

POS -05

Proximate Compositions of Beef Treated with Palm Bunch and Plantain Peel Ashes

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Abstract

This study determined the proximate compositions of beef treated with plantain peel and palm fruit bunch ashes. The palm fruit bunch and plantain peels were processed into ashes as palm bunch ash (PBA) and plantain peel ash (PPA) and thereafter prepared as solutions by dissolving 500 g of PBA or PPA in 1 liter of water. Fresh beef was treated with the solutions in four experiments such that 200 ml of water was used to boil 186 g of beef for 30 minutes (T1 Control), 186 g of beef was soaked in ash solution for 30 minutes, removed and boiled for 30 minutes in water (T2), 186 g of beef was soaked in ash solution for 30 minutes and boiled in the same solution for another 30 minutes (T3) and 186 g of beef was boiled in ash solution for 30 minutes without prior soaking (T4). The samples were thereafter analyzed for their proximate compositions. The ash solution treatment resulted in the lowering of crude protein (CP), crude fat (CF), nitrogen free extract (NFE) and total free fatty acids (FFA) contents of fresh beef, while increasing the moisture, crude fibre and total ash content. Ash solution may be used to alter the proximate composition of beef for the benefit of the consumer.

Keywords: palm fruit bunch, Plantain peels, Beef, crude fat, crude protein

Introduction

Meat comprises 56-72% water, 15-22% protein, 5-34% fat, and 3.5% soluble non-protein substances such as carbohydrates, organic salt, nitrogen substances, minerals and vitamins (Lawrie, 1991). Over the years, several processes have been used to improve meat quality for consumer benefits. Meat-enhancing agents such as phosphates and salts have been applied successfully to meet with reports of improved tenderness and beef colour, accompanied by increase in moisture and ash contents but a decrease in protein and lipid contents (Hoffman, 2006). Plant ash as the inorganic residue of plant materials combustion is a good source of essential minerals (Nwogu *et al.*, 2012) that could influence the quality of meat when treated with it. However, the effect of cooking meat in plant ash solution, which is a cultural practice in many societies, has not been evaluated, especially for proximate compositional changes in treated meat.

The aim of this study was to determine the proximate composition of beef treated with plantain peel and palm fruit bunch ashes.

Materials and Methods

Palm bunch and plantain peels collected from Owerri and were processed into their ashes (PBA and PPA respectively) according to the method earlier described by Nwogu *et al.* (2012). For each experiment, 1.3 kg of fresh beef cut was divided into seven parts of 186 g and each sliced into several pieces to allow the ash solution to properly penetrate them during treatment. The 500g of PBA or PPA was constituted in one liter of clean tap water (Duruanyim, 2017) and used to treat the prepared beef samples. The ash solutions were used in four treatments each of the beef samples such that in T1 (Control), the beef sample was boiled in 200 ml of water for 30 minutes in T2, soaked in ash solution for 30 minutes, removed boiled in 200 ml of water for 30 minutes; in T3, soaked in ash solution for 30 minutes and boiled in the same solution for another 30 minutes; and in T4, boiled in ash solution for 30 minutes without prior soaking. The beef samples were thereafter evaluated for their proximate compositions according to the method of AOAC (2010).

Data generated were subjected to descriptive statistical and calculations of percentage differences from control values.

Results and Discussion

The results in tables 1 and 2 showed that generally, the ash solution treatments resulted in the reduction of crude protein, crude fat, nitrogen free extract and total free fatty acids of beef, while increasing their moisture, crude fiber and total ash contents.

Conclusion

Ash solution may be used to alter the proximate composition of beef for the benefits of consumers that may require lower protein and fat meat products.

Table 1: Proximate and total fatty acid compositions of beef treated with PBA (%)

Parameters (%)	T ₁ (control)	T ₂	T ₃	T ₄	Range of % difference From control value
Moisture	61.40	79.00 (28.66)	65.80 (7.17)	64.00 (4.23)	61.40 – 79.00
Crude protein	22.74	10.35 (-54.49)	12.38 (-45.56)	14.76 (-35.09)	10.35 - 22.74
Crude fat	0.88	0.31(-64.77)	0.35(-60.23)	0.11 (-87.5)	0.11 - 0.88
Crude fibre	0.03	0.02(-33.33)	N/A	0.03(00.00)	0.02 – 0.03
Total ash	0.95	2.42(154.74)	7.7 (711.58)	7.87 728.42)	0.95 – 7.87
NFE	14.00	7.90(-43.57)	13.79(-1.5)	12.33 (-11.93)	7.90 – 14.00
Free fatty acid	0.52	0.32(-38.46)	0.31(-40.39)	0.31 (-40.39)	0.31 - 0.52

NFE = Nitrogen free extract () – percentage differences from the control values

Table 2: Proximate and total fatty acid compositions of beef treated with PPA

Parameters (%)	T ₁ (control)	T ₂	T ₃	T ₄	Range of % difference From control value
Moisture	61.40	77.90 (26.86)	64.80 (5.54)	67.40 (9.77)	61.40 – 77.90
Crude protein	22.74	12.13 (-46.66)	14.67(-35.49)	13.50 (-40.63)	12.13 – 22.74
Crude fat	0.88	0.20 (-77.27)	0.37(-57.95)	0.30 (-65.90)	0.20 – 0.88
Crude fibre	0.03	0.12 (300.00)	0.24 (700.00)	0.24(700.00)	0.03 – 0.24
Total ash	0.95	1.46 (53.68)	7.89 (730.53)	6.63 (597.89)	0.95 – 7.89
NFE	14.00	8.19(-41.50)	12.03 (-14.07)	11.93 (-14.79)	8.19 – 14.00
Free fatty acid	0.52	0.44(-15.38)	0.36 (-30.77)	0.25 (-51.92)	0.25 - 0.52

NFE = Nitrogen free extract; – percentage differences from control values

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