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Amino and Fatty Acid Composition of Achara (Pennisetum Purpureum) Molded Melon. (Mgbam) Soupmeal

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ABSTRACT: *This study investigated the amino and fatty acid composition of Achara(Pennistetum purpureum) with molded egusi / melon (citrilluslanatus) soup meal a typical soup that is mostly consumed in Isiala-ngwa and Umuahia in Abia state and also in some part in Akwa-ibom state. The ingredients used in the soup preparation were melon / egusi seeds (Citrillus lanatus), achara/ elephant grass (Pennistetum purpureum), meat, crayfish, usu, Ukazi (Gnetum africanum), stock fish, snail, pepper, and palm oil and they were purchased at watt market, Calabar. It was an experimental study and the soup was prepared using standardized recipe in Nutrition and Dietetics Laboratory. Amino and fatty acid content of the soup meal were determined using standard methods. The fatty acids composition revealed the predominance of saturated fatty acids; palmitic acids and stearic acid (30.02%) and 27.03%) in the soup meal, and some unsaturated fat such as Poly n-6, and Oleic acid (23.50% and (20.10%) respectively. The Amino acid profile revealed that the soup is rich in protein (essential and non-essential amino acids). The concentration of glutamic acid was seen to be highest (13.63±0.01), followed by Aspartic acid (8.46±0.00), Lysine (6.52±0.01), Leucine (6.36±0.01), glycine (5.81±0.01) and Arginine (5.59±0.00) respectively, Based on the findings it was concluded that the level or amount of saturated fatty acids (palmitic and stearic acids) in the soup meal were high and this can be detrimental to health because saturated fats increases the level of Low density lipoprotein which contributes to the risks of having heart diseases such as hypertension. It was also discovered that the increase level of the saturated fat in the soup was as a result of the quantity of palm oil and melon used in the preparation. However, the fatty acid component were of plant origin, so are easily broken down. Therefore, it is advisable that a moderate lesser quantity of melon and palm oil should be used in the soup preparation in order to reduce the level of saturated fat. It was also discovered that the amount of amino acid content in the soup was commendable and there was no variation or difference with the concentration of amino acids (essential and nonessential amino acids) in Hen's egg which is recommended by FAO as a source of complete protein. Hence the soup meal will contribute in alleviating occurrence of diseases related to protein deficiency such as kwashiorkor, marasmus, and protein energy malnutrition to it consumers and likewise contribute in meeting the nutritional requirement of human growth and development.*
KEY WORDS: Achara, Molded melon, Soup meal, Mgbam.

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INTRODUCTION

Protein is one of the essential macronutrients required to maintain good health. Amino acids are the building blocks of protein. Amino acids are composed of the elements of carbon, hydrogen, oxygen and nitrogen. Amino acids are divided into 2 major groups: The essential and mon-essential amino acids. They cannot be synthesized in the body, but must be included in the diet. They include histidine (infants) isoleucine, leucine, lysine, methionine, phyenylalanine, threonine, tyrosine, tryptophan and valine. The non-essential amino acids are those that can by synthezied in the body. They include: Alanine, Asparagine, Aspartic acid, cysteine, Hydroxlyproline, proline, serine and tyrosine. (Sizer and Whitney, 2000). Proteins help in growth and repair of body cells and tissues, provision of energy and synthesis of enzymes, plasma proteins and anti-bodies. Hence proteins are essential for healthy living. The amino acids are indicators of the level and quality of protein in the diet.

Fats are major supplier of energy to the body. They are also macronutrients. One unit of fat supplies 9kcal of energy while carbohydrate and protein supplies 4kcal each to the body. Fathy foods are therefore energy dense nutrients. Fatty acids are the basic units of fat.

They are essential and non-essential fatty acids as well as saturated unsaturated monounsaturated poly-unsaturated and poly saturated fatty acids. The saturated fatty acids include. Butyric, caporic, caprylic, capric lauric, myristic, palmitic, stearic and Arachidic fatty acids. While unsaturated fatty acids are oleic, linoleic, linolenic and Arachidonic acids. The essentials fatty acids are those that the body produces from other sources such as the linoleic, linolenic and arachidonic acids. They cannot be synthesized by the body in significant amounts but are needed for synthesis of prostaglandins, phospholipids and leukotrienes they are usually found in fish (Waugh and Grant, 2018).

Therefore, an adequate diet is essential for good health and provides appropriate amounts of all nutrients in the correct proportions to meet body requirements. An essential nutrient is a substance that cannot be made by the body and for the maintenance of health and must be eaten in the diet. An adequate diet is referred to as a healthy diet. This is a diet that comprises of all classes of nutrients carbohydrates, protein, fats minerals, vitamins and most times fibres in an appropriate amount (WHO, 2020). The diet is very crucial due to the benefits to health and overall being of humans. Eating adequately is an important habit and life style that needs to be cultivated by everyone in the society so as to prevent the double burden of malnutrition that results to diet related diseases such as diabetes, anemia, phypertension and cardiovascular diseases (WHO, 2020).

Soup which constitute of the mixture of fish, meat, egg and vegetables, contains a lot of nutrients which when consumed nonrishes the body, provides energy, promotes growth, repair worn out tissues and regulate body metabolism. This is a type of African soup especially Nigerian soup meals Ofe Akpuruakpu mgham Achara i.e Molded melon Achara soup. It is

prepared with a lot of ingredients which may lead to high nutrient profile. This particular soup is consumed on very important occasions such as traditional / wedding ceremonies, funeral, child dedication / naming ceremonies etc as a delicacy and relish by the people of Ngwa land and Umuahia of Abia state and some parts of Akwa Ibom State. However, there is death of information on the nutrient (Amino and fatty acid) content of this important soup meal. It becomes necessary that this soup meal should be investigated for Amino and fatty acid composition.

Purpose of Study
The general objective of this study was aimed to investigate the Amino and fatty acid content of molded melon Achara soup meal.

The specific objectives include
1. To prepare the molded melon Achara soup.
2. To determine the amino acid profile of the soupmeal
3. To assess the fatty acid composition of the soup meal of molded melon Achara

Design of Study
The design of study is experimental. The research used standard procedures to determine the amino /fatty acid profile of the soup meal.

MATERIALS AND METHODS

Preparation of Molded Melon Achara Soup
The raw melon seed was purchased from the market and was blended into powder form. It was weighted and its weight was 740g. The 740g of the melon was put in a wooden mortar, 108g of sliced Onions, 111g of fresh chilli pepper, 8g of knorr, 88g of Usu (*Pleurotus tuber-regium*), and one level tablespoon of salt was added to the blended melon. The whole mixture was kneaded until paste was formed. Twenty mils of very hot water was added to the paste and the kneading continued until oil was extracted. The Usu was added to serve as thickener while the hot water was added to make production of oil easy. The melon paste was molded into desirable shapes and sizes using hand. The molded melon was put in 1000ml of boiling water in a cooking pot and on the gas and was allowed to boil for 18mins.

Preparation of the beef
The meat (beef) was caught at desirable sizes and was weighted and its weight was 1018g. The meat was washed and was put in a cooking pot, 32g of knorr, one level tablespoon of salt, three (3) level tablespoons of pepper was added to the meal for steaming. The meat was steamed for 31minutes.

Preparation of the snail
The snail was de shelled and was washed thoroughly using raw garri for the removal of its slim which is a kind of mucus. Salt was also added during the washing. During the washing the snail

was divided from the aperture through to the lip of the snails for hidden sand particles to be removed. The snail was later washed with enough water and was set aside.

Preparation of the fishes

Bonga fish – the bonga fish was deboned, washed with hot water and was weighted.
Managala fish – the mangala fish was deboned, washed with hot water and weighted.
Stock fish head was washed thoroughly with water and salt.

Preparation of ingredients

The soup ingredients such as the fresh chilli pepper was washed and grounded separately, Onions was peeled, washed and sliced in cubic form, the usu (*Pleurotus tuber-regium*) was broken to smaller pieces and pounded to a powder form. Achi was purchased in its powder form, 26g of Achi was poured in a bowl and 256g of palm oil was used to mix it thoroughly. The crayfish was selected to remove particles from it and was blended to a powder form. All the ingredients were weighted.

Preparation of the stock

The stock fish, bonga fish, mangala fish-and the snail was added to the steamed meat in a cooking pot and 100ml of water was added to the beef. The stock was boiled for 45minutes.

Statistical Analysis

The data generated from the study were expressed as mean ± SEM. The means were separated and compared by analysis of variance (ANOVA).

TABLE 1 LIST AND QUANTITIES OF INGRADIENTS USED FOR THE SOUP PREPARATION

S/N	Ingredients	Quantity (gramme)
1	Achara (*pennisetum purpireum*)	457
2	Ukazi (*Gnetum africanum*)	217
3	Melon seeds (*Carcubita citrullusl*)	740
4	Melon seeds formolded melon	740
5	Archi (*Brachiystegia eurycoma*	26
6	Usu (*Pleurotus tuber-regium*)	88
7	Snail	282
8	Dried fish	254
9	Managala fish	194
10	stockfish (head)	637
11	Crayfish (*Procambarus clarkia*)	167
12	Fresh chills pepper	111
13	Beef	1018
14	Onions	108
15	Palm oil	256
16	Salt	4 levels
17	Black pepper	8 ½ level tsps
18	Seasoning bullion cubs	10 cubes

Chemical analysis: Amino acid in the soup sample was determined using AOAC (2005). Nitrogen also determined by micro-kieldalmethod of AOAC (2005). The fatty acids were determined using AOAC (2005).

FINDINGS AND DISCUSSION

Results of Chemical analysis

TABLE 2: AMINO ACID COMPOSITION OF ACHARA WITH MOLDED MELON SOUP MEAL

Amino Acids	Hens egg Std. amino Acids (Mg/gN)	Concentration g/100g protein	Concentration Of amino acid Mg/gN	Standardization % Value
Leucine	551	3.36±0.01	395.5	72.15
Lysine	436	6.52±0.01	407.5	93.464
Isoleucine	393	3.01±0.01	188.12	47.87
Phenylalanine	358	3.46±0.00	216.25	60.41
Tryptophan	93	0.06±0.01	47.5	51.076
Valine	428	3.77±0.01	235.625	55.053
Methionine	210	2.27±0.00	173.125	82.441
Proline	260	3.66±0.00	228.75	87,891
Arginine	381	5.59±0.00	349.3	91.68
Tyrosine	260	2.92±0.01	182.5	70.198
Histidine	152	2.11±0.01	131.8	86.711
Cysteine	152	0.740.00	46.25	30.428
Alanine	370	5.94±0.00	370.6	101.621
Glutamine	769	13.63±0.01	851.82	107.012
Glycine	207	5.81±0.01	363.125	175.422
Threonine	220	3.58±0.001	223,75	69.622
Serine	478	4.06±0.01	253,75	69.922
Aspartic	601	8.46±0.00	528.75	87.979

Table 2 showed the amino acid profile of melded melon achara soup meal. The table revealed that glutamic acid had the highest mean value (13,63%), while lysine essential amino acid had the highest value (6.52g), cysteine and tryptohan had the lowest (0.74 and 0.06g) mean values respectively.

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TABLE 3: FATTY ACIDS COMPOSITION OF ACHARA WITH MOLDED MELON SOUP MEAL

Fatty acids	SOUP SAMPLES 1	2	3	Mean	SEM
Undecanoic	12.30	11.90	12.20	12.13	±0.12
Palmitic	30.02	30.10	30.09	30.02	±0.03
Stearic	27.02	27.03	27.05	27.03	±0.01
Oleic	20.10	20.08	20.20	20.13	±0.04
Poly-n-6	33.50	24.02	23.80	27.77	±0.15
Lauric	0.09	0.12	0.09	0.10	±0.01
Myristic	3.07	3.08	3.06	3.07	±0.01
Palmitoleic acid	6.90	6.80	7.03	6.91	±0.07
Arachidic	0.38	0.34	0.33	0.35	±0.02
C18:1 (Oleic acid)	2.70	2.60	2.7	2.67	±0.03
Alpha-linoleic	0.92	0.93	0.92	0.92	±0.00

Table 3 revealed that the soup meal contained high saturated fatty acids and low values for unsaturated fattys (palmitic acid (30.0g) stearic acid (27.03g), poly-n-6 (23.77g) vis-à-vis the unsaturated fatty acids oleic acid (2.67) linolenic (0.92); palmitoleic (6.91g) Arachrdic, (0.35g) and oleic acid: (2.67g) respectively.

DISCUSSION OF FINDINGS

The investigation into the fatty acid composition of the triplicate samples in this work revealed that achara with molded melon soup meal contain contained 3..07%, palmitic acid (C:16), 27.03 stearic acid (C:11) 12.13% and palmitoleic acids (C16:1) 6.91% and a trace amount of myristic acid 3.07%, 0.09% of lauric acids, 0.35% of arachidic acid, 2.67% of C18:1 acid and 0.92% of alpha-linoleic acid respectively. Comparing the level of saturated acid (Palmitic acid and stearic acid) in achara soup meal to the result of Stella et al., (2020) the saturated fat content of the groundnut soups in the study, palmitic acid: Obudu (1.14±0.00-1.12±0.00) and stearic acid (0.91±0.00) tends to be very low compare to achara soup-meal of this study.

The higher fatty acids observed in this research vis-avis stella et al., (2020) is a cause to worry because saturated fatty acids lead to non-communicable diseases. However, since the soup meal is not prepared and consumed always, only on special occasions, it may not necessarily result to health issue to the consumers. Again since the saturated fatty acid are. from plants, they are not stored like the fatty acids from animal sources but are easily broken down or metabolized. On the other hand the soup meal maybe recommended for those recovering from serious wasting diseases or illnesses and especially children suffering from protein energy malnutrition, severe and acute malnutrition, marasmus and kwashiorkor. Also saturated fat as a type of dietary fat plays significant roles in health like helping in structural integrity of the cell membrane, enables the incorporation of calcium into the skeletal structure and helps improve the immune system. This soup meal also contains other fatty acids; the monounsaturated and polyunsaturated fatty acid such as the poly-n-6 acid (23.77%), oleic (20.13%), palmitoleic (6.91%), C18:1 (2.67%), alpha-linoleic (0.92%), arachidic acid (0.35%)

which are considered to be healthy fat although in moderate and lesser amount. This type of fat also have function they perform which includes reduction of low density cholesterol (LDL) which likewise help in lowering high blood pressure and risk of heart diseases, improving of immune system through reduction of inflammation and brain development in children among other health benefits (Wardlaw, 1999) and this still makes the soup meal recommendable for peoples' consumption.

The amino acids profile (essential and non-essential amino acids) of the soup meal is commendable. The amino acid profile showed that Achara with molded equsi soup meal contained a reasonable amount of both non-essential and essential amino acids in g/100g protein; in that there was no variation with the concentration of amino acids in achara with molded equsi soup meal and hen's egg. Also, comparing the level of amino acid in achara soup meal to the groundnut soup prepared in the research work of Stella et al., (2020) it was revealed that achara soup meal have high level or amount of amino acid than the ground soup meal.
Furthermore, the high level of non-essential amino acids in achara with molded melon soup meal is commendable because these acids act as precursors of many other amino acids and vital cellular substances such as hormones and important proteins. The non-essential amino acid composition of the soup meal was high too and this is commendable because most times the body does not have enough non-essential amino acids which plays vital function, therefore encouraging the consumption of this soup meal will help in meeting these nutritional needs and demands.

Therefore, these results also support the consumption of this soup-meal due to its endowments in amino acids nutrient composition because a poor diet can have an injurious impact on health, causing deficiency diseases such as protein energy malnutrition, kwashiorkor and health threatening conditions such as chronic systemic diseases as cardiovascular disease, diabetes, and osteoporosis.

CONCLUSION

This research work revealed that achara with molded melon soup meal has high amount of saturated fatty acids; palmitic acid and stearic acid which is not good because it increases the level of low density lipoproteins (IDL) which is also regarded 'bad cholesterol' and this can result to the risk of having heart diseases. However, since the saturated fatty acid is of plant origin, it is not stored in the body like the fat from animal sources but it is easily metabolised/broken down in the body hence there is no course for alarm. The soup meal also contained moderate level of unsaturated fatty acids; poly-n-6 acid, oleic acids, and palmitoleic acid which also help in preventing blood pressure by reducing cholesterol level. The soup meal is a good source of protein because it is rich in amino acids (essential and non-essential amino acids) and these nutrient plays a significant role and function such as giving integrity to the cell membrane, absorption, of vitamins, production of hormones and enzymes, wound healing and tissues repair, proper growth and development and lots more.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

1. The melon / egusi used in the preparation of this soup meal, should be of moderate quantity and there should be moderate amount of palm oil so as to reduce the level of saturated fat that is most times unhealthy. The soup meal is also rich in unsaturated fatty acid which play role in reducing high blood pressure that can result to heart diseases.
2. This soup meal is also commendable due to its richness in amino acids both (essential and non-essential) and it should be encouraged to be consumed by all in order to prevent protein energy malnutrition in our society.
3. The consumption of this soup meal should be encouraged in other parts of the world either through seminar presentation or publication of articles.
4. This soup meal should also be included in food composition table.

REFERENCES

AOAC, Association of official analytical chemists) (2005). Chromatographic determination of Amino acids in food journal of AOAC.

Shella Bassey, Lilian Aburme Winifred, Fila Ako, R, Odey; & C> Odey, (2020). Impact of Indigenous Methods of Preparation and cooking on the proximate, Mineral, Vilamins, Amino and Fatty Acids Compositions of Graundnut soups prepared in Cross River State Nigeria. Food science and quality Management 102: 2224-6088.

Ward law, G. M. (1999) Perspectives in Nutrition (4th ed) The mcgraw-hill companies Inc.

Waugh, A. & Grant, A. (2018) Ross & Wilson Anatomy and Physiology in Health and illness 13th ed Elsevier, London.

World Health Organisation (WHO). (2020). Healthy Diet, Nutrition and the Prevention of Chronic Disease. WHO Technical Report Series 916, Report of a Joint WHO/FAO Export consultation, World Health Organisation, Geneva, 88.

Sizer, F. & Whitney E. (2000). Nutrition concepts and controversies. (8th ed) wadsworth, careda.