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FEEDING VALUE OF OILSEEDS RICH IN OMEGA 3 FATTY ACIDS AS POTENTIAL INGREDIENTS IN BROILER NUTRITION

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Abstract: Due to the benefits of consuming products rich in omega-3, people have become more aware of the need for a surplus of n-3 fatty acids for meat in their diet. Three oilseeds rich in omega 3 fatty acids (linseed, hemp seeds and camelina seeds) were characterized to determine their nutritional value for inclusion in broiler diets to increase the PUFA content of poultry meat. Chemical determinations revealed a different protein content ranging between 19.74% (hemp seeds) and 26.78% (linseed). In terms of polyunsaturated fatty acids, especially α-linolenic acid was determined for linseed (50.71g/100g total fatty acids), camelina (34.15g/100g total fatty acids) and hemp (14.2g/100g total fatty acids). The selected products rich in polyunsaturated fatty acids will be introduced into the feed and tested on batches of broilers to track the best growth performance

Introduction

The health benefits of consuming foods with a higher proportion of PUFA Ω3 fatty acids have caused consumers to increasingly seek out products that contain them. The health benefits of PUFA Ω3 are primarily found in the protection of the cardiovascular system, leading to lower blood pressure and heart rate, decreased serum triglycerides, inflammatory markers [Bhatnagar et al, 2003], and arrhythmias [Geelen et al, 2004]. Foods that contain Omega-3 fatty acids are primarily fish and fish oil, oil seeds, nuts, wheat germ, and dietary supplements [Das, 2011]

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• Material and method

Our study characterized three seed sources rich in omega 3 polyunsaturated fatty acids (flax, hemp and camelina) physically and chemically in order to be introduced as suitable raw materials in broilers feed and to estimate the effects on performances end meat quality of broilers.

✶ From the data obtained both in the determinations within the INCDBNA-IBNA Balotesti, as well as reported in various specialized scientific papers (Zajac, 2021; Khan, 2010; Peiretti and Meineri, 2007; Ciurescu, 2016; Alonso-Esteban, 2022), it can be observed that the three seeds of oleaginous plants are rich in protein.

✶ Macro and microelements need to be known for all feed components, in order to know how much we should supplement if necessary.

✶ The levels of fatty acids are also important, not only OMEGA3 or OMEGA 6, the principal purpose of the study, but through the entire range of fatty acids, the energy intake in broiler feed is increased. All fatty acids have their importance in regulating the endocrine system and improve de health system of animal bodys.

Conclusions

Of the three materials studied, ***flaxseeds*** are the most suitable for increasing the level of polyunsaturated fatty acids, while also providing a high amount of crude protein. Therefore, flaxseeds can be introduced in smaller proportions, thus eliminating the limiting factors that we face when using them. Another important aspect in the decision to use flaxseeds is the cost-benefit ratio, which surpassed all other options in this study.

• Results and discussions

The primary chemical composition of the vegetal seeds studied

• FLAXSEED, %	IBNA	FEEDIPEDIA	Zajac et al, 2021	Khan et al, 2010
Dry matter, (DM)	**92.75**	88.2 – 93.5	91.7	-
Crude protein, (CP)	**26.78**	20.3 – 27.9	20.5	24.18
Ether extract, (EE)	**32.17**	31.2 – 43.6	44.6	37.77
Crude fiber, (CF)	**18.83**	13.2 – 33.8	8.12	25.87
Ash, (Ash.)	**2.94**	3.3 – 6.2	3.62	4.78
• CAMELINA SEEDS, %	IBNA	Peiretti & Meineri, 2007 [26]	Zajac et al, 2021	Ciurescu et al, 2016
Dry matter, (DM)	**93.4**	93.2	86.2	93.66
Crude protein, (CP)	**23.48**	24.5	24.6	24.78
Ether extract, (EE)	**26.92**	30.2	39.3	36.84
Crude fiber, (CF)	**17.02**	29.4	11.7	11.4
Ash, (Ash.)	**12.61**	3.2	4.31	4.27
• HEMPSEED, %	IBNA	FEEDIPEDIA	Borhade, 2013	Alonso-Esteban et al, 2022
Dry matter, (DM)	**91.38**	90.6	96.93	95.5-93.44
Crude protein, (CP)	**19.74**	23.9	23.9	18.3-23
Ether extract, (EE)	**30.52**	35.7	32.91	29.1-32.66
Crude fiber, (CF)	**30.12**	16.5	17.3	32.5-40.4
Ash, (Ash.)	**5.39**	5.7	4.32	4.2-6.32

Determined mineral concentration in the plant seeds studied

SOURCE	Macroelements			Microelements		
	Calcium, %	Phosforus, %	Coper, ppm	Iron, ppm	Manganese, ppm	Zinc, ppm
• FLAXSEED						
IBNA	**0.294**	**0.49**	**2.07**	**70.69**	**21.83**	**45.61**
Khan et al, 2010	0.39	0.89	4.67	50.56	8.29	13.55
• CAMELINA seeds						
IBNA	-	**0.49**	**6.33**	**369.65**	**121.72**	**46.83**
Zubr, 2010	1.00	1.4	9.9	329	40	69
Toncea et al, 2013	0.18	0.53	-	-	-	-
• HEMPSEED						
IBNA	**5.39**	**1.01**	**10.68**	**110.03**	**125.66**	**62.25**
Mihoc et al, 2013	nd	nd	10-12	130-164	89-108	42-57
Oseyko et al, 2019	0.09	0.89	nd	74.7	59.4	56.1

The concentration of the main fatty acids (g/100 g fat) of the vegetable sources

FLAXSEED	IBNA	FEEDPEDIA	Bozan &Temelli, 2008	Sargi et al, 2013
Palmitic Acid C16:0	**5.88**	6.1	6.86	4.13-66.12
Stearic Acid C18:0	**3.90**	3.6	4.59	2.67-5.65
Oleic Acid C18:1n9	**21.85**	18.4	15.07	15.4-19.78
Linoleic Acid C18:2n6	**16.67**	15.8	13.96	14.02-12.75
Linolenic Acid C18:3n3	**50.71**	55.7	58.31	48.35-39.66
CAMELINA SEEDS	IBNA	FEEDPEDIA	Peiretti &Meineri, 2007	Abramovic & Abram, 2005
Palmitic Acid C16:0	**6.85**	8.0	5.7	6.4
Stearic Acid C18:0	**2.20**	2.5	2.7	2.6
Oleic Acid C18:1n9	**15.58**	18.6	12.9	17.4
Linoleic Acid C18:2n6	**20.04**	24.6	17.7	16.9
Linolenic Acid C18:3n3	**34.15**	32.4	37.3	35.7
HEMPSEED	IBNA	Vonapartis, 2014	Oseyko et al, 2019	Mikulcova, 2017
Palmitic Acid C16:0	**7.63**	6.8	5.7-6.3	59-62
Stearic Acid C18:0	**3.36**	2.49	3.0-3.2	2.2-2.4
Oleic Acid C18:1n9	**14.82**	11.76	13.3-13.6	9.0-12.1
Linoleic Acid C18:2n6	**54.05**	56.07	54.8-56-9	55.3-57.3
Linolenic Acid C18:3n3	**14.20**	15.98	16.0-18.5	16.7-20.3

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