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Chemical and Nutritional Characteristics of Traditional Meat Products of Borana Community in Marsabit County, Kenya

Buke Dabasso[1], Anselimo Makokha[1], Hassan Roba[2], Arnold Onyango[1]

[1]Jomo Kenyatta University of Agriculture and Technology, Food Science, Kenya
[2]National Museums of Kenya, CBD, Kenya

Abstract

The Borana community, who are pastoralists in northern Kenya, has well established traditional meat processing and preservation practices. The preserved meat products help to contribute to household food security, particularly during periods of droughts. The meat products are produced mainly from cattle (*Bos indicus*) goat (*Capra hircus*) and camel (*Camelus dromedarius*) meat. The processing of these products involves the use of preservation techniques such as striping, drying and heating, with or without the use of various added ingredients. However, upscaling of the traditional meat conservation has been constrained by lack of adequate information on the nutritional content and quality of the products. The objective of this study was therefore, to determine the nutritional composition and indicators of spoilage in traditional meat products of the Borana Community in Marsabit County, Kenya.
Traditionally processed meat samples were collected in Marsabit County. The proximate composition, quality indices and mineral content of the samples were analysed using the methods of the Association of Official Analytical Chemists (AOAC).
The result showed that traditional meat products were high in protein, with mean contents ranging from 55.8-72.5%. The minerals calcium, magnesium, iron and potassium ranged from 35.8-110 mg/100g, 52.8-60.7 mg/100g, 4.5-7.4 mg/100g, and 701-826 mg/100g, respectively. The fatty acid composition showed that traditional beef and goat meat products contained good amount of monounsaturated oleic acid at mean levels of 37.2% and 39.2% respectively. The linoleic acid content for the same products was 13.3% and 13.5%, respectively. Peroxide Value (PV), ranged from 1.8-2.6 mg Eq./kg, acid value was 0.01% while Thiobarbituric Acid (TBA) ranged from 0.32-0.52 mg malondialdehyde (MDA)/kg. The PV, acid value and TBA levels were below the value associated with meat spoilage during the expected shelf life. Hence there is good potential for upscaling of the production of these traditional meat products including exploring options for packaging and selling products to increase income while contributing towards improved food security among the community.

Keywords: Borana, drying, Marsabit, meat, nutrition composition, quality, traditional

Introduction

Borana people produce different type of traditional meat products from Boran cattle *(Bos indicus* and goat *(Capra hircus)* for nutritional supplement and snacks for special occasions and to meet seasonal fluctuation in the available protein in their diet. The traditional meat is prepared from beef or goat meat which is striped, dried and deep fried. It has a high cultural and economic importance to Borana people which warrants the efforts to confirm its quality and nutritional composition.

The processing and preparation of these traditional meat products is an elaborate process where the meat parts used are selected carefully by removing fatty tissues and tendons, only lean meats parts are used. The meat is then striped and suspended to dry for one to three days to lower the moisture content. Bintoro et al (1987) observed that lowering the moisture content (dehydration) prevent foods from spoilage which is a well-known method in tropical areas.

Borana people have developed unique recipes and storage methods that increase products shelf-life under the traditional pastoral production environment however as Imungi (2014) observed, the preserved meat products from the pastoral area are not standardized and that most of the process and product parameters are currently unknown. Up scaling production of traditional meat products is constrained by lack of understanding of its nutrient and chemical contents. Therefore, this study was undertaken to determine the nutritional composition and indicators of spoilage traditional meat products of Borana Community in Marsabit County, Kenya

Material and Methods

Traditionally processed meat samples were collected in Marsabit County. The proximate composition, quality indices and mineral content of the samples were analysed by use of the methods of the Association of Official Analytical Chemists (AOAC), (1995).

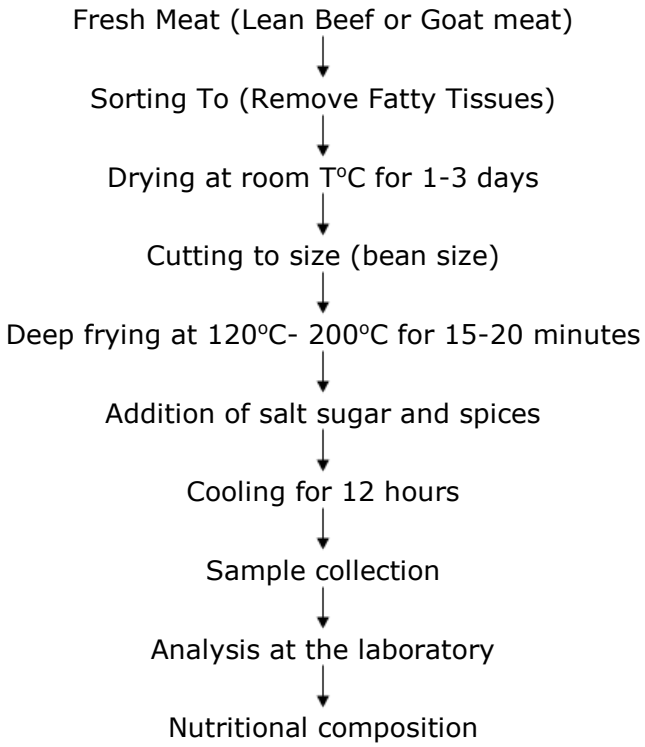

Fig I: Flowchart of traditional meat processing

Results and Discussion

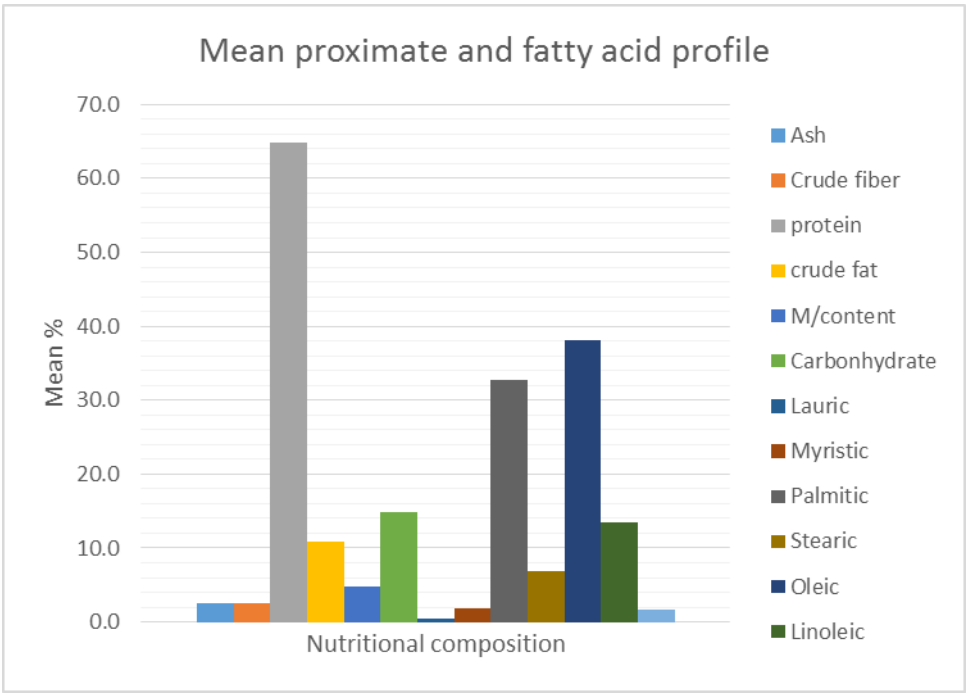

Figure II: Nutritional composition of Traditional meat

The proximate composition shows that traditional meat is a shelf stable product as it has low moisture content of 4.8% and nutrient rich product. This is similar to the study done by Ogunsola (2008) who opined that the profile of the proximate composition of the *danbunama* proved the product to be a very shelf stable product, where its low moisture percentage promotes its ability to stay at room temperature in spite of its high level of protein and fat combined. The traditional meat has a high protein content due to increase in dry matter. Traditional meat was also found to have higher content of oleic 38% and linoleic 13% indicating that the traditional meat products do provide important essential fatty acids.

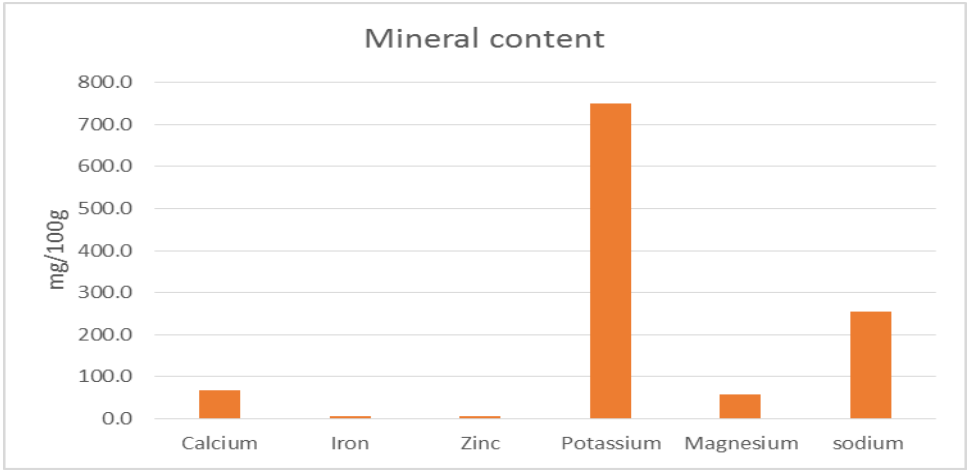

Figure III: Mineral content of traditional meat

Meat and meat products are also important sources of minerals in the diet. Beef has almost all-important minerals for human nutrition. Meat and meat products are also important

sources of minerals in the diet. Oliveira et al., (2015) noted that beef has almost all-important minerals for human nutrition

Table I: Quality parameters of traditional meat

Parameter	unit	Mean
PH		5.9
Peroxide Value	Meq/kg	2.3
TBA	mgMDA/kg	0.4
Acidity	%	0.0
Free Fatty Acid	%	1.3

The Peroxide Value, acid value and Thiobarbituric Acid levels were below the value associated with meat spoilage during the expected shelf life. The TBA test measures a secondary product of lipid oxidation, malonaldehyde. The TBA of 0.4 mg TBA/kg of traditional meat product in this study did not exceed critical value of 3 mgTBA/Kg of meat at which rancidity is virtually detected (Wong et al., 1995).

Conclusions and Outlook

The traditional meat products were nutrient rich products, where the concentration of nutrients was enhanced by the drying process. The keeping quality of the products was good, as all the rancidity indices including the Peroxide Value, Acidity and Thiobarbituric acid (TBA) were below the value associated with increased risk of rancidity. There is good potential for up scaling of the production of these traditional meat products including exploring options for packaging and selling products to increase income while contributing towards improved food security among the community.

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