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# NUTRIENT CONTENT OF COOKED OSTRICH MEAT

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## INTRODUCTION

Ostrich production has grown rapidly in the United States (Jobes and Hendrickson, 1994). As the ostrich industry has developed, more restaurants have chosen to place ostrich meat on their menus (Morris, 1994). For those consumers who wish to monitor nutrient intake, there is little information available regarding the nutrient content of ostrich meat. Scientific literature provides limited nutrient information and no nutrient information is available from the United States Department of Agriculture-Agriculture Research Service (USDA-ARS) Agriculture Handbook-8 series Composition of Foods (USDA, 1990). The objectives of this study were to characterize the nutrient content of cooked ostrich meat and determine variability of different muscles from the carcass.

## MATERIALS AND METHODS

Twelve ostriches, ranging from 10 to 14 mo of age, were slaughtered commercially. After chilling 24 h at 2°C, carcasses were fabricated into muscle groups, vacuum packaged, and frozen (-10°C) until nutritional analyses were performed. Upon thawing, muscles were identified (Mellett, 1994) and two steaks (2.54 cm thick) were removed randomly from four different muscles (Iliofibularis, Iliotibialis lateralis, Obturatorius medialis, and Gastrocnemius) from each ostrich carcass. All steaks were trimmed of fat and connective tissue before cooking. Steaks were cooked to 62.7°C on a Farberware Open Hearth Grill, cooled to room temperature, homogenized in a Cuisinart Food Processor, and samples frozen (-10°C) for subsequent analyses. Fatty acid, cholesterol, calcium, iron, and sodium analysis were performed by a USDA approved laboratory. Total fat was determined by the lipid extraction-modified Folch method (AOAC, 1990), moisture by the oven-dry method (AOAC, 1990), and ash by the muffle furnace method (AOAC, 1990). Percent crude protein was determined by the Kjeldahl procedure (AOAC, 1990), and kilocalories calculated on the basis of the percent crude protein and fat calories (USDA, 1990). Data were analyzed by ANOVA using GLM procedures of SAS (SAS, 1989) to determine the significance of muscle location on each nutrient. Tukey's mean separation procedure was used to identify significant differences at $P < .05$.

## RESULTS

The percentage of moisture, lipid, protein, and ash in four muscles from 12 ostrich carcasses are reported in Table 1. The Iliofibularis, Iliotibialis lateralis, and Gastrocnemius muscles were similar in moisture content containing approximately 68% moisture; however, the Obturatorius medialis muscle had a lower percentage of moisture. As moisture and fat are inversely related in muscle, the percentage of lipid was higher ($P < .05$) in the Obturatorius medialis and lower ($P < .05$) in the Gastrocnemius than the other muscle groups. Cholesterol levels were higher ($P < .05$) in the Obturatorius medialis than the Gastrocnemius and Iliofibularis. Sodium levels were higher ($P < .05$) in the Obturatorius medialis and Gastrocnemius than the other two muscle groups.

TABLE 1. NUTRIENT COMPOSITION OF 100 GRAM COOKED SERVINGS OF SELECTED OSTRICH MUSCLES

| Nutrient | Iliofibularis | Iliotibialis lateralis | Obturatorius medialis | Gastrocnemius | SE |
|---|---|---|---|---|---|
| Moisture (g) | 68.42[a] | 68.52[a] | 65.88[b] | 68.59[a] | 0.283 |
| Protein (g) | 25.52 | 24.40 | 23.20 | 26.24 | 0.558 |
| Fat (g) | 2.74[b] | 2.66[b] | 3.84[a] | 2.07[c] | 0.125 |
| Ash (g) | 1.22 | 1.24 | 1.28 | 1.22 | 0.014 |
| Cholesterol (mg) | 76.71[b] | 79.85[a,b] | 91.45[a] | 76.03[b] | 1.845 |
| Calcium (mg) | 1.46 | 1.49 | 1.76 | 2.03 | 0.080 |
| Iron (mg) | 2.87 | 2.94 | 2.78 | 3.31 | 0.167 |
| Sodium (mg) | 62.39[b] | 60.20[b] | 75.40[a] | 84.21[a] | 1.968 |
| Calories | 133.67 | 127.13 | 133.65 | 130.74 | 2.503 |

[a,b,c]Means with different superscripts in each row are different ($P < .05$)

When compared to other food products (USDA, 1990), the composition of cooked ostrich meat is lower in fat and calories than beef, pork, lamb, veal, and dark meat broiler and turkey muscles. Cholesterol levels were similar to beef and pork, but lower than dark meat broiler

and turkey meat, and veal. The iron content was higher in iron than veal, turkey, pork, and chicken, but similar to beef and lamb. Other nutrients were similar to other lean meat sources.

Table 2 presents the fatty acid profile of cooked ostrich meat. The Iliofibularis was higher in saturated fatty acids than the Obturatorius medialis and Gastrocnemius. However, few other trends were observed.

TABLE 2. FATTY ACID PROFILE OF 100 GRAM COOKED SERVINGS OF SELECTED OSTRICH MUSCLES

| Fatty Acid, percent of total | Iliofibularis | Iliotibialis lateralis | Obturatorius medialis | Gastrocnemius | SE |
|---|---|---|---|---|---|
| 14:0 | 0.77 | 0.70 | 0.68 | 0.67 | 0.018 |
| 16:0 | 25.71[a] | 23.05[a,b] | 24.54[a] | 21.10[b] | 0.502 |
| 16:1 | 6.67 | 6.52 | 6.12 | 6.47 | 0.177 |
| 17:0 | 0.45 | 0.52 | 0.28 | 0.33 | 0.044 |
| 17:1 | 0.80 | 0.30 | 0.30 | 0.00 | 0.114 |
| 18:0 | 12.41 | 13.42 | 13.22 | 14.14 | 0.284 |
| 18:1 | 34.98 | 33.68 | 34.15 | 34.19 | 0.482 |
| 18:2 | 12.94 | 13.77 | 14.14 | 13.93 | 0.437 |
| 18:3 | 0.81 | 0.80 | 0.84 | 0.82 | 0.044 |
| 20:1 | 0.50[b] | 0.75[a] | 0.36[b] | 0.53[b] | 0.047 |
| 20:4 | 5.32 | 7.77 | 5.87 | 8.45 | 0.524 |
| Total Saturated Fatty Acids | 39.19[a] | 37.43[a,b] | 38.65[a,b] | 35.99[b] | 0.446 |
| Total Monounsaturated Fatty Acids | 41.74 | 40.35 | 40.50 | 4.79 | 0.574 |
| Total Polyunsaturated Fatty Acids | 19.08 | 22.33 | 20.85 | 23.13 | 0.795 |

[a,b]Means with different superscripts in each row are different ($P < .05$)

When compared to other lean meats (USDA, 1990), the fatty acid profile was similar to poultry, and pork, but higher in polyunsaturated and lower in saturated and monounsaturated fatty acids than beef, lamb, and veal.

Results indicate that ostrich meat compares favorably in nutrient profile to other lean meats. Comparatively, ostrich meat was low in fat and calories and a good source of protein and iron.

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