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An Evaluation of Biochemical Composition of Beef, Mutton and Fish Seasoned With Iyere (Allium Sativum) Uziza (Piper Guineense), Eru (Xylopia Aethiopicum) and Ariwo (Manodoro Myristica)

ADEBAYO, IBIDAPO NATHANIEL (Corresponding author)
Department of Hospitality Management,
Federal Polytechnic, Auchi,
Edo State. Nigeria.
E-mail: adenath2@gmail.com,Tel: +2348062434701,

ADEBAYO, KAYODE JULIUS
Department of Chemical Pathology, Faculty of Clinical Sciences,
College of Medicine, AAU.
Ekpoma, Edo State. Nigeria.
E-mail: kjadebayo@yahoo.com, Tel: +2348023071025

Abstract

The study evaluated the biochemical and antinutrient composition of beef, mutton and fish seasoned with Iyere (allium sativum), Uziza (piper guineese), Eru (xylopia aethiopicum) and Ariwo (manodoro myristica). The samples were classified as follows: Sample A=Beef with Iyere Uziza, Eru, Ariwo; Sample B =Mutton with Iyere, Uziza, Eru, and Ariwo and Sample C= Fish with Iyere, Uziza, Eru and Airiwo. After subjecting the samples to chemical analysis, it was later analyzed statistically with samples T-test. The results obtained from the comparative analysis of chemical and antinutrients composition of spiced and unspiced samples (beef, mutton and fish) showed that out of chemical and antinutrients composition of the spiced and unspiced samples, mutton seemed to be the most resistant to spice effect. This might not be unconnected to the high fat content of mutton that does not absorb liquid content easily. Spicing of mutton therefore requires special adjustment to get the desired effect. Besides, the analysis of the antinutrient composition of the spiced beef, mutton and fish revealed the side effect of application of spices on the samples (i.e. beef, mutton and fish). Across all the antinutrient components (i.e. Phytate, Oxalate and Tannin), there was positive mean difference which indicates that the antinutrient composition of the spiced beef, mutton and fish is higher than that of the unspiced samples.

Keywords: Indigenous spices, beef, mutton, fish, biochemical & antinutrient composition**.**

1. Introduction

Indigenous spices are mostly obtained from the wild as stated earlier. To encourage widespread use of the indigenous spices, there is the need to increase their availability (production) through domestication. There is also the need to create an understanding of the effect of their application on food items. For a successful domestication of the spices, understanding the spices' biochemical properties as well as the effects they will have when applied to food items through empirical findings (which is relatively scarce at the moment) is imperative. To this end, this study was conducted to determine the biochemical composition of beef, mutton and fish spiced with Iyere, Uziza, Eru and Ariwo.

2.Methodology

The determination of chemical antinutrients composition of samples viz: moisture content, ash content, protein content, fat content and crude fiber content was done by methods described by AOAC (1990). Carbohydrate was calculated by difference, and energy was calculated using Atwater conversion factors.

The spices samples were subjected to chemical analysis in the Institute of Public Analyst of Nigeria, Moor plantation Ibadan, Oyo state, Nigeria. The chemical Analysis was carried out in duplicates, i.e. first and second determination, and the mean values were calculated as shown below and used for analysis:

$$X = \frac{V1 + V2}{2}$$

Where,
X = Test Result Mean
V1 = Value of first test
V2 = Value of second test

Moisture, crude protein, crude fat, crude fibre and total ash were determined using the AOAC (1990).

3.Results and Discussion

The moisture, crude protein, crude fat, crude fibre and ash content of beef, mutton and fish spiced with Iyere, Uziza, Eru or Ariwo were compared with the unspiced beef, mutton and fish in unique combinations using paired sample T-test. The results are as presented in Table1.

3.1.Moisture

Comparative analysis of moisture content of different combinations of spiced beef, mutton and beef with the unspiced one revealed that there was significant difference ($p<0.05$) between the spiced and unspiced beef, mutton and fish except for mutton spiced with Uziza which showed significant difference at 0.05 probability level. Besides, the unspiced samples as indicated by the negative (-) mean difference of the samples. This implies that the spices applied absorbed the moisture content. The significant difference between the spiced mutton with Uziza might be as a result of the natural content of the spice that does not dissolve easily.

3.2.Crude Protein

Analysis of the crude protein content of the spiced samples in comparison with the unspiced samples shows a significant difference ($P \leq 0.05$) except for Mutton spiced with Iyere which shows no significant difference at 5% level.

3.3.Crude fat

The crude fat content in the samples (both spiced and unspiced) significantly except for fish and beef spiced with Ariwo that had no significant difference ($P \leq 0.05$).
No significant difference was recorded in the crude fibre content of mutton and fish spiced with Uziza and unspiced samples at 0.05 level. All other sample combination had significant difference at 0.05 level.

3.4.Ash Content

Evaluation of the ash content of fish, beef and mutton spiced and either Iyere, Uziza or Airiwo revealed no significant differences at 0.05 level. Conclusively, the study that revealed that application of spices on mutton resulted in less or no significant difference from the unspiced mutton. This implies that mutton needs to be specifically studied for appropriate application spices to get the desired effect.

3.5.Antinutrient Composition

The evaluation of the antinutrient composition of the spiced beef, mutton and fish sough to reveal the side effect of applying spices on the samples (i.e. beef, mutton and fish). Looking at the distribution in Table 2 across all the anitnutrients components (i.e. Phytrate, Oxalate and Tannin), there is positive mean difference which indicates that the antinutrients composition of the spiced beef, mutton and fish was higher than that of unspiced samples.

3.5.1.Phytate content

Comparative analysis of Phytate content of the spiced samples and the unspiced ones revealed significant difference at 0.05 level in Beef spiced with Iyere, Uziza, Eru and Ariwo but insignificant difference in the mutton spiced with Iyere at 0.05 level.

3.5.2.Oxalate

Results of the paired sample T test of Oxalate composition of the spiced and unspiced samples revealed that there was no significant difference in the Oxalate content of the spiced and unspiced samples (beef, mutton and fish).

3.5.3.Tannin

Evidence on Table 2 revealed that there was no significant difference in the Tannin composition of the spiced and unspiced samples at $p \leq 0.05$ level.

4.Conclusion.

Having analyzed the chemical antinutrients composition of the spiced and unspiced samples, mutton seemed to be the most resistant to spice effect. This might be connected to the high fat content of mutton that does not absorb liquid content easily. This means that mutton has to be specifically studied in order to determine the appropriate spices to be applied in order to get desired results. Consumption of any of the spiced meat will impact the health of the patron proportionately. It is therefore very important to pay attention to this when planning how and what to season or otherwise.

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Table 1: **Comparative Analysis of Chemical Composition of Mutton, Beef and Fish Spiced with Iyere, Eru And Ariwo.**

		MEAN DIFFERENCE	STD DEVIATION	Sig (P<0.05
Moisture	IYERE ON BEEF VS CONTROL	-0.59000	0.01414	0.011(S)
	UZIZA ON BEEF	-1.07500	0.00707	0.003(S)
	ERU ON BEEF	-0.73500	0.00707	0.004(S)
	IYERE ON MUTTON	-0.92000	0.01414	0.007(S)
	UZIZA ON MUTTON	-0.68500	0.06364	0.042(NS)
	ERU ON MUTTON	-1.07500	0.00707	0.003(S)
	ARIWO ON MUTTON	-0.52500	0.04950	0.042(S)
	IYERE ON FISH	-6.57500	0.06364	0.004(S)
	UZIZA ON FISH	-5.43000	0.01414	0.001(S)
	ERU ON FISH	-8.38500	0.02121	0.001(S)
	ARIWO ON FISH	-7.00000	0.01414	0.001(S)
Cultured protein	IYERE ON BEEF VS CONTROL	1.53500	0.16263	0.048(S)
	UZIZA ON BEEF	4.53000	0.04243	0.004(S)
	ERU ON BEEF	1.92500	0.04950	0.012(S)
	IYERE ON MUTTON	3.10000	0.38184	0.055(S)

	ERU ON BEEF	1.76500	0.02121	0.005(S)
	ARIWO ON BEEF	3.34000	0.02828	0.004(S)
	IYERE ON FISH	0.93000	0.01414	0.007(S)
	UZIZA ON FISH	2.62000	0.04243	0.007(S)
	ERU ON FISH	2.03500	0.00707	0.002(S)
	AIRIWO ON FISH	1.87500	0.02121	0.005(S)
	ARIWO ON BEEF	2.64000	0.15556	0.027(S)
Cultured fat	IYERE ON BEEF	0.57000	0.01414	0.011(S)
	UZIZA ON MUTTON	0.60500	0.00707	0.005(S)
	ERU ON MUTTON	0.51500	0.00707	0.006(S)
	ARIWO ON MUTTON	0.35500	0.00707	0.009(S)
	IYERE ON FISH	0.27500	0.00707	0.012(S)
	UZIZA ON FISH	0.19500	0.00707	0.016(S)
	ERU ON FISH	0.36000	0.01414	0.018(S)
	ARIWO ON FISH	0.07000	0.01414	0.090(NS)
	ARIWO ON BEEF	0.22500	0.17678	0.323(NS)
Cultured Fibre	IYERE ON BEEF	0.16500	0.02121	0.058(NS)
		0.27000	0.01414	0.024(S)
		0.22000	0.01414	0.029(S)
		0.16000	0.01414	0.040(S)
		0.11000	0.01414	0.058(NS)
		0.19500	0.02121	0.049(S)
		0.14000	0.01414	0.045(S)
		0.14000	0.01414	0.045(S)
		0.12000	0.01414	0.053(NS)
		0.17000	0.01414	0.037(S)
		0.10500	0.00707	0.030(S)
		0.25500	0.02121	0.037(S)
Ash	IYERE ON BEEF	0.30500	0.00707	0.010(S)
	IYERE ON FISH	0.48500	0.00707	0.007(S)
	UZIZA ON FISH	0.41000	0.01414	0.016(S)
	ARIWO ON FISH	0.32500	0.00707	0.010(S)
	ARIWO ON BEEF	0.21500	0.00707	0.015(S)

Table 2: Comparative Analysis of Antinutrient Composition of Spiced Beef Mutton & Fish

Phytate	IYERE ON BEEF	0.0012500	0.0000707	0.025(S)
	UZIZA ON BEEF	0.0017000	0.0001414	0.037(S)
	ERU ON BEEF	0.0010500	0.0000707	0.030(S)
	ARIWO ON BEEF	0.0014500	0.0000707	0.022(S)
	IYERE ON MUTTON	0.0006000	0.0001414	0.105(NS)
	UZIZA ON MUTTON	0.0008000	0.0001414	0.079(NS)
	ERU ON MUTTON	0.0012500	0.0000707	0.025(S)
	ARIWO ON MUTTON	0.0004000	0.0001414	0.156(NS)
	IYERE ON FISH	0.0022000	0.0001414	0.029(S)
	UZIZA ON FISH	0.0018000	0.0001414	0.035(S)
	ERU ON FISH	0.0025000	0.0001414	0.025(S)
	ARIWO ON FISH	0.0015500	0.0002121	0.061(NS)
Oxalate	IYERE ON BEEF	0.0053000	0.0063640	0.448(NS)
	UZIZA ON BEEF	0.0046000	0.0056569	0.456(NS)
	ERU ON BEEF	0.0047500	0.0062933	0.479(NS)
	ARIWO ON BEEF	0.0048000	0.0057983	0.450(NS)
	IYERE ON MUTTON	0.0021000	0.0025456	0.451(NS)
	UZIZA ON MUTTON	0.0023000	0.0025456	0.423(NS)
	ERU ON MUTTON	0.0026500	0.0026163	0.388(NS)
	ARIWO ON MUTTON	0.0021000	0.0021213	0.395(NS)
	IYERE ON FISH	0.0042500	0.0031820	0.310(NS)
	UZIZA ON FISH	0.0041500	0.0041719	0.393(NS)
	ERU OF FISH	0.0039500	0.0023335	0.252(NS)
	ARIWO ON FISH	0.0033500	0.0036062	0.414(NS)
Tannin	IYERE ON BEEF	0.0008500	0.0002121	0.111(NS)
	UZIZA ON BEEF	0.0006000	0.0001414	0.105(NS)
	ERU ON BEEF	0.0003500	0.0002121	0.258(NS)
	ARIWO ON BEEF	0.0010500	0.0002121	0.090(NS)
	IYERE ON MUTTON	0.0006000	0.0001414	0.105(NS)
	UZIZA ON MUTTON	0.0004000	0.0001414	0.156(NS)
	ERU ON MUTTON	0.0008000	0.0001414	0.079(NS)
	ARIWO ON MUTTON	0.0003000	0.0001414	0.205(NS)
	IYERE ON FISH	0.0011500	0.0002121	0.083(NS)
	UZIZA ON FISH	0.0015000	0.0002828	0.084(NS)
	ERU ON FISH	0.0009000	0.0002828	0.139(NS)
	ARIWO ON FISH	0.0018500	0.0000707	0.017(NS)

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