THE EFFECTS OF DIFFERENT WOOD TYPES ON CHEMICAL AND SENSORY CHARACTERISTICS OF SMOKED RABBIT MEAT

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Abstract

This study was conducted to investigate the effects of using different wood types on chemical and sensory properties of smoked rabbit meat. 20 rabbits of mixed breed and sex were purchased and used for this study in the Meat Science Laboratory, Department of Animal Production, Olabisi Onabanjo University Ayetoro Campus. The rabbits were slaughtered and the carcasses allotted to 4 wood types smoking and cooking gas as control thus T_0 = cooking gas (control), T_1 = Hard wood, T_2 = softwood, T_3 = Medium wood, T_4 = Handwood + softwood+medium wood. Data were collected and analysed in a completely randomized experiment at $p<0.05$. The results showed that there were no significant differences ($p>0.05$) in the chemical properties of rabbit meat irrespective of wood type used. In the sensory analysis, rabbit meat smoked with the combination of wood types (T_4) had highest ($p<0.05$) scores in all the variables and most preferred trailed by rabbit meat smoked with hard wood. The use of wood combination is recommended for high sensory quality of rabbit meat.

Introduction

Rabbits (*Oxyctolagus cuniculus*) are mammals that belong to the order *Lagomorpha* and similar to rodents as the possess incisors teeth which are used to grind forages. Rabbits play an important role in the supply of animal protein to the Nigerian and other developing countries populace as they are kept for meat production (Apata *et al.*, 2012). Meat from rabbits is white, has high quality protein with lower fat and cholesterol levels than meats from other species of meat animals and poultry (Dalle Zotte, 2004). However, rabbit meat like meat from other animals or fish is prone to deterioration therefore, needs to be preserved right from exsanguination (Apata *et al.*, 2012). Smoking is one of the oldest traditional methods of meat preservation and also imparts flavour, taste and prolong the shelf-life of the meat (Dal Bosco and Bernardini, 2001). It had been reported that smoking and other processing methods important for meat and fish preservation have various effects on physicochemical and nutritional quality of these food items (Eyo, 2001, Oparaku and Mgbenka, 2012; Idah and Nwankwo, 2013). Although the effects of smoking on nutritional value of meat had been documented, (Azaz and Ahamad 2012), the actual effects of differently used wood type or in combination on the chemical and sensory qualities of meat had not been adequately reported. The objective of this study was to investigate the influence of different wood types on chemical and sensory properties of smoked rabbit meat.

Materials and Methods

This study was carried out in the Meat Science Laboratory of the Department of Animal Production, Olabisi Onabanjo University, Ayetoro Campus. 20 rabbits of mixed breed sex were used for this study. They were purchased from a reputable farm at Abeokuta and were transported to the laboratory. They were kept in cages, fed mixture of *Tridax procumbens, gliricidia sepium* and *Leucaena haucocephella* in the morning and concentrate (Grower marsh) produced by Animal Care Services Konsult Limited to stabilize them for 2 weeks before slaughter. The animals were weighed, stunned and slaughtered. Their carcasses were allotted to smoking with 4 wood types and a control using cooking gas as follows: T_0 = cooking gas T_1= Hardwood; T_2 = Softwood; T_3 = Medium (hardness between hard and soft) wood and T_4 = Hardwood + softwood + medium woods. Smoking of the rabbits carcasses was done using 4 drums each filled with hardwood (*Tectona grandis*), softwood (*Gmelina Gmelina arborea*), and medium wood (*Cassia siamea*) combination of hard, soft and medium wood while rabbits in control treatment were smoked with cooking gas. The operations for smoking followed that of Eyo (2001). The chemical composition of the smoked meat was carried out with the AOAC 2005 method. The sensory evaluation of rabbit meat was done following AMSA 1995 procedures, while the statistical analysis of data was done using (Genstat, 2011) software at $p<0.05$ in a completely randomized experiment.

Results and Discussion

Table 1 shows the results of chemical characteristics of smoked rabbit meat using different types of wood. There were no significant differences ($p>0.05$) in all the chemical characteristics of smoked rabbit meat tested for in this study. This implied that none of the wood type, hard, soft, and medium and the combination of the three as well as the cooking gas (control) influenced any of the chemical variables in rabbit meat. This was in agreement with Egbal *et al*; 2010 who reported similar results on fish smoked with two different woods *citrus lemon and Acacia seyal*. There were significant differences ($p<0.05$) in the sensory scores of rabbit meat smoked with different wood types Table 2. Rabbit meat smoked with combination of hard, soft and medium woods (T_4) gave the highest ($p<0.05$) eating qualities and acceptability of the meat trailed by rabbit mat smoked with hard wood (T1) while the meat smoked with cooking gas (T_0) gave the least ($p<0.05$) sensory scores on colour, flavour and overall acceptability. These results indicated that the intensity of smoke could have influenced the quality of the rabbit meat in this study which agreed with (Egbal *et al*., 2010).

Conclusion

Smoking of rabbit meat using any wood type did not have significant impact on the chemical characteristics of the meat in this study. However, different wood types, produced significant effects on the sensory properties of rabbit meat with the combination of the woods-hard, soft and medium (T_4) imparting highest and best quality on rabbit meat which was recommended in this study.

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Table 1: Chemical characteristics of smoked fresh rabbit meat as affected by different wood types (±SE)

	Treatments				
Variables	T_0	T_1	T_2	T_3	T_4
Moisture content (%)	55.37±1.45	55.74±1.54	55.51±1.45	55.18±1.90	55.43±1.20
Crude protein (%)	31.13±0.73	30.48±0.75	30.34±0.72	30.44±0.85	29.78±0.51
Ether Extract (%)	8.39±0.13	8.49±0.15	8.93±0.84	8.84±0.12	8.83±0.09
Ash (%)	3.96±0.09	4.08±0.09	3.95±0.15	3.76±0.12	3.92±0.04
NFE (%)	1.15±0.10	1.21±0.01	1.27±0.01	1.78±0.02	2.04±0.00
pH	6.49±0.05	6.59±0.09	6.49±0.09	6.59±0.04	6.51±0.04

No significant difference in the means ($p>0.05$)
NFE – Nitrogen Free Extract

Table 2: Sensory properties of smoked fresh rabbit meat as affected by different wood types

	Treatments				
Variables	T_0	T_1	T_2	T_3	T_4
Col.	$3.15±2.67^{d}$	$5.55±0.58^{b}$	$4.25±1.67^{c}$	$4.35±1.79^{c}$	$6.85±0.39^{a}$
Flv.	$2.80±0.45^{d}$	$5.45±0.91^{b}$	$4.15±0.22^{c}$	$4.30±1.24^{c}$	$6.53±1.34^{a}$
Tend.	$3.35±0.76^{d}$	$5.67±0.60^{b}$	$4.50±0.31^{c}$	$4.65±0.67^{c}$	$6.75±0.78^{a}$
Juic.	$3.43±0.23^{c}$	$4.65±0.53^{b}$	$3.55±0.65^{c}$	$3.60±0.60^{c}$	$5.90±0.92^{a}$
Text	$3.21±0.57^{c}$	$4.30±0.24^{b}$	$3.20±0.43^{c}$	$3.27±0.53^{c}$	$5.35±0.54^{a}$
OA	$3.80±1.24^{d}$	$6.43±0.23^{b}$	$5.23±0.61^{c}$	$5.30±0.40^{c}$	$7.60±0.09^{a}$

Means on the same row with different superscripts are statistically significant ($p<0.05$)
Col = Colour, Flv = Flavour, Tend.= Tenderness, Juic = Juiciness, Text = Texture, OA= Overall acceptability.