EFFECT OF REARING TECHNIQUES AND GENDER ON THE CONSUMER PREFERENCES AND AMINO ACID PROFILES OF BEEF FROM DIFFERENT PARTS OF CATTLE

ABSTRACT

This study provides comparative information to the consumer preferences and processing sectors about amino acid and consumer preferences of free range grown and Truka cattle. The aim was to compare nutritional quality of male and female Truka and free range grown cattle. Biochemical qualitative and quantitative spectrophotometric methods of analysis were employed to ensure total accuracy of the results. The percentage level of amino acid that were mostly found in the skin of dorsal (back) parts of Male Truka cattle such as glycine, alanine, serine, leucine, lysine and arginine were as follows: (4.21%), (6.29%), (4.19%), (8.19%), (9.39%) and (6.55%), respectively. However, Most of the essential amino acid, saturated mono fatty acid and high protein content were found at various parts of female Truka cattle. From a nutritional point of view, the studied beef (cattle) had a good protein, due to their richness in essential amino acids and low cholesterol. The present study provided new insights on the organoleptic quality and the nutritional value of Truka cattle. Therefore, both male and female Truka contain the high level of protein and essential amino acid.

Keywords: Rearing technique and gender of Free range grown and Truka cattle; amino acid and consumer preferences

1. INTRODUCTION

1.1 Background of the study

The value of meat is measured in terms of the major chemical component amino acid. It has been shown, for example, that an estimated 7 million people currently either avoid red meat or are vegetarians (1). The concerns about public health in industrialized countries, where coronary heart disease and other "diseases of affluence are common," have led to recommendations to the public to modify their diet popularized as Dietary Guidelines (2). Meat, particularly beef, has sometimes been mentioned in this regard. These guidelines particularly recommend a reduction in fat consumption, especially saturated fatty acids (SFA) and consequently, even if incorrectly, in red meat. This has led – in some sections of their populations – to a relative increase in the consumption of poultry and fish at the expense of red meat (3).

Meat is very nutritious and animal protein is regarded as complete protein since it contains all the essential amino acids.

There are many suggestions in the literature (4) for healthy daily diet with different species of meat usage.

Therefore, knowledge concerning the exact amino acid of the meat is extremely important. However, little information exists about the composition of farm animal species meatsA lot of unsubstantiated claims about which part of cattle meat should be consumed due to perceived health concerns now pervade the Nigerian society. Hence, amino acid of meats from different parts of cattle play a role in the acceptance of the product and health of the consumers. This is due to their influence on sensory

properties like textures, colour, and flavour. Therefore, investigating amino acid of different parts of cattle meat will help increase the awareness of the nutritional capabilities.

This results from this study gave a valuable insight on the clarification on the essentials of effect of rearing techniques and gender on the amino acid type for normal cattle meat growth and development. The function of these range from the source of energy, transport and absorption of vitamins, protection of organs, physical and thermal insulation, hormone precursors in the cattle, and they are extremely important in texture, flavour, palatability, colour and preservation of cattle meat.

The scope of the work involved the effect of rearing techniques and gender of the consumer preferences and amino acid profiles of different parts of cattle as it relates to human diet; as consumers are increasingly interested in meat consumption(5).

2. MATERIAL AND METHODS

2.1 Materials

The equipment and chemical used for this work were gotten from Department of Food Science and Technology Laboratory, University of NnamdiAzikiwe Nigeria.

2.2 Collection of sample and preparation of sample

Cattle meat was purchased from AmanseaAwka Market in Anambra State Nigeria. They were transported within an hour in a cooler made from Polyethylene terephthalate (plastic) and packed with iced block. The cattle meat samples were separated into the lean and skin of different part of cattle. Transported to Enugu laboratory for analysis.

2.3 Research Design

Field study and laboratory experiments were conducted

2.3.1 Field study

Questionnaire and oral interview were used here to evaluate consumer's preference for meat from different parts of cattle.

2.3.2 Laboratory experimental Design

The research design used in this study is a factorial experiment of 2X2X12 giving a total of 48 samples. The main factor, sub-factor and sub-sub-factor are as follows:

Main factor: Type of rearing and feeding:

i. Home-grown in a confined enclave and is known in *Fufulde*language as *Truka*;
ii. Free-ranged open grazing type.

Sub-factor: Sex

i. Male;
ii. Female.

Sub-sub-factor: Cattle parts (Table 1)

Table 1.Parts of cattle from which meat sourced

No	Parts of cattle
1	Skin-cut from dorsal (back) parts of cattle
2	Skin-cut from ventral (stomach) parts of cattle
3	Red-meat cut from the thigh of fore-limb
4	Red-meat cut from the thigh of hind-limb
5	Marbled Red-meat cuts from cattle
6	Cuts from cattle stomach
7	Cuts from cattle small intestine
8	Cuts from cattle large intestine
9	Cuts from cattle liver
10	Cuts from cattle kidney
11	Cuts from cattle lungs
12	Cuts from reproductive organs

The resulting 48 samples from the 2 X 2 X 12 are shown in Table 2.

.Table 2Meat samples from 2 X 2 X 12 factorial experiments

No	*Sample description*
1	*Skin-cut from dorsal (back) parts of Male Truka cattle*
2	*Skin-cut from dorsal (back) parts of Female Truka cattle*
3	*Skin-cut from dorsal (back) parts of Male Free-range grown cattle*
4	*Skin-cut from dorsal (back) parts of Female Free-range grown cattle*
5	*Skin-cut from ventral (front) parts of Male Truka cattle*
6	*Skin-cut from ventral (front) parts of Female Truka cattle*
7	*Skin-cut from ventral (front) parts of Male Free-range grown cattle*
8	*Skin-cut from ventral (front) parts of Female Free-range grown cattle*
9	*Red-meat cut from the thigh of fore-limb (hand) of Male Truka cattle*
10	*Red-meat cut from the thigh of fore-limb (hand) of Female Truka cattle*
11	*Red-meat cut from the thigh of fore-limb (hand) of Male Free-range grown cattle*
12	*Red-meat cut from the thigh of fore-limb (hand) of Female Free-range grown cattle*
13	*Red-meat cut from the thigh of hind-limb (leg) of Male Truka cattle*
14	*Red-meat cut from the thigh of hind-limb (leg) of Female Truka cattle*
15	*Red-meat cut from the thigh of hind-limb (leg) of Male Free-range grown cattle*
16	*Red-meat cut from the thigh of hind-limb (leg) of Female Free-range grown cattle*
17	*Marbled Red-meat cuts from Male Truka cattle*
18	*Marbled Red-meat cuts from Female Truka cattle*
19	*Marbled Red-meat cuts from Male Free-range grown cattle*
20	*Marbled Red-meat cuts from Female Free-range grown cattle*
21	*Cuts from stomach of Male Truka cattle*
22	*Cuts from stomach of Female Truka cattle*
23	*Cuts from stomach of Male Free-range grown cattle*
24	*Cuts from stomach of Female Free-range grown cattle*
25	*Cuts from small intestine of Male Truka cattle*
26	*Cuts from small intestine of Female Truka cattle*
27	*Cuts from small intestine of Male Free-range grown cattle*
28	*Cuts from small intestine of Female Free-range grown cattle*

Table 2.continued: Meat samples from 2 X 2 X 12 factorial experiments

No	*Sample description*
29	*Cuts from large intestine of Male Truka cattle*
30	*Cuts from large intestine of Female Truka cattle*
31	*Cuts from large intestine of Male Free-range grown cattle*
32	*Cuts from large intestine of Female Free-range grown cattle*
33	*Cuts from liver of Male Truka cattle*
34	*Cuts from liver of Female Truka cattle*
35	*Cuts from liver of Male Free-range grown cattle*

36	*Cuts from liver of Female Free-range grown cattle*
37	*Cuts from kidney of Male Truka cattle*
38	*Cuts from kidney of Female Truka cattle*
39	*Cuts from kidney of Male Free-range grown cattle*
40	*Cuts from kidney of Female Free-range grown cattle*
41	*Cuts from lungs of Male Truka cattle*
42	*Cuts from lungs of Female Truka cattle*
43	*Cuts from lungs of Male Free-range grown cattle*
44	*Cuts from lungs of Female Free-range grown cattle*
45	*Cuts from testis (Male) Truka cattle*
46	*Cuts from vagina (Female) Truka cattle*
47	*Cuts from testis (Male) Free-range grown cattle*
48	*Cuts from vagina (Female) Free-range grown cattle*

Table 3.Parts of cattle for lipid and amino acid profile analyses

No	Sample description
1	Skin-cut from dorsal (back) parts of Male Truka cattle
2	Skin-cut from dorsal (back) parts of Female Truka cattle
3	Skin-cut from dorsal (back) parts of Male Free-range grown cattle
4	Skin-cut from dorsal (back) parts of Female Free-range grown cattle
5	Red-meat cut from the thigh of hind-limb (leg) of Male Truka cattle
6	Red-meat cut from the thigh of hind-limb (leg) of Female Truka cattle
7	Red-meat cut from the thigh of hind-limb (leg) of Male Free-range grown cattle
8	Red-meat cut from the thigh of hind-limb (leg) of Female Free-range grown cattle
9	Cuts from liver of Male Truka cattle
10	Cuts from liver of Female Truka cattle
11	Cuts from liver of Male Free-range grown cattle
12	Cuts from liver of Female Free-range grown cattle
13	Cuts from kidney of Male Truka cattle
14	Cuts from kidney of Female Truka cattle
15	Cuts from kidney of Male Free-range grown cattle
16	Cuts from kidney of Female Free-range grown cattle

2.4 Methods of experimental analyses

The procedure used for amino acid was**HPLC apparatus**

The HPLC equipment consisted of a Spectra Physics (San Jose, CA) HPLC apparatus comprising an 8700 XR ternary pump, a 20-µL Rheodyne (Cotati, CA) injection loop, an SP8792 column heater, a 8440 XR UV-vis detector, and a 4290 integrator linked via Labnet to a computer running WINner 8086 software (operating system, MS.DOS version 3.2). For separation, a 250- × 4.6-mm column packed with 5-µm Spherisorb C_{18} (Sugelabor, Madrid, Spain) was used. while modification of the method (6).

3. RESULTS AND DISCUSSION

3.1 Results of field survey on consumers of beef

Table 4 gives the sociocultural status as well as perceptions, likes and dislikes of consumers about beef. From the 50 (fifty) respondents at Ogbete main market, Enugu the findings included:

Majority of beef consumers preferred meat from cattle reared at home known as *Truka*, Majority of beef consumers preferred bull meat (Male cattle) irrespective of its parts, Beef from male *Truka* (Bull) is the choice of majority.Majority preferred male testis parts of *Truka*due to its perceived nutritional value. The taste content of female vagina of free range and *Truka* grown cattle is lesser than male testis of *Truka* and free range grown cattle.

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Table 4 Percentage frequency distribution of respondents' status and meat preference

No	Factors	Sub-factors	Frequency	% Frequency
I.	Age group	21-25	1	2.22
		26 – 30	15	33.33
		31 – 40	4	8.89
		41-50	15	33.33
		51-60yrs	10	22.22
		Total	45	100
II	Marital status	Married	50	100
		Separated	None	
		Divorced	None	
		Total	50	100
III.	Academic qualification	FSLC $ WAEC	49	98
		Others	1	2
		Total	50	100
IV.	Occupation	Trader	48	96
		Others	2	4
		Total	50	100
V.	Reason for preference of cow meat	nutritional value	47	94
		Others	3	6
		Total	50	100
VI.	Preference for female cow meat than male cow meat	Number of people that preferred male cow meat	50	100
		Others	0	
		Total	50	100
VII.	Cow meat of preference	Truka	50	100
		Free ranging ones	none	
		Total	50	100
VIII.	Cow meat part of preference	Lean meat	10	20
		Liver	15	30
		Leg	15	30
		Head	10	20
		Total	50	100
IX.	Preferred processing/preservation method	Freezing & Drying	45	90
		Others	5	10
		Total	50	100

3.3 Amino acid contents of meat-cuts from different parts of *Truka and* home-grown cattle

3.3.1 Essential amino acidcontents(g/100g) of meat-cuts from different parts of *Truka and* home-grown cattle

Table 5 gives the essential amino acid contents of meat-cuts from different parts of *Truka*and Free range grown cattle

The high percentage level of phenylalanine (5.24),(5.24),(5.73) and(4.93) were mostly found in the male, female (dorsal skin and hind limb) part of free range grown cattle, female (liver and kidney) part of *Truka* grown cattle respectively. Therefore, female and male dorsal skin, fore hind limbs parts of *Truka*grown cattle has less phenylalanine as well as male and female kidney parts of free range grown cattle. The phenylalanine amino acid is an essential amino acid that is important for growth and development as well as the production of several neurotransmitters and hormones. Some studies suggest this amino acid could promote weight loss, reduce chronic pain and protect against depression (7).

The highest percentage level of valine(4.90),(1.90),(4.49) and(2.78) were mostly found in the female: dorsal skin, hind limb, parts of free range grown cattle and female liver, kidney part of Truka grown cattle respectively. Therefore male kidney part of *Truka* grown cattle has less valine content as well as dorsal male part of free range grown cattle.Valine is essential for mental focus, muscle coordination, and emotional calm(8). People may use valine supplements for muscle growth, tissue repair, and energy. Deficiency may cause insomnia and reduced mental function (9).

The highest percentage level of tryptophan (8.56), (8.55), (1.66) and (8.55) were mostly found in the female dorsal skin, hind limbs, liver parts of free range grown cattle and female kidney part of *Truka* grown cattle respectively. Therefore male free range and Truka grown cattle has low tryptophan amino acid content. Female Truka and free range should be eating periodically to avoid heart disease. The body uses tryptophan to help make melatonin and serotonin. Melatonin helps regulate the sleep-wake cycle, and serotonin is thought to help regulate appetite, sleep, mood, and pain. The liver can also use tryptophan to produce niacin (vitamin B3), which is needed for energy metabolism and DNA production (10).

The highest percentage level of threonine (4.39),(4.58),(4.68) and (4.38) were mostly found in the male dorsal skin part of *Truka,* female hind limb part of Truka, female liver part of free range grown cattle, female kidney part of *Truka* respectively. Therefore, male dorsal skin, hind limb, liver as well as kidney part of *Truka* grown cattle has low threonine amino acid content and should not be consumed periodically. Threonine, pronounced three-uh-neen is one of nine essential amino acids your body needs to function properly. Aiding in maintaining healthy skin, teeth, collagen, elastin, and muscle tissue, it also helps with digestion, metabolism and preventing fat buildup in the liver (11).

The methionine level (5.65), (5.08), (8.48) and (4.50) were mostly found in the female dorsal skin, hind limb, liver and part of free range grown cattle respectively. Therefore male and female dorsal skin, liver, kidney and hind limb part of *Truka* grown cattle has low content of methionine and should be consumed periodically. Methionine is an antioxidant. It may help protect the body from damage caused by ionizing radiation.

The leucine level (8.19), (7.84),(7.07) and (6.65) were mostly found in the male dorsal skin cut part of *Truka*, female hind limb and liver part of Truka, male kidney part of free range grown cattle respectively. Therefore female dorsal skin, liver, kidney part of free range grown cattle as well as hind limb has low content of leucine and should be avoided.Leucinemay help in healing skin and bones. It may increase muscle growth and lean body mass. It may increase production of human growth hormone (HGH). It may help control blood sugar (12).

The percentage level of lysine(9.39),(6.85), (9.72) and (4.39) were mostly found in the male (dorsal skin and hind limb) Part of Truka grown cattle, female liver part of free range, female kidney part of Truka respectively. Therefore female and male dorsal skin, liver as well as hind limb of free range and Truka grown cattle has low content of lysine.Lysine appears to help the body absorb calcium, and it plays animportant role in the formation of collagen, a substance important for bones and connective tissues including skin, tendons, and cartilage. Most people get enough lysine in their diet (13).

The percentage level of isoleucine(4.29),(4.98),(4.45) and(2.85) were mostly found in the male(dorsal skin) part of Truka, female (hind limb and liver) part of free range grown cattle and male kidney part of free range grown cattle respectively. Therefore, female dorsal skin, hind limb, liver as well as kidney part of *Truka* grown cattle has low isoleucine content. It may help control blood sugar. It may also boost energy and endurance. It's also said to help speed healing of injured muscles. Isoleucine may also help muscle development and lean body mass (14).However, essential amino acid whose value was very low were mostly found in the free ranging grown cattle. Meat is a necessary source of

essential amino acid for a healthy and balanced diet (15). Amino acids (AAs) play an essential role in the assessment of meat nutritional value (16). Thus, they are extremely involved in sensory qualitative determination, by the formation of precursors responsible for taste and flavour during cooking (12) however, samples obtained from free ranging grown cattle from a quantitative point of view, they were higher than those reported by (17). This difference was probably due to the grazing abundance. Moreover, the results showed that genotype has strongly influenced the meat protein value. This may be due to the forest-based pasture system, which was characterized by a diet that mainly includes the oak corns rich in the nitrogenous matter. Several studies have already shown the beneficial effect of oak corns on the nutritional value of meat (18).

Table 5. Essential amino acid contents (g/100g) of meat-cuts from different parts of home-grown and free range-grown cattle

No	Different meat-cuts parts of cattle	Methionine	Leucine	Lysine	Isoleucine	Phenylalanine	Valine	Tryptophan	Threonine
1	Male Truka Dorsal skin cut	1.09	8.19	9.39	4.29	3.09	4.19	1.09	4.39
2	Female Truka Dorsal skin cut	1.10	7.01	6.32	4.10	5.16	4.09	1.04	4.19
3	Male Free range (FR) Dorsal skin	1.08	5.05	3.46	2.98	5.24	4.90	8.56	3.79
4	Female FR Dorsal skin cut	5.65	7.69	6.32	1.84	5.16	1.29	0.75	4.25
5	Male Truka Hind-limb Red meat	1.50	7.65	6.85	1.85	3.74	1.75	1.79	3.57
6	Female Truka Hind-limb Red meat	1.56	7.84	4.85	1.49	3.60	1.18	0.46	4.58
7	Male FR Hind-limb Red meat	1.11	7.72	5.08	4.10	5.19	1.56	0.28	4.50
8	Female FR Hind-limb Red meat	5.08	7.05	3.46	4.98	5.24	1.90	8.55	3.79
9	Male Truka Liver meat cut	1.30	6.74	1.35	2.74	2.74	1.64	1.80	1.69
10	Female Truka Liver meat cut	1.29	7.07	6.32	4.19	5.73	4.49	1.04	4.38
11	Male FR Liver meat cut	1.50	2.47	9.72	1.56	1.49	1.48	1.12	4.68
12	Female FR Liver meat cut	8.48	5.33	6.47	4.45	4.00	1.33	1.66	3.89
13	Male Truka Kidney meat cut	1.49	6.64	3.83	2.37	1.47	1.65	0.12	1.68
14	Female Truka Kidney meat cut	1.08	1.79	4.39	2.39	4.98	2.78	8.55	4.38
15	Male Free range Kidney meat cut	1.50	6.65	3.85	2.85	1.75	2.75	1.79	1.58
16	Female Free range Kidney meat cut	4.50	1.98	4.68	4.47	0.46	0.65	1.05	3.57

3.3.2 Non-essential amino acid(g/100g)contents of meat-cuts from different parts of *Truka and* home-grown cattle

Table 6 gives the non-essential amino acid contents of meat-cuts from different parts of *Truka*and Free range grown cattle.

The percentage level of glycine (4.12), (3.77),(3.75) and (3.64)were mostly found in the male skin part of *Truka,* female hind limb part of free rang grown cattle, male liver part of *Truka*and male kidney part of free range respectively. Therefore male kidney, liver, hind limb and dorsal skin part of free range has low content of glycine and should be eaten with great care.). More glycine may help

support heart and liver health, improve sleep, reduce diabetes risk, and reduce muscle loss. Glycine acts as neurotransmitter in central nervous system and it has many roles such as antioxidant, anti-inflammatory, cryoprotective, and immunomodulatory in peripheral and nervous tissues (19).

The level of alanine (6.29), (4.4), (4.94) and (3.59) were mostly found in the male dorsal skin part of *Truka,* female hind limb, liver and kidney part of free range grown cattle respectively .Therefore female kidney, liver, dorsal skin and hind limb part of *Truka* remains the most preferable due to its alanine low content. Alanine is an amino acid that is used to make proteins. It is used to break down tryptophan and vitamin B-6. It is a source of energy for muscles and the central nervous system. It strengthens the immune system and helps the body use sugars. What are the risks of taking beta-alanine supplements? Some people have reported tingling of the skin after taking large doses of beta-alanine. Beta-alanine may interact with some heart medications and with drugs for erectile dysfunction (20).

The level of proline(4.58),(4.78), (4.78) and (3.03) were mostly in the female (dorsal skin and hind limb,) part of female *Truka*, female liver part of free range and male kidney part of free range grown cattle respectively. Therefore male kidney and liver part of *Truka* contain low percentage level of proline and should be eaten with great care to avoid skin damage. Proline plays important roles in protein synthesis and structure, metabolism (particularly the synthesis of arginine, polyamines, and glutamate via pyrroline-5-carboxylate), and nutrition, as well as wound healing, antioxidative reactions, and immune responses. Functions of proline include helping form collagen, regenerating cartilage, forming connective tissue, repairing skin damage and wounds, healing the gut lining, and repairing joints (21).

The percentage level of serine(4.19),(1.75),(4.19) and (2.67 were mostly found in the male dorsal skin part of *Truka*, female hind limb, liver and kidney part of *Truka* respectively. Therefore male and female kidney, liver, dorsal skin and hind limbs part of free range cattle lacks serine amino acid content.D-serine also sends chemical signals in the brain. This might help with schizophrenia and other brain conditions.

The aspartic level (1.49),(1.89),(4.57) and (9.97) were mostly found in the female skin part of free range grown cattle, male hind limb, liver and kidney part of *Truka* grown cattle respectively. The lowest content of aspartic acid were mostly found in dorsal skin, liver, kidney as well as hind limb male part of free range grown cattle. Some athletes claim aspartic acid improves stamina. It may enhance your immune system. Aspartic acid may protect you from toxins and neural and brain disorders. It may help treat chronic fatigue. They found no safety concerns and concluded that this supplement is safe to consume for at least 90 days. On the other hand, another study found that two of 10 men taking D-aspartic acid reported irritability, headaches and nervousness (22).

The histidine level (3.10),(1.01),(2.85) and(3.36)were mostly found in the male dorsal skin part of *Truka,* female hind limbs and liver part of free range grown cattle, male kidney part of Truka grown cattle respectively. Therefore male kidney and liver part of free range grown cattle has the lowest percentage of histidine. Histidine is an amino acid most people get from food. It's used in growth, repair of damaged tissues, and making blood cells. It helps protect nerve cells. It's used by the body to make histamine. High amounts of histidine in the body may result in unwanted side effects. Excess histidine consumption (> 32g/day) has been reported to cause headaches, weakness, fatigue, nausea, anorexia, depression, and memory failure (23).

The glutamic acid level (15.92), (14.92), (21.38) and (15.57) were mostly found in the dorsal skin of male part of free range grown cattle, female hind limbs, liver and kidney part of free range grown cattle respectively, both male and female kidney, liver, hind limb as well as dorsal skin has low content of glutamic acid.In the body it turns into glutamate. This is a chemical that helps nerve cells in the brain send and receive information from other cells. It may be involved in learning and memory. It may help people with hypochlorhydria (low stomach acid) or achlorhydria (no stomach acid). The common side effects observed with the use of Glutamic acid are: Allergic reactions, Abdominal cramps, Slow wound healing, Bleeding, Skin thinning, Mood changes, Swelling of throat and Skin burning Sensation (24).
The level of arginine (7.07), (4.98),(6.55) and 2.67 were mostly found in the male skin, hind limb, liver part of free range grown cattle and female kidney part of Truka grown cattle respectively. Therefore, the lowest content of arginine were mostly found in the dorsal skin, kidney, liver and hind limb

malepart of *Truka*. And it remains the most preferable parts.L-arginine is considered to be generally safe. It might be effective at lowering blood pressure, reducing the symptoms of angina and PAD , and treating erectile dysfunction due to a physical cause. However, if you take a blood pressure drug, talk to your doctor before using L-arginine.In clinical trials, arginine has been used safely with minor side effects for up to three months. Possible side effects include abdominal pain and bloating, diarrhea, and gout. It may also cause a worsening of breathing in people with asthma. Arginine may interact with certain medications that lower blood pressure (25).

The level of tyrosine (3.30),(3.39),(3.07) and (3.04) were mostly found in the female dorsal skin part of both free range and *Truka*, female hind limb, liver and kidney part of *Truka* grown cattle respectively. Both male free range and male kidney, lung, liver as well as dorsal skin part of Truka has low content of tryosine and should be consumed periodically with great caution.Tyrosine also helps produce melanin, the pigment responsible for hair and skin colour. It helps in the function of organs responsible for making and regulating hormones, including the adrenal, thyroid, and pituitary glands. It is involved in the structure of almost every protein in the body. Common side effects of L-Tyrosine may include: nausea, heartburn, headache joint pain; or and feeling tired (26).

The level of cystine (4.29), (3.74),(1.16) and (2.74) were mostly found in the female dorsal skin part of the free range, male hind limb part of *Truka,* female liver part of *Truka* and male kidney part of free range grown cattle respectively. Therefore, male kidney, liver, dorsal skin as well as hind limb has low content of cystine.Cystine may play a role in the normal growth rate of hair. Cysteine may also help reduce the effects of aging on the skin. It may help healing after surgery or burns and protect the skin from radiation injury. Cystine may help burn fat and increase muscle mass. Side effect of cysteineare : Anxiety, chest pain, confusion cough, dizziness lightheadedness, drowsiness, fainting, fast heartbeat and feeling of warmth(27).

Table 6:Non-essential amino acid contents (g/100g) of meat-cuts from different parts of home-grown and free range-grown cattle

No	Different meatn-cuts parts of cattle	Glycine	Alanine	Proline	Serine	Aspartic acid	Glutamic acid	Histidine	Arginine	Tyrosine	Cystine
1	Male Truka Dorsal skin cut	4.21	6.29	3.08	4.19	0.65	14.47	3.10	6.55	2.92	1.42
2	Female Truka Dorsal skin cut	3.89	3.49	4.58	4.07	1.15	14.01	2.28	4.97	3.30	1.39
3	Male Free range (FR) Dorsal skin	3.77	4.14	4.19	4.16	0.60	15.92	1.01	7.07	3.04	2.60
4	Female FR Dorsal skin cut	1.38	1.49	4.14	1.38	1.49	14.48	0.58	1.09	3.30	4.29
5	Male Truka Hind-limb Red meat	1.23	1.85	3.69	1.57	1.89	13.75	0.76	2.74	2.92	3.74
6	Female Truka Hind-limb Red meat	1.48	1.85	4.78	1.75	1.49	14.76	0.99	2.90	3.39	1.07
7	Male FR Hind-limb Red meat	3.29	3.19	1.79	1.10	1.15	12.46	0.89	4.98	3.09	1.29
8	Female FR Hind-limb Red meat	3.77	4.14	1.19	1.16	1.57	14.92	1.01	2.84	3.04	2.60
9	Male Truka Liver meat cut	3.75	2.64	1.74	1.89	4.57	12.68	0.74	3.84	2.74	1.08
10	Female Truka Liver meat cut	3.50	3.06	4.08	4.19	1.15	4.462	2.89	4.29	3.07	1.16
11	Male FR Liver meat cut	1.79	0.68	1.03	1.88	3.37	13.39	3.64	6.55	2.79	0.42
12	Female FR	2.17	4.94	4.78	2.97	2.29	21.38	2.85	3.85	2.40	1.49

	Liver meat cut										
13	Male Truka Kidney meat cut	2.64	1.64	3.03	2.64	0.65	10.83	3.36	2.40	2.92	1.04
14	Female Truka Kidney meat cut	2.74	3.59	2.90	2.67	4.78	11.74	2.84	2.67	3.04	2.60
15	Male Free range Kidney meat cut	3.64	2.74	1.69	1.74	9.79	11.65	1.76	1.55	0.92	2.74
16	Female Free range Kidney meat cut	1.64	2.29	1.27	1.33	1.64	15.57	0.37	1.78	0.84	1.44

4. CONCLUSION

The meats have an important role in human nutrition because of their nutritive value. the preferences for meat consumption, the effect of rearing technique, consumer preferences and amino acid profile from different part of types of cattle were ascertain. indeed, increasing consumer interest is being shown in the energetic and nutritional values of food, as well as in the role played by correct diet in a healthy lifestyle.

This work entails that meat and meat products have significant role in fulfillment and maintenance of human health. Studies indicated that strong nutritional composition (fats, proteins and carbohydrates) with minerals; vitamins and other functional compounds have a preventive role against major and minor nutrients deficiency diseases. This food material must be included as important proportion in balanced diet to meet the required health benefits. Amino acids are beneficial for growth and building of muscles in humans. Thus, intake of meat in balanced proportion must be according to the prescription of nutritionist and health practitioners. The meats have an important role in human nutrition because of their nutritive value. the value of meat is measured in terms of the major chemical components such as proteins, fats, carbohydrates, minerals and fatty acids contents .indeed, increasing consumer interest is being shown in the energetic and nutritional values of food, as well as in the role played by correct diet in a healthy lifestyle.

the following are some of the side effects of non-essential amino acid such as gastrointestinal distress, such as bloating, abdominal pain, diarrhea, increased risk of gout (buildup of uric acid in the body, leading to joint inflammation),unhealthy drop in blood pressure, changes in eating patterns and need for your kidneys to work harder to maintain balance.

Finally from nutritional point of view female parts of *truka* grown cattle remains the best meatdue to amino acid.

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