PJN
ISSN 1680-5194

PAKISTAN JOURNAL OF NUTRITION

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorpjn@gmail.com

Pakistan Journal of Nutrition 4 (6): 428-430, 2005
ISSN 1680-5194

Nutritional Effect of Spices from Roasted Chicken and Beef Meat Consumption

A.J. Ekpo[1] and E.O. Jimmy[2]
[1]Department of Biochemistry, University of Uyo, Akwa Ibom State, Nigeria
[2]Department of Physiology, University of Uyo, Akwa Ibom State, Nigeria

Abstract: The effect of chicken and beef meat paste power was determined in thirty (30) subjects; 18 males and 12 females. Of this number, 19 (63.3%) at 50% paste powder concentration had complete lysis of their red blood cells. Thirteen 13 (72.2%) males were affected by complete destruction of their red blood cells while 7 (58.3%) females were similarly affected. The assayed powder had higher concentration of magnesium and cadmium least. However, lead a poisonous substance was detected in the paste mixture. It is concluded that certain ingredients in the powder used in coating roasted chicken and beef meat taken in high concentration may lead to red blood cell destruction particularly in persons with glucose-6-phosphate dehyrogenase deficiency .

Key words: Roasted chicken, beef meat, spices

Introduction

Food spices are widely used these days especially on out door foods mainly for edibility enhancing. However, some spices have nutritional relevance and healing potentials eg as antioxidants and sources of vitamins and minerals (Daood *et al*., 1966) But the questions with spices are sources particularly the imported ones. Of recent a harmful chemical, Sudan 1 meant for tissue staining had been discovered by NAFDAC in an imported spices in Nigeria.

There are also locally prepared spices especially those used in flavouring tea which has pepperish taste and lots of others. Such spices are without documented sources and mode of preparations but with unestimated health hazards. It is based on this health consequences that the reassessment of roasted meat spices was undertaken apart from such responsibilities on FAO and NAFDAC of locally and imported spices for consumption. Procrastination on such lists would continue to pre-empt many health complications. And such is the blood haemolysis and attendance haemolytic anaemia which may results in death. Such haemolytic episode may be enhanced in those with glucose-6-phosphate dehydrogenase deficiency enzyme that protects the red blood cells from intra oxidative stress destruction. However, there may be cases of morbidity arising from the silent intravascular haemolysis and the population of such patients would be high as many patronize roasted chicken and beef meat with spices.

Materials and Methods

Sample collection: Spices powder, pepper, curry and colorant were collected from different preparatory spot in Uyo, Akwa Ibom State, Nigeria. The ingredients were mixed together to form paste as used commercially and kept for the determination of haemolytic effect on human red blood cells. Each of the ingredients were dried into ash and kept for mineral contents determination.

Blood collection: About 2ml of venous blood samples were collected from 18 males and 12 females randomly selected from the University of Uyo Medical Centre into anticoagulant bottles. The fresh uncoagulated blood samples were kept for the determination of haemolysis in the red blood cells using the paste mixture.

Minerals determination: Some key minerals of nutritional relevance were determined from the atomic absorption spectrophotometry (Kakulu *et al*., 1987).

Rate of haemolysis: The paste mixture was prepared with water at four levels concentration (50, 25, 12.5 and 6.25%).

Results

The result of selected mineral composition of roasted beef and chicken paste powder is presented on Table 1. Vanadium was not present in any of the ingredient analyzed. Cobalt, nickel and chromium were present only in spice powder. Cadmium was detected in curry and peeper. Lead was also found to be present in colourant and curry only. High concentrations of magnesium, iron and calcium were found in all the ingredients. Zinc, copper and manganese were also detected.

Table 2 and 3 present haemolytic effect of paste powder on the male and female red blood cells respectively. Table 4 summarized the haemolytic frequency at the different paste concentration levels. Seventy-two percent of the male cells had complete lyses at 50% concentration while 58% of female cells lysed at that point. At the concentration of 25%, 83% of the male and

Table 1: Beef and Chicken Paste Content

Mineral Elements	Paste Condiments Power Mixture			
	Spice powder µg/g	Colorant (µg) g	Curry (µg) / g	Pepper (µg)/g
Manganese	31.25	14.58	45.88	22.92
Nickel	9.52	ND	ND	ND
Vanadium	ND	ND	ND	ND
Cadmium	ND	ND	2.00	0.50
Cobalt	8.33	ND	ND	ND
Chromium	12.80	ND	ND	ND
Zinc	3.87	4.52	5.81	6.77
Calcium	236.36	125.00	222.73	270.45
Copper	16.00	7.00	4.00	11.00
Iron	81.82	95.48	159.09	445.45
Magnesium	698.13	598.34	666.11	683.38
Lead	ND	8.33	1.39	ND

*ND means not detected.

Table 2: Haemolytic effect of paste mixture on male red blood cell

Male red blood cell samples	Haemolytic effect at different paste mixture concentration in percentage			
	6.25	12.5	25	50
1	+	+	++	+++
2	-	+	++	++
3	+	++	++	++
4	+	+	++	++
5	+	+	++	+++
6	+	+	++	+++
7	+	+	++	+++
8	+++	+++	+++	+++
9	+	+	++	+++
10	+	++	+++	+++
11	+	+	++	+++
12	+	+	++	+++
13	+	++	++	++
14	+	++	+++	+++
15	+	++	++	+++
16	++	++	++	++
17	+	+	++	+++
18	+	++	++	+++

(-) = no lysis, (+) = low lysis, (++) = high lysis, (+++) = complete lysis

Table 3: Haemolytic effect of paste mixture concentration percentage

Female red blood	Haemolytic effect at different paste mixture concentration in percentage cell			
sample	6.25	12.5	25	50
1	+	+	++	+++
2	+	++	++	+++
3	+	+	++	+++
4	+	+	++	+++
5	+	+	++	++
6	+	+	++	++
7	+	++	++	++
8	+	++	++	+++
9	+	++	++	+
10	+	++	++	+++
11	+	++	++	+++
12	+	++	++	++

(-) = no lysis, (+) = low lysis, (++) = high lysis, (+++) = complete lysis

100% of female cells had high lyses. At 12.5% concentration 50 and 42% of the male and female cells were at low lyses.

Discussion

Paste mixture had been used for many years to preserve, flavour, blend, thicken and colour food. It plays an important role in reducing serious nutritional deficiencies. From the present study roasted chicken/meat mixture is found to be a good source of magnesium, manganese, iron and calcium. Manganese element is one of the confactors for enzyme activities in the gluconeogenesis pathway. The present of cobalt in paste mixture is nutritionally important, as it is an element of vitamin B_{12} which is important in the synthesis of haemoglobin so also the iron contents. Both enhances the growth and maturation of red blood cells. Magnesium is an essential part of many enzyme systems necessary for energy transfer. It enhances the stability of ribosomes and it deficiency affects the metabolism of calcium in hypocalcaemia.

Calcium one of the minerals present in the paste mixture in the study is highly necessary for skeleton development. High consumption of cadmium is said to be toxic to the body (Okwu, 1999), and was found in curry

Table 4: Haemolytic frequency at the different paste concentration levels

Paste concentration %	Haemolytic frequency											
	male (18)[1]				female (12)[1]				total			
	-	+	++	+++	-	+	++	+++	-	+	++	+++
50	0	0	5	13	0	0	5	7	0	0	10	20
25	0	0	15	3	0	0	12	0	0	0	27	3
12.5	0	9	8	1	0	5	7	0	0	14	15	1
6.25	1	15	1	1	1	12	0	0	1	27	1	1

(-) = no lysis, (+) = low lysis, (++) = high lysis, (+++) = complete lysis

and pepper. Colorant one of the ingredients in chicken/beef meat paste had a high content of lead. This mineral element is said to interfere with respiration, energy production and cell membrane activities and confirmed to be poisonous (Okwo, 1999) which with cadmium and pepper may be the reason the red cells in this study are lysed.

Greater haemolysis of red blood cells was recorded with high dilution of paste mixture. This implies that the higher the concentration of the paste mixture, the more the destruction of red blood cells. The high haemolytic level found among the male cells in the study could be attributed to glucose-6-phosphate dehydrogenase (G-6-PD) deficiency. G-6-PD deficiency is an inheritable x-linked recessive disorder whose primary effect is the reduction of enzyme which is more prevalent among males than females. This haemolysis can lead to anaemia, which may either be acute haemolytic or chronic spherocytic type (Miller and Wollman, 1974). There are also a number of factors independently that can produce destruction of erythrocyte. It is assumed that high consumption of roasted beef and chicken with high paste mixture may result in anaemia, but beef and chicken consumption only enhances good health.

References

Daood, H.G., M. Vinkier, F. Markus, E.A. Hebshi and P.A. Biacs, 1996. Antioxidant vitamin content of spice red pepper (paprika) as affected by technological and varietal factors: Food Chem., 55: 365-372.

Kakulu, S.E., O. Oibarijo amd S.O. Ajayi, 1987. Comparison of Digestion method for trace element. Int. J. Environ., Analytical Chem., 34: 242-249.

Okwu, D.E., 1999. Flavouring Properties of Species. Afr. J. Root and Tuber Crop, 3: 18-30.

Miller, D.R. and M.R. Wollman, 1974. A new variant of glucose 6-phosphate dehydrogenase deficiency hereditary haemolytic anaemta G6PD Cornell: Erythrocyte Leukocyte and platelet studies. Blood, 4: 44-50.