Journal of Food Technology 3 (4): 498-501, 2005
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Nutrient Status of Meat Content of Cattle Egret (*Bubulcus ibis*) in Nigeria

Olawale Abulude, Mary Ogunkoya and Bukola Osadare
Department of General Studies, Federal College of Agriculture, Akure 340001, Ondo State, Nigeria

Abstract: The study assessed the proximate composition, mineral contents and *in vitro* digestibility of meat of cattle egret (*Bubulcus ibis)* found in Federal College of Agriculture, Nigeria. It was scarified, defeathered, dissected, oven dried, ground and analyzed using standard methods. The life weight of the samples was 300±10.20 g. The sample contained 76.72% DM crude protein, 0.14% crude fibre and ash 6.41%. It had low level of crude fat (2.14%). The energy level was 365.46 Kcal. The concentration of Na, K, Ca, Mg and Fe were found to be high whereas Zn, Mn, Cu and Pb wee low. The digestibility, biological value, net protein utilization and net protein value were 65.24±1.41%, 52.19±0.84, 34.05±0.62 and 26.12±0.50, respectively. The nutritive composition of the sample compared with other sources of conventional protein and minerals. Based on these results, it is suggested that nutritional qualities of cattle egret should be harnessed.

Key words: Cattle egret (*Bubulcus ibis*), dissection, proximate composition, minerals, digestibility

INTRODUCTION

The cattle egret belongs to phylum Chordata, class (Aves), order (*Cicnniiformes*), family (*Ardeidae*) and genus (*Bubulcus*). It is a medium sized bird, with a 'hunched' posture, even when it is standing erect. The total length of the bird ranges from 46-56cm and its wingspan averages 88-96 cm. The basic plumage of the adult of both sexes is pure white[1]. Cattle egret is the most terrestrial heron, being well adapted to many diverse terrestrial and aquatic habitats. It is always close to livestock grazing areas especially with cattle. It is native to Africa and Southern Spain[2]. Some ranchers rely on cattle egrets for fly control more than they do parasites. It may transmit parasites and other diseases organism to livestock and people. It herenries are considered nuisances when near structures used by humans due to noise, odor concern over health hazards and potential danger to air craft [1]. It is sometimes called by names of animals it associates with, such as elephant birds, rhinoceros egret or hippopotamus egret. Three subspecies are recognized. *B.I. ibis, B.i. seychellarum* and *B.i. coromanda*[1].

There are no information on the proximate minerals, digestibility and anatomical weight compositions of cattle egret which could be used to assess its value in the food industries. Therefore this study reports the results of investigation on cattle egret (*Bubulcus ibis*).

MATERIALS AND METHODS

The cattle egret (*Bubulcus ibis)* was obtained at the Federal College of Agriculture, Akure, Ondo State campus. The sample was obtained in February 2005. It was sacrified, defeathered, weighed and dissected to separate the parts and weighed. Then the meat was oven dried at 105°C for 6 h, ground in a Kenwood blender, sieved (45 mm) and stored prior to analyses.

Sample was analysed for proximate composition using the AOAC[3] procedures. Carbohydrate was determined by difference. Energy was calculated according to the following equations[4].

Energy (Kcal) = 4x(g protein + g carbohydrate) + 9x (g fat)

Minerals were analyzed using the solution obtained by dry ashing the sample muffle furnace (530° C) for 3h and dissolving it in 10% HCL and making up to 50cm^3. All metals were measured with Pye Unicam SP9 atomic absorption spectrophotometers. Mineral ratios were calculated.

Digestibility, biological value, net protein utilization and net protein value were determined using the methods of Adeola[5].

RESULTS AND DISCUSSION

The life weight is 300g±10.20 g. The head, beak and heart are 19.3±0.50 and 5.9±0.50cm and 3.1±0.05 respectively (Table 1). The anatomical weight in this study are far higher to those recorded for land snails [6]

Correponding Author: Olawale Abulude, Department of General Studies, Federal College of Agriculture, Akure 340001, Ondo State, Nigeria.

Table 1: Anatomical weight composition of meat sample of cattle egret (wet weight in g)

Parameters	Value±SD
Life weight	300±10.20
Length of neck (cm)	13.0±0.50
Right arm (cm)	23.2±0.50
Left arm (cm)	24.0±0.50
Head	19.3±0.50
Right leg	28.2±0.60
Left leg	25.3±0.10
Heart	3.1±0.05
Liver	5.0±0.05
Bile duet	1.0±0.05
Intestine (Large + small)	8.0±0.50
Beak (cm)	5.9±0.50
Gizzard	13.0±0.60

Table 2: Proximate composition (% DM) of meat sample of cattle egret

Parameters	Value±SD	CV (%)
Ash	6.41±0.02	0.31
Moisture	4.79±0.02	0.42
Crude protein	76.72 ±0.02	0.68
Crude fat	2.14±0.01	0.47
Crude fibre	0.14±0.02	14.29
Carbohydrate	9.83±0.53	5.39
Energy	365.46±10.28	2.81

and *Ilisha africana* fish[7]. The differences are due to physiological composition of the different species.

Table 2 Shows the proximate composition of the sample in percent edible portion. This result shows the chemical composition as percent dry matter and also the energy in Kcal. From the table, it can be deduced that the sample is low in moisture content. This content is 4.79±0.02% DM with CV (%) of 0.42. the low moisture content avoid the sample to be stored for a fairly long time without microbial spoilage. The result is in close agreement with that reported for termites (10.2±0.57%[8]. In terms of the protein, fat, fibre and ash contents, the sample can be considered as good, source of protein. The mean protein content of 76.72±0.68% is found to be of high quality similar to that of beef meat and fish. This means that cattle egret can be used as substitute for fish and beef meat. The adult man of 70 kg body weight requires 0.57 gkg^{-1} of protein[9], that is 39.9 g of protein daily and about 25 g of meat will supply 45% of a child's daily need for protein[6] it is evident from the result obtained that this sample would satisfy the needs of both the adult and the young. The sample is low in crude fat. (2.14±0.01%). This low level of fat has been observed in seeds of *Carica papaya*[10] whereas higher value is reported for cricket (20%,[11]. The low fat content will not allow the egret to contribute significantly as a source of non-visible oil to the diet in which it may be present.

Na (518±13.96), K (555.05±12.12), Fe (51.25±3.36), Ca (407.74±10), Mn (4.29±0.50), Zn (3.32±0.50), Mg (481.69±10.32), Cu (4.29±0.50), Pb (1.43±0.50) and Cd (Not detected) (Table 2). The calculated content is lower than

Table 3: Mineral and mineral ratio of meat sample of Cattle egret (mg/100g DM)

Parameters	Value	±SD	CV (%)
Na	518.26	13.96	2.69
K	555.05	12.12	2.18
Fe	51.25	3.36	6.56
Ca	407.74	10	2.45
Mn	4.29	0.5	11.66
Cd	-	-	-
Zn	3.32	0.5	15.06
Mg	481.69	10.32	2.14
Cu	4.29	0.5	11.66
Pb	1.43	0.5	34.97
Mineral ratios	-	-	-
K/Ca	1.15	0.06	5.33
K/Ca	1.36	0.03	2.05
Mg/Ca	1.18	0.04	2.93
K/Na	1.07	0.02	1.96
K/Ca + Mg	0.62	0.04	5.66

that in mushroom samples (570mg100g,[12], but higher than those of snails (22.2-121mg100 g[13]. Sodium content is higher than that of Nigerian fresh fish[14] ranging from 12.5 to 63.1 mg/100g or that of variegated grasshopper. The iron content is higher than the values reported for fishes obtained from black sea[15] and cricket[11]. The copper and Zinc are lower than those of fishes[16,17]. The levels of trace metals may not be of concern in terms of toxicity to consumers. They are below the upper limit of safe intake of 2 to 5 mg day (Mn), 12 to 15 mg/day (Zn) and 10 to 15 mg/day (Fe).

Mineral elements are necessary for life. Iron facilitates the oxidation of carbohydrates, proteins and fats. Lack of adequate iron in the diet is associated with poorer learning and decreased cognitive development [9]. Calcium tends to be a kind of coordinator among inorganic elements for example Ca is capable of assuming a corrective role if amounts of K, Mg and Na are present in the body and Fe is utilized to better advantage in the diet[18]. Cu is present in the enzyme cytochrome oxidase involved in energy metabolism[19] its absorption failure can bead to Menkes' disease and needed to form red blood cells (with vitamin C)[9]. Zn is present in all tissues of the body and is a component of more than 50 enzymes[20].

The K/Mg ratio in the meat sample is 1.15±0.06 (Table 3). This result is lower than 0.11-4.86 reported for feeding stuffs consumed by land snails[21]. K/Ca (1.13) is not in agreement with values of 1.0 to 25.27 reported for apricot purees[22]. In MgCa ratio a low variability was obtained when compared with apricot purees (1.8 to 4.5). In general a low variability was obtained between K/Na and K/Ca + Mg ratio of the sample in this study and literature values[23]. The result obtained for K/Ca + Mg indicate that the egret is within safe limit of 2.2.

The mean result is 65.24%(Table 4). The result follows the trend on African yam bean[24] some tropical plant seeds[25]. The Biological Value (BV), Net Protein

Table 4. In protein digestibility of meat sample of Cattle egret

Parameter	Value±SD	CV (%)
Digestibility (%)	65.24±1.41	2.16
Biological value	52.19±0.84	1.61
Net protein utilization	34.05±0.62	1.82
Net protein value	26.12±0.50	1.91

Utilization (NPU) and Net Protein Value (NPV) are depicted in Table 4. The results varied thus: BV (57.19), NPU (34.05) and NPV (26.12). All these values are in close agreement with those obtained for cowpea[26]. The BV is lower than the values for sorghum grains, egg and milk protein[27]. The measure of BV and NPU of the protein here compared with that for a standard protein. Digestibility of protein and bioavailability of its constituent amino acids are very important factors In determining protein quality[28]. This is true because not all proteins are digested, absorbed and utilized to the same extent[9]. Differences in protein digestibility may arise from inherent difference in the nature of food protein, from the presence of non- protein constituents which may modify digestion, from the presence of anti-physiological factors or from processing conditions that after the release of amino acids from proteins by enzymatic processes.

CONCLUSIONS

The present results show that cattle egret meat sample has high protein value and rich minerals. Its digestibility is also high. The consumption of egrets should be harnessed because it would go a long way in reducing malnutrition in the developing countries.

ACKNOWLEDGEMENT

The authors are grateful to Mr. Onuoha of Federal College of Agriculture (Livestock section), Akure, Nigeria for the provision of the sample.

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