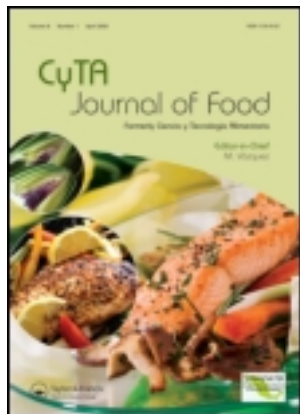


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Publisher: Taylor & Francis

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CyTA - Journal of Food

Publication details, including instructions for authors and subscription information:
<http://www.tandfonline.com/loi/tcyt20>

A comparative study of physico-chemical and functional properties, and ultrastructure of ostrich meat and beef during aging

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Version of record first published: 23 Feb 2012

To cite this article: Sepideh Alasvand Zarasvand, Mahdi Kadivar, Mahmoud Aminlari & Shahram S. Shekarforoush (2012): A comparative study of physico-chemical and functional properties, and ultrastructure of ostrich meat and beef during aging, *CyTA - Journal of Food*, 10:3, 201-209

To link to this article: <http://dx.doi.org/10.1080/19476337.2011.631221>

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A comparative study of physico-chemical and functional properties, and ultrastructure of ostrich meat and beef during aging

Estudio comparativo de las propiedades físico-químicas y funcionales y ultraestructura de carne de avestruz y buey durante su maduración

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(Received 30 June 2011; final version received 28 September 2011)

Ostrich meat has received considerable attention in recent years due to its low fat, low sodium and collagen, and high polyunsaturated fatty acids and iron. It is recommended as an alternative to other types of red meat. In this study, functional characteristics of ostrich meat (*M. iliofibularis*) and beef (*M. longissimus dorsi*) during storage at 4°C for different lengths of time post-mortem were determined and compared. Significant decrease in Warner-Bratzler shear force in both meat types occurred during storage. Lightness (L^*) of the two muscles decreased while redness (a^*) and yellowness (b^*) increased. The pH significantly decreased whereas buffering, emulsion, foaming and water holding capacities and emulsion stability, protein solubility increased during seven days postmortem. Aging had no effect on cooking loss. In conclusion, the results of this study showed that ostrich meat has superior functional properties in comparison to beef and these properties are more preserved than beef during aging.

Keywords: ostrich meat; aging; beef; postmortem; functional properties; physico-chemical properties; ultrastructure

La carne de avestruz ha recibido una importante atención en años recientes debido a su bajo contenido en grasa, en sodio, colágeno, alto contenido en ácidos grasos poliinsaturados y hierro. Se recomienda como alternativa a otros tipos de carne roja. En este estudio se determinaron y compararon características funcionales de carne de avestruz (*M. iliofibularis*) y buey (*M. longissimus dorsi*) en almacenamiento a 4°C durante diferentes períodos de tiempo post-mortem. Una reducción significativa en fuerza de corte de Warner-Bratzler en ambos tipos de carne tuvo lugar durante el almacenamiento. La claridad (L^*) de los dos músculos se redujo, mientras la rojez (a^*) y el amarilleado (b^*) incrementaron. El pH se redujo significativamente mientras que las capacidades reguladoras, de emulsión, espumado y retención de agua, estabilidad de emulsión y solubilidad de proteína aumentaron durante los siete días post-mortem. La maduración no tuvo efecto en la pérdida durante cocción. En conclusión, los resultados de este estudio mostraron que la carne de avestruz tiene propiedades funcionales superiores en comparación con la de buey y esas propiedades se conservan mejor que las de carne de buey durante el envejecido.

Palabras clave: carne de avestruz; maduración; post-mortem; propiedades funcionales; propiedades físico-químicas; ultraestructura

Introduction

Ostrich meat (*Struthio camelus*) is perceived and marketed as a healthy alternative to other types of red meats (Fisher, Hoffman, & Mellett, 2000). Ostrich meat products are being marketed in food market as steaks, sausage links, summer sausage, fillets, hamburger, pastrami and jerky (Jeffery, 1999). Several researchers have studied the nutritional value of ostrich meat indicating that it contains low collagen, saturated fatty acid and sodium, whereas its polyunsaturated fatty acid along with iron content is high (Balog & Almeida Paz, 2007; Hoffman, 2005; Hoffman, Muller, Cloete, & Bran, 2008; Paleari, Corsico, & Beretta, 1995; Polawska, Marchewka, Krzyzewski, Bagnicka, & Wojcik, 2011a; Polawska et al., 2011b; Sales & Oliver-Lyons, 1996). The studies also indicated that ostrich meat is characterized by a higher pH (> 6.2) and darker visual color due to more pigment content, whereas its tenderness and cooking loss is as of beef.

Functional properties of meat proteins are important in food processing and food product formulation. These include water holding/oil binding capacity, emulsification, foam capacity and gelation. These properties are affected by the intrinsic factors of proteins such as molecular structure, amino acid sequence (hydrophobicity profile) and size. Proteins with high oil and water binding capacities are desirable for use in meat products while proteins with high emulsifying and foaming capacity are good for sausages, bologna and soups (Ahmedna, Prinyawiwatukul, & Rao, 1999). To the best of our knowledge, there is no report on the effect of aging on physico-chemical, functional properties of protein, and the ultrastructural patterns of ostrich meat. Since beef is extensively used in meat industry, the present work sets out to identify and compare the properties of ostrich meat and compare it to beef during aging. The aim of this research was to evaluate several physico-chemical,

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