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Ostrich Farming: A Wildlife Management Option for Restraining Nigeria's Lingered Farmers–Herders Conflicts

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ABSTRACT

Farmers/herder conflict has been a major national security issue in Nigeria. Despite all efforts of the government and other well-meaning Nigerians, the problem still lingers. This present study seeks to provide a different perspective in curtailing the existing problem. The study indicated that as long as beef remains the most prominent source of red meat in Nigeria, the problem will still persist. The benefits and the challenges of ostrich farming were then discussed. The study recommends that there is a need to publicise the health benefits of ostrich meat so as to attract more consumers and players in the industry.

Keywords: Conflicts, farmers-herders, ostrich farming, restrain, wildlife

1. INTRODUCTION

Conflicts between farmers and nomadic cattle herders have been a common feature of economic livelihood in West Africa [1]. In the period before the beginning of the 20th century, the problem was mainly restricted to the savanna belts of West Africa. This gave the cattle herders access to a vast area of grass land. As time went on, and with the introduction of irrigated farming in the Savanna belt of Nigeria, and the increased withering of pasture during the dry season, less pasture was available to cattle herders. The large number of wild animals and the fear of losing animals to diseases, especially trypanosomiasis, prevented herders from settling permanently in the humid zone [2]. [1] Stated that there is a consensus among

observers that farmers-herders clashes have only since the 20th century become widespread in the coastal countries of West Africa. [1] Opined that the factors that account for the increasing farmer-herder conflict include the southward movement of pastoral herds into the humid and sub-humid zones, promoted by the successful control of the menace posed by disease, the widespread availability of veterinary medicine and the expansion of farming activities into areas that hitherto served as pastureland. He further suggested that since the 1950s there has been a growth in human as well as livestock population in the coastal countries of West Africa.



Fig. 1. Map of Nigeria

The majority of red meat consumption in Nigeria is from beef. This has made cattle rearing a major agricultural activity in Nigeria. Cattle farmers do not pay tax and are allowed to move with their cattle within the country. This has resulted to clashes between herders and farmers. In extreme cases, an entire family has almost been wiped off. Some culturally-sensitive people have called for a boycott of beef, in order to discourage these herders from perpetuating such violence. A boycott of one protein source calls for the adoption of another. The people need to switch to a healthier alternative because of health concerns and because consuming beef regularly helps indirectly encourages the activities of these 'killer herdsman'. It is generally believed in the security circle in Nigeria, that after the dreaded boko haram sect, herders-farmers conflict has resulted to more loss of lives in recent times. Adopting ostrich farming will not immediately put an end to the herders-farmers conflict, but it will help in restraining it.

A number of works has been done on the prevalence of conflicts in Nigeria, for instance, [3] carried out an explicit work on the conflict for survival between Fulani pastoralists and farmers in Northern Nigeria. These works are plausible in their own merits. Yet, none of them is able to approach the matter with the view of finding a better alternative to cattle production; the backbone of the problem. The present paper aims to bring to the awareness of the readers the comparative advantages of ostrich meat over other meats.

2. METHODOLOGY

The method of the paper is exploratory. Data were generated from secondary sources. Secondary data were obtained from library and official (government) sources. In this regard, books, journals, dailies and periodicals, internet materials, as well as relevant official records were explored with a view to eliciting useful information (Fig. 1).

3. RESULT

Table 1 shows the chemical composition (g/100 g of edible material) of ostrich meat. Table 2 reveals the average chemical composition (mg/100 g of edible material) of different types of meat. Table 3 shows the comparative production performance of ostrich as compared to cattle

Table 1. Chemical composition (g/100 g of edible material) of ostrich meat

| Component | Ostrich meat |
|--------------|--------------|
| Dry material | 23.3-25.5 |
| Protein | 20.6-21.7 |
| Fat | 0.9-1.34 |
| Ash | 1.07-1.17 |

Source: [16]. Variation depends on the muscle analyzed and the bird's age

Table 2. Average chemical composition (mg/100 g of edible material) of different types of meat

| Component | Ostrich ¹ | Lamb ² | Beef ² | Chicken ² | Turkey ² |
|---------------|----------------------|-------------------|-------------------|----------------------|---------------------|
| Fat (g/100 g) | 1.12 | 8.79 | 4.6 | 4.3 | 1.19 |
| Cholesterol | 49.5-74.33 | 78 | 59-65 | 69-110 | 45-61 |

| | | | | | |
|----------------------------|-------|-------|-------|------|------|
| MUFA+PUFA/SFA ³ | 2.16 | 0.86 | 1.25 | 2.3 | 1.33 |
| Fe | 2.75 | 1.8 | 2.2 | 0.9 | 0.65 |
| Zn | 3 | 2.89 | 3.9 | 0.85 | 1.45 |
| Na | 38.7 | 59.5 | 63 | 77 | 48.5 |
| Vit. B6 | 0.225 | 0.22 | 0.125 | 0.35 | 0.5 |
| Vit. B12 (µg/100 g) | 1.25 | 1 | 1.5 | - | 1.5 |
| Vit. E | >0.1 | 0.075 | 0.1 | 0.1 | - |

Source: [31]

Table 3. Comparative production performance of ostrich as compared to cattle.

| | Ostrich | Cattle |
|-----------------------------|----------------|---------------|
| Gestation/Incubation period | 42 | 280 |
| Offspring per year | 40 | 1 |
| Slaughter Age | 350 | 645 |
| Meat (kg) | 2000 | 250 |
| Leather (sq m) | 50 | 2.7 |

Source: [12]

4. DISCUSSION

The modern-day way of life and its changing aspects, made the people part of a ‘fast food’ generation, with unhealthy habits and unhealthy way of life. As a result of the inappropriate nutrition and insufficient physical activity, nowadays the cardiovascular diseases and cancer are becoming prevalent, having a large part of the total mortality.

Taking into deep concern the propensity of producing “healthy food” and healthy way of life, people aim at consuming meat with high biological value, high percentage of full protein, and low percentage of fat and cholesterol. The ideal solution is the ostrich meat.

In nations with developed ostrich farming (South African Republic, USA, Canada, Israel, Australia, China, France) a lot of consideration is paid to this branch of animal husbandry, but the utmost experience in growing these birds is not achieved yet.

Almost all parts of the ostrich can be utilized – meat, skin, feathers, eggs, fat, eyelashes [4]. Depending on the wittiness of the breeders and processors, even the bill and the nails can be used for different types of ornaments. The people in China use the inner part of the ostrich

nail as an aphrodisiac, and the researches made in USA show that the human iris can be successfully replaced by an ostrich iris [5,6]. Together with the crocodile, ostrich leather stands at the top of the world leather market. The ostrich meat became important at the end of the 80's, and today there is no high reputation restaurant or hotel not serving ostrich meat [7].

4. 1. Ostrich

Ostriches are one of the oldest birds kept by mankind since the earliest recorded histories having existed as a species for over 40 million years [8]. They are world's largest Ratite (species of flightless birds without keel bone; *Struthio camelus*) bird, the keel-less breastbone of ostriches resembles a raft and is actually a large cartilaginous plate [9]. An ostrich will reach adult height 6-10 feet tall in between 18 and 20 months of age with a growth rate 25 cm per month (7 cm per week) and 300-400 pounds in mass.

They can gain 80 kg body weight within 9 months and 100 kg in one year. Ostrich may also produce the 1.5 kg feathers at one year of age and its feathers are fluffy and symmetrical [14]. Other ratite birds are Emu (*Dromaius novaehollandiae*), Rhea (*Rhea spp.*), Cassowary (*Casuarius spp.*) and Kiwi, produce red meat that is similar to deer meat or beef and the hide makes fine leather products. A male ostrich is black with white wing tips and tail plumage called rooster and female ostrich light brown and gray plumage called hen. Female is smaller than rooster. Skin color fawn, dark brown, pink, red. Ostrich is the largest vertebrate and has ability to position his head to produce an image from in front of and below the eye [10].

4. 2. Ostrich Meat's Physical Characteristics and Nutritional Composition

Despite its avian nature, ostrich meat is reddish in colour (similar to beef) due to a high concentration of pigment (22-30 $\mu\text{g Fe/g}$) and myoglobin levels closer to those found in mammals' muscles than in poultry [11,12]. Its flavour is not unlike that of beef, although it has a slightly fishy aroma, and it is tenderer and easier to digest due to its lower levels of intramuscular fat and collagen [13]. While knowledge of ostrich meat's nutritional composition is still limited, Majewska's recent studies [14] on 10 different types of muscle give the values set out above (table 1). 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 [15].

In contrast, ostrich meat's fat levels (0.9-1.34%) are much lower than those of meats such as lamb (8.79%), beef (4.6%) and chicken (4.3%), and similar to those of poultry meat with a low fat content, such as turkey (1.19%) [16]. While preliminary studies suggested a very low level of cholesterol, more recent research indicates that ostrich meat's cholesterol content is similar to that of beef and chicken, and varies depending on the cut of meat, being higher in fat from a bird's back (74.33 mg/100 g) than in fat from its breast (49.50 mg/100 g) [17]. Nonetheless, it is worth noting that ostrich meat has a more beneficial fatty acid profile than turkey, lamb or beef. Saturated fatty acids (SFA) make up 29.88-33.31% of its total fatty acid content, monounsaturated fatty acids (MUFA) 35.52- 39.05% and polyunsaturated fatty acids (PUFA) 27.64- 34.60%. More than 8% of ostrich meat's PUFA are omega-3 (ω 3) fatty acids.

Besides being an important source of protein in the human diet, meat is a good provider of minerals, particularly iron and zinc. General analysis of ostrich meat's mineral content indicates a profile more like that of beef than of chicken and notable levels of iron and zinc.

Its iron content stands at around 2.75 mg/100 g, superior to beef's 2.2 mg/100 g and chicken's 0.9 mg/100 g. Its concentration of zinc, meanwhile, at around 3 mg/100 g, is superior to that of any other poultry meat, although lower than that of beef sirloin (4.09 mg/100 g) and of lamb [13,16]. The sodium levels in ostrich meat, on the other hand, are far lower than in meats such as beef and chicken. The ostrich muscles with the highest concentration of sodium contain no more than 38.7 mg/100 g, in comparison to 63 mg/100 g in the case of beef and 77 mg/100 g where chicken is concerned.

Although information on ostrich meat's vitamin content is still limited, the studies undertaken to date have detected B-group vitamin levels similar to those of beef, but with higher levels of vitamins B6 (0.225 mg/100 g, compared to beef's 0.125 mg/100 g), B12 (1.25 µg/100 g compared to 1 µg/100 g) and E [18].

4. 3. Ostrich Meat Suitable for Cardiac Patients and a New Taste in Food Industry

Despite being poultry meat, ostrich meat is intensely red called red meat, and may be darker [23]. However ostrich meat is enormously lean having intramuscular fat contents round about 2.3% in average most of which approximately 67% are easily digestible unsaturated fats having significantly high content of omega 3 [20, 21]. Energy contents of the diet are main factor considering the carcass fatty acid profile [19]. Ostrich meat is rich in Oleic acid (C18:1) contents, followed by palmitic acid (C16:0) and linoleic acid (C18:2n-6) [22; 23]. However chemical composition of meat is varies nutrition of the birds [23, 24], mainly by the energy: protein ratio 19: 20 19: 20 [25]. The average mineral level (1.29%) in ostrich meat is higher than in chicken meat (1.17%) [26]. Feeding the lucern or any fodder may increase total mineral content in ostrich meat as compared to birds fed only concentrate [27].

Age at slaughter and weight of the birds influence some meat quality traits, such as tenderness, juiciness and lipid contents etc. However these differences are not significant with gender. Parts yield may reach up to 42%, depending on genetic background, rearing system, and slaughter techniques [26]. Ostrich meat is rich in Protein levels (28%) and the most frequent amino acid is creatine [23]. As ostrich meat has very low fat content due to which it has a very unique flavor, characteristic of this species, being very tasty and mild. Ostrich meat is slightly sweet due to its higher muscle glucose content [28]. However low lipid content in ostrich meat confers low palatability to sausages and cured product [29; 30; 31]. Ostrich meat is very tender and easy to digest and to chew due to its high levels of unsaturated fat and its low collagen to protein ratio [26].

Ostrich meat has tendency to retain water during cooking [26], which ensures better texture (low shearing force) and juiciness. Meat color is also influenced by water holding capacity, as higher water content results in higher absorption of radiation and lower reflection, making the meat darker. Slaughter processing methods also affect meat quality of ostriches. It has been shown that the use of ozone for carcass chilling reduces its microbiological load.

Having been faced with the fact that the mankind feeds less healthy and the number of people with cancer and cardiovascular diseases increases as a result of inappropriate diet, the nutritionists' advice is to decrease the fat and cholesterol in the nutrition, and as for the meat, they suggest low fat meat rich in protein. The World Health Organization is the cheerleader in emphasizing the slogan "healthy food". Taking into consideration the healthy meat alternatives, this paper determines the chemical structure of the meat from ostrich grown and slaughtered in Macedonia, compared to the chemical structure of the chicken and beef.

5. RECOMMENDATION

Based on the study, the following are recommended;

- a) There is a need to publicise the health benefits of ostrich meat that will attract more consumers and other players in the industry.
- b) Agricultural loans should be made available to novel ostrich farmers to enable them offset the initial cost of investment.
- c) Ostrich research and development centres should be established in the six geo-political zones of the country to ensure the availability of ostrich eggs and chicks for rearing.
- d) Wildlife extension workers should be recruited and sent to the field to facilitate the general acceptance of the meat and the training of novel ostrich farmers in various localities.
- e) Other value-additional sectors of the ostrich industry should be exploited; this will bring in more players in the industry and ensure the availability of the product in the market.

6. CONCLUSION

The work has brought to the attention of the readers the advantages of ostrich meat over other meat. The chemical composition of ostrich meat shows an improved performance to other types of meat. The study noted that the adoption of ostrich farming will help to curtail herders-farmers conflicts in Nigeria.

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