholas 700 استفاده شد و آنها به صورت تصادفی به سه گروه دسته بندی شدند و هر گروه ۴ تکرار داشت(n=10). تغذیه گروه شاهد با خوراک ترکیبی بدون کنجاله کلزا بود ولی در دو گروه دیگر به ترتیب ۵٪ و ۱۰٪ کنجاله به غذای ترکیبی اضافه شد. بر اساس نتایج به دست آمده، افزودن این مقدار از کنجاله به خوراک آنها تاثیری منفی در عملکرد بوقلمون ها نداشت. نیز، آشکار شد که با زیاد شدن سهم کنجاله در خوراک طیور، مقدار اسید چرب امگا ۳ فزونی یافت و روندی مثبت در کاهش نسبت امگا۳/امگا۶ اسیدهای چرب چند غیر اشباع پدید آمد. همچنین می توان اثرات مثبت مالی در پرواربندی انتظار داشت چرا که کنجاله کلزا در مقایسه با خوراک سویا که مصرف رایجی دارد منبع ارزانتری است. بنا بر این، برای پروار بندی بوقلمون های هیبرید ، مصرف کنجاله کلزا را تا ۱۰٪ در ترکیب خوراک می توان توصیه کرد.

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