

PROCESS STANDARDIZATION USING SENSORY EVALUATION OF DAMBUN NAMA; A TRADITIONAL SHREDDED MEAT PRODUCT

*Yusuf, H.L.¹, Gambo, A.¹

¹Department of Food Science and Technology, Bayero University Kano.

*Corresponding Author: ladsufy83@gmail.com

ABSTRACT

The study was aimed at establishing a standardized method, for the processing of a traditional meat product Dambun Nama, with reproducible quality characteristics, using beef. Fresh beef from skeletal muscle with an average moisture content of 74% was used to produce the samples. Two samples (D1 and D2) were produced based on the pounding (*Dakau*) and stirring (*Tuqe*) methods respectively. Sensory analysis of the finished products using a panel of fifteen members, and based on a nine point hedonic scale was used to compare preferences of critical parameters (Texture, taste, aroma, colour, and the overall acceptability) of the two samples. The data obtained from the results of the sensory analysis was then subjected to Analysis of Variance (ANOVA) to compare the variation in the means of the parameters tested. A post hoc analysis using Duncan's Test was carried out to separate the means and determine the level of significance at 5% level. From the results, sample D1 had the highest means in all the parameters tested (8.07, 8.21, 8.21, 8.21, and 8.27 respectively), which were significantly different ($P \leq 0.05$) with those of sample D2 (7.71, 7.93, 7.86, 7.43, and 7.20 respectively). Based on the results obtained, the study concluded that the preparation method of sample D1 could be adopted as the standardized procedure for the commercial production of Dambun Nama in Nigeria.

Keywords: Dambun Nama, Skeletal muscle, Pounding, Stirring, Sensory Analysis

INTRODUCTION

Meat is a nutritious, protein-rich food that is a highly perishable produce with a short shelf-life unless preservation methods are used. Shelf life and maintenance of meat quality are influenced by a number of inter-related factors including holding temperature, which can result in detrimental changes in the quality attributes (Nychas *et al.*, 2008). In many developing countries, meat is widely consumed either in a freshly cooked form, or processed into other products in order to improve taste and palatability, and also to avoid associated spoilage (Apata *et al.*, 2013). Dambun-Nama (a shredded fried meat product), prepared from the meat of ruminant animals is a ready-to-eat meat product, produced mainly with the aim of extending the shelf life of meat, providing variety, and developing its individual distinct texture and flavor (Yusuf *et al.*, 2020). The potential of developing Dambun Nama into a conventional product with stable storage features requires the development and adoption of a standardized procedure that gives reproducible results, as well as generate useful data on the final product characteristics. The study was aimed at using sensory evaluation as a tool to standardize the production method of Dambun Nama from beef, in order to establish consistency in the quality characteristics of the final product.

MATERIALS AND METHODS

Fresh beef cuts from the skeletal muscle of the hind quarters of a medium aged healthy animal; with an average moisture content of 70%, was purchased from Kano main abattoir to produce the samples. The meat was prepared and processed within 6 hours of slaughter. Two common traditional methods (*Dakau* or pounding, and *Tuqe* or stirring) that differ in their preparation procedures were used in producing the two different samples of Dambun Nama, coded D1 (*Dakau* method) and D2 (*Tuqe* method) respectively (Figure 1). The assistance of two local producers was employed, each of which was an expert in the preparation method of one of the samples. The ingredients used and their quantities, were as obtained from an approximation of most of the traditional basic ingredient

formulation originally used in both methods, without alteration. These ingredients were the meat, onions, ginger, salt, water, vegetable oil, and flavour enhancer.

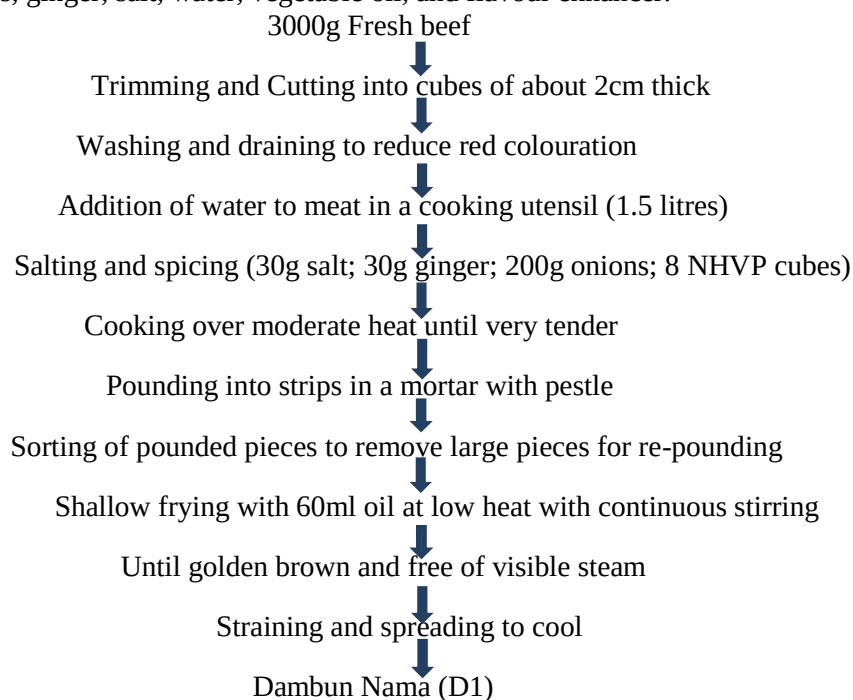


Figure 1a: Flow Chart for the preparation of Dambun Nama, *Dakau* Method

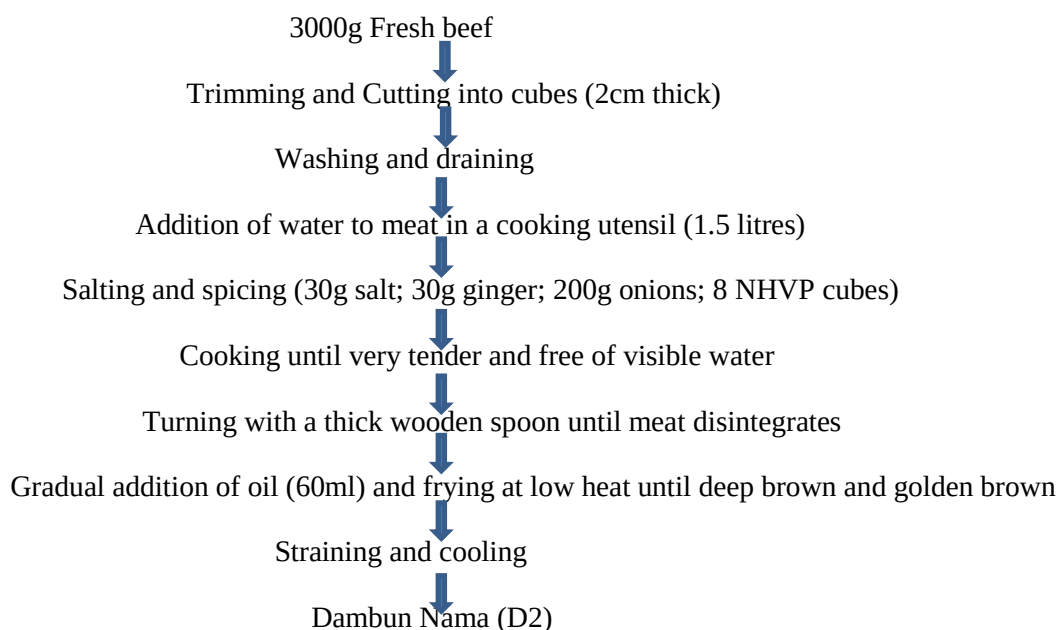


Figure 1b: Flow Chart for preparation of Dambun Nama, *Tuqe* Method

The products D1 and D2 respectively, were subjected to sensory assessments by a panel of 15 members, based on a nine point hedonic scale ranging from 9 being extremely liked, to 1 being extremely disliked, respectively. The parameters analysed were taste, texture, aroma, colour, and overall acceptability (Yusuf *et al.*, 2019). Data obtained from the sensory evaluations were subjected to univariate Analyses of Variance (ANOVA), to generate means that were further subjected to T-test for preference testing at 5% significance level.

RESULTS AND DISCUSSION

The results as shown in Table 1, indicate sample D1 having the highest means in all the parameters assessed, using the T-test for preference testing (Dean *et al.*, 2017). These parameters were all significantly different ($P \leq 0.05$) with those of sample D2. The higher mean obtained in the sensory property of taste in sample D1 (Table 1) could be related to the uniformity in the particle sizes of the sample. However, in sample D2, different particle sizes were arbitrarily created as a result of the continuous stirring of the softened meat pieces. This endless combination of particle sizes constituted those that were fragile, which required minimal heat exposure and short processing times. The variation in the particle sizes in sample D2 required that long processing time must be applied in order to effectively process the large particles. This caused processing challenges in terms of the sensitivity of the fragile particles being prone to over-processing and heat damage (Tetra Pack, 2016; Ranken, 2002). The process duration and temperature of exposure of sample D2 resulted in giving its particles the final colour of golden brown, deep brown, and random black particles. These random black particles were the smallest, therefore the most affected by the temperature and time of processing, which resulted in their pyrolysis or charring (Cascarosa *et al.*, 2011). This resulted in a slightly bitter taste and an aroma that was not as acceptable as that of sample D1 (Table 1). The formation of the black particles was prevented in sample D1 because they had been sorted prior to heat processing, therefore they were evenly heated for a determined period. From the results of the statistical analysis, the preferred sample was D1; therefore its method of preparation was adopted as the standard method of preparing Dambun Nama.

Table 1: Sensory Scores of Dambun Nama Samples used for Process Standardization

Sensory Property	Samples/Mean ¹	
	D1	D2
Texture	8.07 ± 0.68 ^a	7.71 ± 0.70 ^b
Taste	8.21 ± 0.65 ^a	7.93 ± 0.77 ^b
Aroma	8.21 ± 0.65 ^a	7.86 ± 0.72 ^b
Colour	8.21 ± 0.54 ^a	7.43 ± 0.47 ^b
O.A	8.27 ± 0.47 ^a	7.20 ± 0.66 ^b

1. Means with different superscripts in each row are significantly different ($P \leq 0.05$)

2. D1 = Pounded, sorted, stir fried Dambun Nama (Dakau Method)

3. D2 = Stir fried Dambun Nama (Tuqe Method)

4. A.O = Overall Acceptability

CONCLUSION

In this study, it was observed that the particle size of meat plays an important role in determining the quality of the final product during moisture removal using heat processing. The dry-heat processing of the Dambun Nama with different and uneven particle sizes resulted in an end product with poor quality. The study highlighted that the use of sorting and controlled heating time and temperature greatly affected the final quality of Dambun Nama. The preparation methods and the final product characteristics of sample D1 (*Dakau*) resulted in its preference over sample D2 (*Tuqe*). The analyzed sensory data proved the preference of sample D1 in all the parameters tested including the overall acceptability. Therefore, for establishing consistency in the processing method of Dambun Nama, and in the final product quality characteristics, the preparation method of sample D1 could be adopted as a standardized procedure of commercial production of Dambun Nama in Nigeria.

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