Caracterización de un producto cárnico tipo jamón elaborado con carne de conejo (Oryctolagus cuniculus)

Characterization of a meat product type made from rabbit (Oryctolagus cuniculus) meat

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Resumen

Los productos de carne de conejo son una alternativa para los consumidores que requieran productos nutritivos y bajos en grasa. Por lo anterior el objetivo de esta investigación fue desarrollar un producto cárnico tipo jamón con carne de conejo. A estos productos cárnicos se les realizaron análisis de composición proximal, microbiológicos y sensoriales. De acuerdo con la normatividad mexicana y El contenido proteico de 16.31 ± 0.05, el jamón se clasificó como "fino", y presentó una cantidad de grasa de 3.68 ± 0.05. Después de 28 días de almacenamiento los recuentos microbiológicos se encontraron en los límites permisibles. La evaluación sensorial sugiere una buena aceptación del producto, las calificaciones lo ubican en un rango de entre "me gusta poco" y "me gusta moderadamente". La utilización de carne de conejo para la elaboración de productos cárnicos, es una alternativa saludable que permite la diversificación de la industria cárnica en México.

Abstract

Rabbit meat products are an alternative for consumers who require products nutritious and low in fat. Therefore the aim of this research was to develop a meat product type rabbit meat ham. These meat products were performed proximate composition analysis, microbiological and sensory. According to Mexican regulations, the protein content is of 16.31 ± 0.05, the ham was classified as "fine", and presented a fat of 3.68 ± 0.05. Microbiological counts in permissible limits were found after 28 days of storage. The sensory evaluation suggests a good acceptance of the product, ratings placed it in a range between "I like little" and "I like moderately". Use for the manufacture of meat products rabbit meat, is a healthy alternative that allows diversification of the meat industry in Mexico.

Introduction

Meat is considered as a nutritious food because its components: water (60-80%), protein (16-25%) and fat (1-30%), whose proportions can be very variable (Gold et al. 1999). However, from the point of view of health, excessive consumption of meat products is not recommended due to high fat content (Cengiz & Gokoglu, 2005). Therefore, the reformulation of traditional meat products can be carried out by modifying the lipid content and / or adding a number of functional ingredients (Jimenez-Colmenero et al., 2007). In this regard, rabbit meat can be integrated into a healthy diet. Rabbit meat is a lean meat rich in proteins of high biological value, source of micronutrients, with a low content of uric acid, cholesterol and purines (Hernandez, 2007; Dalle Szendrő Zotte A. & Z., 2011). For this reason and because of the beneficial compositional characteristics, the aim of this study was to evaluate a ham made with rabbit, whose proximate

composition meets the nutritional requirements, it is microbiologically safe and sensorially acceptable.

MATERIALS AND METHODS
Raw materials

500 g of rabbit (Oryctolagus cuniculus) race New Zealand and Mexico Classification 1 were used in accordance with the Mexican standard NMX-FF-105-SCFI-2005. The meat was passed through a sieve of 2.5 cm in a meat grinder (Torrey, Mod. M-12-FS, Monterrey, Mexico) was packed in polyethylene bags and stored at 4 ± 1 ° C. The meat was purchased in Agricultural Services Saint Bernard Puebla (Puebla, Mexico), the non-meat raw materials were supplied by McCormick-PESA (Puebla, Mexico) and are detailed in Table 1.

Table 1. Formulation for the preparation of ham

Ingredientes	Contenido (%) m/m
Carne	50
Sorbato de potasio	0.1
Sal de cura (5 % nitritos)	0.5
Eritorbato de sodio	0.1
Fosfatos (Hamine V.S. 817)	0.3
Fécula de papa	5.0
Carragenina (Aquagel MP4134)	1.1
Aislado de soya (IPSOC-403)	1.5
Cloruro de sodio	1.2
Maltodextrina (10 E)	1.3
Hielo y agua	38
Color artificial rojo	0.01
Sabor jamón	0.9

Product development.

For the elaboration of the ham, the meat and the ingredients were placed in a Meat Vacuum Tumbler (Torrey, Mod. MV-25, Monterrey, México), the ice and water were added at 4 °C. The blend is massaged until 5 000 rpm, stored for 24 h at 4 °C. The mixture was introduced in direct cooking bags and they submerged in water at 80 °C for approximately 1 hour until the 73 ± 1 °C. Products are sliced, vacuum packed and stored at 4 ± 1 °C.

Proximate analysis

Analysed the percentage of moisture with the Official Mexican Standard NMX-F-083-1986, contents of fat with the Official Mexican Standard NMX-F-089-S-1978, proteins and residual

nitrite with the rules Mexican NMX-F-608-NORMEX-2002 and NOM-213-SSA1-2002, respectively.

Microbiological analysis

The microorganisms count aerobic mesophilic was the Official Mexican Standard NOM-092-SSA1-1994, of moulds and yeasts with the NOfficial Mexican Standard NOM-111-SSA1-1994. Total coliforms count was determined with the Official Mexican Standard NOM-113-SSA-1-1994, for *Salmonella* was used the NOM-114-SSA1-1994 and finally the NOM-115-SSA1-1994 to *Staphylococus aureus* in foods.Sensory Analysis

Rabbit hams compared to commercial pork and turkey hams using a structured hedonic scale of nine points, considering the rating of 9 (I like very much) and to 1 (I dislike extremely).

The attributes evaluated were: color, aroma, flavor and overall appearance, with a panel of 80 judges not trained, 60% were women and the rest men, ranging in age from 18 to 23 years. The tests were offered to judges sliced to 24 ± 2 ° C. Significant differences between the mean values of the sensory attributes were evaluated by ANOVA with 95% confidence, using the Minitab statistical version 16, 2010 (Pennsylvania, USA) program.

RESULTS

Proximate analysis

As shown in Table 2, the meat product presented a percentage of protein 16.31 ± 0.05, and 3.68 ± 0.05 fat. Moisture and residual nitrite are in the allowable limits in Mexico. According to Mexican law, the meat product is classified as "fine" due to the protein content, fat content also represents 38.6% less fat than allowed by the NOM-158-SCFI-2003.

Table 2. Composition proximal evaluated in rabbit ham

Análisis (%)	Valor[a]	Valores permisibles de acuerdo con la normatividad vigente *
Humedad	74.5 ± 1.0	75 (Valor máximo)
Grasas	3.68 ± 0.05	6 (Valor máximo)
Proteínas	16.31 ± 0.05	16 (Valor mínimo)
Nitrito residual	86.09 ± 1.33	156 mg/kg** (Valor máximo)

[a]Valor promedio ± D.S.; n=3
*NOM-158-SCFI-2003
**NOM-213-SSA1-2002

Microbiological analysis

According to Table 3, the meat products showed an acceptable microbiological stability. In general, the cooked ham is a food with a low salt content, with a pH near 6.0 and activity over 0.95 water; these factors are unable to inhibit microorganisms associated with product contamination (Gonzalez et al., 2010).

Under these conditions, the stability of the hams made with rabbit meat was good. The action of the cold reduces the growth of microorganisms without inhibiting it, which is usually the limiting factor of conservation. It was evident that the packaging of the hams under high vacuum in polyethylene bags, impervious to water and oxygen, and cooling contribute to reducing the growth of molds and yeasts, mesophilic bacteria and total coliforms because no permit limits

were exceeded at end of 28 days. However, during the processing steps, various pathogenic microorganisms from handlers, equipment, raw materials and environment, can cause product contamination (Gonzalez et al., 2010). Hence the importance of the presence of Salmonella spp and Staphylococcus aureus. As shown in Table 3, the absence of these microorganisms at the time of preparation of meat products was confirmed.

Table 3. Values of the counts and the presence of microorganisms in meat products stored 4°C for 28 days

Análisis	Resultados (UFC/g)
Bacterias mesófilas aerobias	2.3×10^4
Coliformes totales	< 10
Mohos y levaduras	< 10
Salmonella spp	Ausente en 25 g
Staphylococcus aureus	Ausente

Sensory Analysis

The product of rabbit meat compared to commercial pork hams and turkey respectively, as shown in Figure 1. The assessment made by the consumer on the quality of meat products is defined by the sensory experience (Pietrasik et al. , 2010). Quality of food products is of great importance to define the subjective sensations experienced by consumers and conditioning the acceptance or rejection of the product (Estrada et al., 2009).

The aroma in different hams was evaluated and no difference ($P \geq 0.05$) between rabbit and ham trade ham, obtaining values of 7.4 ± 0.6, 6.6 ± 0.9 and 6.2 ± 1.6 for hams turkey, rabbit and pork, respectively. Also, color evaluations showed no difference ($P \geq 0.05$), with values for turkey ham, rabbit and pork 7.2 ± 0.8, 6.4 ± 1.6 and 6.4 ± 1.7, respectively. When comparing the taste, the judges did not detect differences ($P \geq 0.05$), with values for turkey ham $0\ 7 \pm 7.3$ and $7.0 \pm$

1.3 and 6.4 ± 1.1 for the rabbit and pork hams. For appearance, the rating assigned to the rabbit ham was lower (6.0 ± 1.7) compared to the other two hams in the study (7.6 ± 0.8 and 7.0 ± 1.5). This difference (P ≤ 0.05), can be attributed to the filling process, this was done manually, which caused the formation of small cavities, which could adversely affect the appearance of the ham rabbit. The study suggests a good acceptance Ham rabbit, placing the meat product in a range of "I like little" and "like moderately".
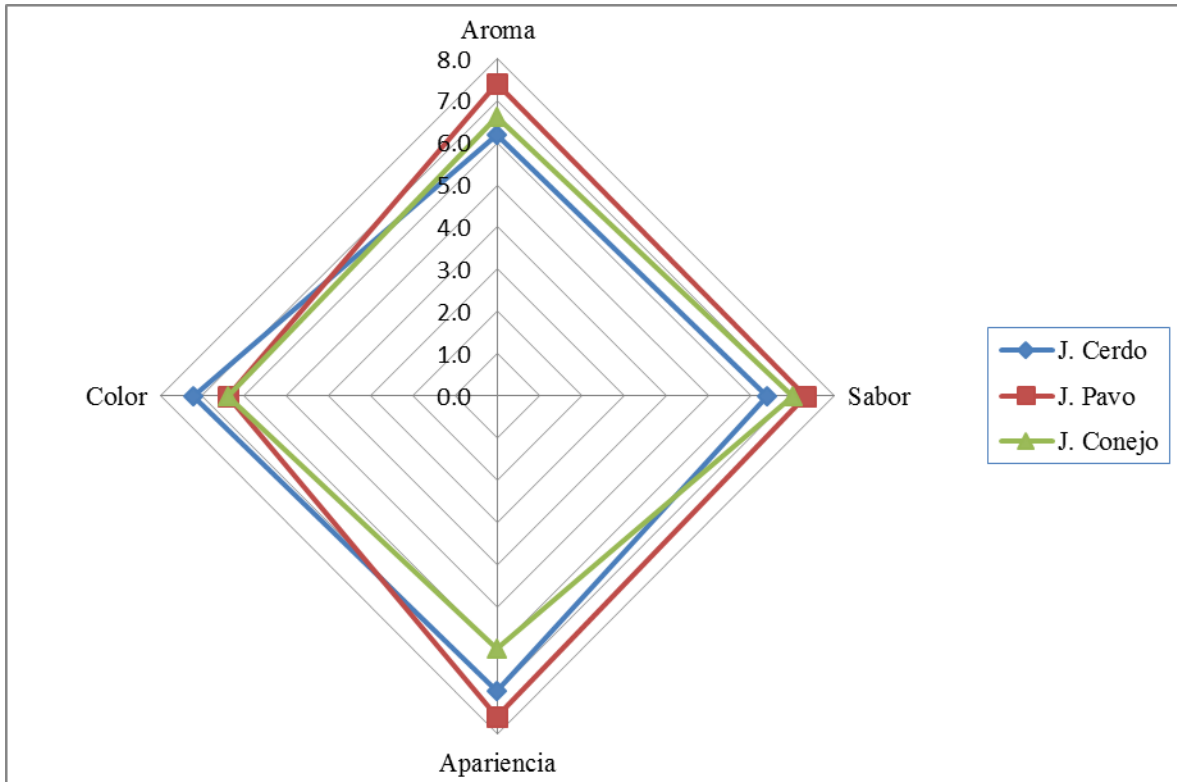

Figure 1. Sensory Evaluation rabbit Ham.

CONCLUSIÓN

Obtaining rabbit meat ham is a viable option for alternative meat industry Mexico. The results demonstrate comply with the standard specifications of composition and microbiological stability until day 28. From the foregoing, becomes relevant to continue the study of meat that provide potentially functional effects, without detriment to their sensory quality.

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