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Ostrich and Camel meat produced in Libya: Comparison of the amounts of Essential and non-essential amino acids

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Abstract *The study showed that ostrich meat contains a higher amount of protein than camel meat, and the results of the approximate analysis of the ostrich and camel meat were 20.71% and 18.30% protein, respectively. The results revealed that ostrich and camel meats contain all essential, non-essential amino acids. They were compared with the suggested needs for both children and adults and found that they cover most of the requirements with a clear superiority of some amino acids for ostriches and that the most amino acids present in the two types are glutamic, aspartic, and leucine, lysine, arginine, and alanine, with slight differences between them, where the proportion of leucine was higher in ostriches than in camels, while the amount of valine was higher in camels than in ostriches. According to the previous results, it is clear that ostrich meat is characterized by high proportions of protein when compared to camel meat. In addition, both ostrich and camel meat contain essential and non-essential amino acids, which cover most of the requirements of children and adults*

Keywords:- Ostrich, Camel, Amino acids, Protein

Introduction

Meat is considered one of the most important sources of human nutrition, as it is necessary for building various body tissues and protecting them from diseases [1]. With the large food gap in animal protein and the steady increase in the world's population, as well as the high prices of animal meat in particular, the modern trend is to search for alternative sources to bridge this gap, including breeding ostriches (Struthio camelus) and other birds to benefit from them in the production of meat, leather, feathers, and eggs, in addition to being characterized by a low fat content, especially cholesterol, which is related to many diseases that affect human health[2]. Alternative food sources that support healthy human nutrition are in heavy demand. Ostrich meat is lean meat with low intramuscular fat (0.5%) and cholesterol content. [3]. is marketed as a healthy red meat because it is characterized by high polyunsaturated fatty acid contents, low saturated fatty acid content, and a low cholesterol level compared with other red meats, such as beef. [4]. It should also be noted that ostrich and camel meat can constitute tributaries of protein, as they can be relied upon to fill an important portion of the growing demand for meat, especially in areas with poor pastures, as is the case in the Libyan environment. [5].

In Libya, in an attempt to introduce it as a source of red meat at affordable prices for the consumer, given the advantages of the product, which represents low production costs, high nutritional value, and is free from many diseases associated with other types of meat, such as beef, Moreover, the production of ostrich meat is considered to have a large economic return compared to that of cows, as the ostrich bird gives about 1500 kg of meat per year compared to 330 kg per year in the case of cows. cows, and the efficiency of feed conversion is higher in the case of ostriches than cows, in addition to the production of feathers, leather, and other products that have economic value [6].

The available information about ostrich meat is relatively limited and not available in Libya compared to some other sources such as camels, sheep, and goats, as well as the dietary habits of the Libyan individual, which makes it difficult to obtain raw ostrich meat. Numerous studies have shown that ostrich meat is distinguished by its high protein content compared to beef and poultry meat, as it amounts to about 22% and exceeds cow and turkey meat [7]. and in comparing the amount of amino acids of ostrich meat with the amount of amino acids in beef and poultry, they noted that there was no difference between them in the content of essential and non-essential amino acids, and the quantities meet the amount of daily needs recommended by the Food and Agriculture Organization FAO [8]. Ostrich meat is a low-fat meat containing physiologically significant amino acids in large quantities, and it was suggested that ostrich meat could be safe and suitable for a protein and amino acid supplement [9].

The results of the study conducted by [10]. on some ostrich meat muscles showed that the average of the amino acids lysine, threonine, valine, methionine, isoleucine, leucine, phenylalanine, histidine, arginine, aspartic acid, serine, glutamic acid and glycine, tyrosine, and alanine have 8.5, 3.92, 4.75, 2.74, 4.65, 8.5, 4.80, 2.06, 6.80, 9.75, 3,15.75,4.3,3.1,5.5mg/100g Ostrich meat's percentage of protein (20.6-21.7%) and its amino acid composition are rather similar to those of meats such as beef and chicken, although with a lower proportion of histidine

and serine. [11]. It was also found [12]. in a study on camels that the essential amino acids in camel meat were 8.45 lysine., 4.4 threonine, 5.16 valine, 2.14 methionine, 5.23 isoleucine, 8.41 leucine, 4.24 phenylalanine, and 4.33 histidine mg/100 g protein, while the remaining acids were 7.38 arginine, 9.09 aspartic acid, 3.63 serine, 16.9 glutamic acid, 5.39 proline, 5.95 glycine, 3.23 tyrosine, 6.25 alanine, and 0.60 tryptophan g/100 g protein Analyzing the data in Table 2, it may be mentioned that there is a high content of essential amino acids in the ostrich meat. According to the content of leucine, threonine, lysine, methionine, isoleucine, valine, cystine, alanine, and lutamic acid, which are involved in the formation of the organoleptic properties of the meat products, ostrich meat is not inferior to the traditional high-quality meat raw material. [13].

Ostrich meat

Three male bird of similar age (approximately one year and two months) were transported from an ostrich farm in the city of Benghazi to the city of Al-Bayda. The bird were placed on a pre-equipped farm for the purpose of resting for three days before slaughter. After that, they were transferred to one of the slaughterhouses in the city of Al-Bayda, and then slaughtered

Camel meat

The camel (1–1.5 years old) was brought from the Tobruk region to the city of Al-Bayda, placed in a prepared stall, and rested for 3 days before being slaughtered. and left for 24hours to complete rigor mortis, after which the meat was removed for testing by pickling the leg in brine and deboning it

Crude Protein Determination

The Macro-Kaldahl method was used for the determination of total nitrogen by wet digestion with concentrated sulfuric acid using digestion tablets, distillation with a Gerhard and Vapadest 40 apparatus, and titration of the sulfuric acid distillate to a known standard to calculate the percentage of nitrogen content in the samples with a conversion factor of 6.25. The percentage of crude protein was determined by the method [14].

Total amino acid determination

The sample was prepared with 50 mg of minced ostrich and camel meat in a 50 ml sealed tube, to which 5 ml of performic acid was added. The tubes were sealed and placed on ice for 16 hours, then 0.25 ml of sodium bisulfate and 5 ml of hydrochloric acid (6.0N) were added and placed in an oven at 110 °C for 24 hours. After cooling and filtering through a 25 ml volumetric flask, 5 ml of the filtrate was transferred to a 100 ml beaker and vacuum-dried in glass desiccators. The dry degradation product was dissolved in the appropriate amount (1-2 ml) of sodium citrate buffer solution (pH 2.2), and the amino acids were determined. (without tryptophan) with the High Performance Amino Acid Analyzer, Beckman 7300, according to the method [15].

Results and Discussion

Crude protein

The results showed that ostrich meat was high in protein, as the protein percentage of ostrich and camel meat was 20.71% and 18.30%, respectively.

Table 1. Amino acid content of ostrich and camel meat (g/100g protein

Amino acid c	camel meat	meat ostrich
Isoleucine	5.01	5.06
Leucine	8.60	9.15
Lysine	8.52	8.87
Methionine	2.34	3.03
Cysteine	1.30	1.20
Phenylalanine	4.18	4.87
Thereonin	4.22	4.18
Valin	5.59	5.53
Arginine	6.72	7.48
Histidine	2.77	2.64
Alanine	6.38	6.13
Aspartic Acid	9.32	10.45
Glutamic acid	14.39	13.80
Glycine	6.43	4.61
Proline	4.76	4.80
Serine	3.94	3.29
Tyrosine	**3.21**	**3.35**

Amino acid content

The results obtained for the total amino acid content in both ostrich and camel meat proteins (Table 1) revealed that the most abundant amino acids in the two species are glutamic, aspartic, leucine, lysine, arginine, and alanine, with minor variances. The percentage of leucine in ostriches was higher than in camels, whereas the amount of valine in camels was higher than in ostriches

The results showed that the values of valine, isoleucine and threonine were similar in both ostrich and camel meat, while the value of phenylalanine was higher in ostrich than camel meat. On the other hand, the least abundant amino acids were tyrosine, serine, methionine, histidine, and cysteine.

The percentage of tyrosine was similar, but ostrich meat had more methionine than camel meat. The proportion of total essential amino acids in ostrich meat was 44.04 g/100 g protein and 44.44 g/100 g protein in camel meat, respectively. These acquired results were consistent with what was found by [16].

In view of the nutritional importance of essential amino acids

and the daily needs of them for children and adults alike, the content of these acids has been compared in table 2

Table (2). *The essential amino acid content of ostrich and camel meat compared with the values for children and adults suggested by* [17].

Essential Amino Acids g/100g protein)(	FAO/WHO Preschool children	camel meat	meat ostrich
Isoleucine	2.8	5.01	5.06
Leucine	6.6	8.60	9.15
Lysine	5.8	8.52	8.87
Cystein+Methionin	2.5	5.24	4.23
Phenylalanine +Tyrosine	6.3	7.39	8.22
Thereonin	3.4	4.22	4.18
Valine	3.5	5.51	5.53
Hisitadin	1.9	2.77	2.64

Conclusion

In terms of amino acids and the nutritional value of ostrich and camel meat is nearly comparable. All essential and non-essential amino acids are also found in ostrich and camel meat. The essential amino acids found in ostrich meat availability the majority of the recommended demands for children and adults. Ostrich meat has a high nutritional value and a low cost of production

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