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COMPARATIVE PROXIMATE ANALYSIS OF TWO WHEAT VARIETIES IN MAIDUGURI, BORNO STATE, NIGERIA

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***Abstract**: This study investigates the proximate composition of two wheat varieties, Achilla and Durum, available in Maiduguri, Borno State, Nigeria. The analysis focused on key nutritional components, including moisture, ash, fat, protein, and carbohydrate content. Results showed variations between the two varieties, with moisture ranging from 7.11% in Durum to 8.70% in Achilla. Ash content was higher in Achilla (10.84%) compared to Durum (9.85%), while fat content was slightly higher in Durum (4.52%) than in Achilla (4.04%). Protein levels were comparable, with Achilla at 2.78% and Durum at 2.80%. Carbohydrate content varied significantly, with Achilla containing 73.65% and Durum 77.15%. These findings highlight the nutritional differences between the wheat varieties and emphasize the need to consider varietal characteristics when assessing their potential contributions to human health and dietary needs.*

***Keywords:** Wheat, Proximate Composition, Climatic Conditions, Drought Tolerance, Agronomy.*

INTRODUCTION

Wheat (tritium aestivum L.emthell) is the first important and strategic cereal crop or the majority of world's population. It is the most important staple food of about two billion people (36% of the world). Worldwide, wheat provides nearly 55% of the carbohydrates and 2% (Graur,1995). Wheat can be grown beyond these limit from the Arctic circle to higher elevation near the equator the optimum growing temperature about 25°c to in the 4°c and 32°c respectively (Briggle, 1980). Wheat is adapted to a broad range of moisture condition from xerophytic to literal. Although, wheat is being harvested in the world in a given month,harvest in the temperature zone occur within April and September in the northern hemisphere (Percival, 1921). Wheat is also classified into spring or winter wheat both common and traditional refer to the season during which the crop is grown for winter heat,heading is delayed until the plant experience a period of cold winter temperature 0° - 50°c. It is planted autumn to germinate and develop into young plant that remains in the vegetation phase during the winter and resume growth in early spring. Wheat as the name implies is usually planted in the spring and moisture

in the late summer but can be down in the autumn in the countries that experienced mild winter, such as south Asia , North Africa,the middle east and the lower attitude (Percival, 1921).

Wheat is special in several ways,wheat is grown more than 240 million larger than for any other crop and world trade is greater than for all other crops combine the raised bread loaf is possible because the wheat kernal cornet contains gluteni an elastic of protein that traps minutes bubbles of CO2 (carbon dioxide) wheat fermentation occurred in levelled dough or raised dough causing the dough to rise (Hanson et Al; 1982). It is the best of the cereal food source. Wheat is a major diet component because of the wheat plant agronomic adaptability,ease of grain storage and ease of covering grain into flour making edible,portable, interesting and satisfying food dough produce bread, wheat flour differ those made from other cereals in their unique visco- elastic properties (Orth and Shellenbergar, 2000).

Wheat is the most important source of carbohydrates in a majority of countries.wheat starch is easily digested,as is most wheat protein,wheat contains minerals, vitamin and fat(lipid),and of small amount of animals or legumes protein added is highly nutritious. A predominantly wheat - base diet is higher in fiber than a meat base diet (Johnson et Al; 1978).

Wheat is also a crop of major interest in Nigeria as it main components of bread and other wheat base product such as cakes, biscuits, macaroni and spaghetti pasta. In Nigeria, because of higher temperature and humidity,the local climatic condition has not been favourable for optimum growth and yield of wheat. Accordingly,the climatic potential for wheat production generally decrease equator wards due to consisting entirely high temperature and humidity (Oche,1998). Thus, production is presently restricted to area between latitudes 10 - 14°N covering the Sudan and Sahel savannah zones). During the cold harmattan period between the month of November and February under irrigation (Abbas,1998).

According to Anonymous (2006), the Increasing consumption demand for wheat was largely to increase expansion in bread and pasta Industries,and for the manufacture of crackers noodles etc. Presently, domestic wheat demand I'm the country is far more than local production consequences 19 - 95% of wheat consumed is imported from united States of America for example,the country as far more imported 4.5 million tons of wheat in 2007 as against 3.8 million tons in 2008. Increasing wheat production in Nigeria requires prior investigation of the corp requirement in place with relativelow technology as obtainable in developing countries in Nigeria,a naturally favourable environment is paramount for optimum production even where all production input could be met the choice of appropriate genotype is impassive (Peterson, 1965).had indicated should be adopted for high productivity early wheat variety screening trials at kadawe,Northern Nigeria by fisher and Maurie's,(1978).Okakwue et Al; (1991); a recent cated that varieties with superior drought tolerance gave high yield especially under sub - optimal growing condition study by Miko et al: (2006), at some location also found differential responds of two Mexican wheat varieties to the growing condition which was attributed to their varied reaction to applied fertilizer and adaptability to harsh environment. Distinction between common wheat and durum wheat is that the common wheat sometime called bread wheat is that the common wheat is the most widely grown species and yield the flourable bag,the bags. It is wheat with four (4) set of chromosomes (tetrahaphoid) which durum wheat in Latin means "hard" is a

variety of wheat that has a higher protein and gluten content than other raw of wheat,it is wheat to set of chromosomes of commercial importance that is widely cultivated today

Sample Preparation

Composition sample 2kg each were drawn from the throughly mixed composition and grounded using mortar and pestle, the dry as method was imposition on this day. The grounded samples(10kg each) were place in porcelain crucible and few drop of concentrated nutric acid welas further carried out in a furnace at 450°c with a temperature increases 50°c per hour to avoid selfigration in the Sam. Therefore, the ash was moistened and few drops of deionized water, dried and re - ash this process was repeated until a carbon free ash (while on a lightly coloured with no chained particles) was obtained the ash was left cool and was dissolved in 40ml of 20% HCl. The ash suspension was filtered through voltmeter flask and filtrate made up to volume with deionized water.

Materials and Methods

In the preparation of reagent, chemicals of analytical grade purity and deionized water were used throughout the analysis. All laboratory apparatus (glass wares and plastic containers) were thoroughly wash with detergent solution, soaked in 0.1M nitric acid and followed by several rinses with tape water, deionized water and finally with the analyte sample.

Estimation of moisture

Dry a clean flat crucible in an oven and cool in dessicator weigh the cooled dish (W1) introduce and spread into the dish and weigh accurately (W2) transfer. The dish and it's content into an air oven at 105°c to dry for about 3 hours using a pair of tongs transfer the dish into a dessicator,allow cooling and weighing (W3).

Calculation:

% moisture= W2 - W3 /W2 - W1 × 100

Calculation of moisture content in sample A

W1 = 55.06g

W2 = 61.27g

W2 = 60.73g

= (61.27 - 60.73)/(61.27 - 55.06)=0.54/6.21

=8.6956%

Calculation of moisture content in sample B

W1= 55.08g

W2 = 61.27g

W3 = 60.83g

= (61.27 - (60.83)/(61.27 - 55.08) =0.44/6.19*100

= 7.1082%

Estimation of Ash

Clean dry ignite cool (in a dessicator) and weigh the platinum or silica dish (W1) weigh accurately and directly in the dish about 5g of the sample or food (W2). Transfer using a pair of tongs into a muffle furnace at 500°c until fully ashed cools the dish with ash in dessicator and weigh (W3).

Calculation:

% ash content =(W3 - W1)/(W2- W1) × 100

Calculation of Ash content in sample A

W1= 24.36g

W2 = 26.39g

W3 = 24.58 g

=(24.58 - 24.36)/(26.39 - 24.36)*100=10.8374%

Calculation of Ash content in sample B

W1 =24.36g

W2 =26.39g

W3 =24.56g

= (24.56 - 24.36)/(26.39 - 24.36) = 0.2/2.03*100

=9.8522%

Estimation of protein

This method will not include nitrogen from nitrite but will include nitrogen from protein, alkaloids, nucleic acid etc. The organic matter is oxidized by concentrated sulphuric acid and in the presence of catalyst and the nitrogen converted to ammonium sulfate. This is then made alkaline and the liberated ammonia is distilled and estimated.

As a very large part of the nitrogen present in food is derived from protein,the crude protein is estimated by multiplying the percentage of nitrogen by an appropriate factor.

Calculation of protein content in sample A

W1 =1.14g

T.V =4ml

=(4*0.0014)/(1.14)*100

=2.7799%

Calculation of protein content in sample B

W1 =1.14g

T.V =4ml

=(4*0.0014)/(1.14)*100 =0.4912*570

=2.7799%

Estimation of fat

Weigh accurately about 2g of the sample(W0) weigh the flat bottom flask (W2) and mount the extractor on it. Drop the thimble containing the sample or filter paper into the extractor.pour the solvent to reach about 2/3 of the flask and continuously extract for 5 hours when extraction is complete, evaporate off the solvent on water bath .cool and weigh the flask

Calculation

%fat = (W2-W1)/ W×100

Calculation of fat content in sample A

W1=106.12g

W2=106.02g

W0=2.23g

= (106.12-106.02)/(2.23)=0.09-2.23×100

= 4.0358%

Calculation of fat content in sample B

W1=106.12

W2=106.02

W0=2.21

(106.12-106.02)(2.21)=0.09/2.21×100

=4.5248%

3.8 Determination of carbohydrates

Carbohydrates is calculated by difference include calculation of sample A and B

100 -(8.6956 + 10.8327 +4.0358 + 2.7799)

100 - (26.3487)

= 73.6514%

RESULTS AND DISCUSSION

RESULT

The table below shows the proximate analysis of different varieties of wheat sample

Sample	A	B	WHO
Moisture	8.6956%	7.1082%	9.86
Ash	10.8374%	9.8522%	0.71
Fat	4.0358%	4.5248%	1.80
Protein	2.7799%	2.7994%	1.80
Carbohydrates	73.6513%	7.7150%	80.59

KEY, Sample A= Achilla, Sample B= durum

The analysis was conducted and the result obtained which shows the different concentration in different varieties of wheat which indicate the moisture in sample A has the value of 8.6956% while in sample B were found to be 7.1082%. All these are below the standard value of WHO with the value of 9.86. Without the right balance of moisture, your skin is not itself. skin can only perform it task as the body's protective, barrier if it has sufficient moisture prevent dry out, sin lipid regulate moisture balance and minimize water loss. Humidity or the amount of moisture in the air, can make the temperature feel warmer, as our sweat is slower to evaporate. Not only is the muggy Air uncomfortable, but it can cause our body to overheat, exhaust easily and posses a potential danger to our health. Ash in sample A has the value of 10.8374% while in sample B were found to be 9.8522%.All these are above the standard value of WHO with the value of 0.71%. They improve soil, raising PH and increasing nutrients availability. Thus they have a big influence on decomposer, mycorrhizal fungi and soil community, Ash is the sole food source or host for rather few animal species in comparism to most other native trees. Volcanic Ash can create eye and upper airway irritation, Ash fall can cause minor to major damage to vehicle and building, contaminate water supplies, disrupt sewage and electrical system and damage or kills vegetation. Fat in sample A is found to be 4.0358% while in sample B is found to be 4.5248%. All these are above the standard value of WHO with the value of 1.80%. A small amount of Ash is an essential part of a healthy, balance diet. Fat is a source of essential fatty acids which the body cannot make itself. Fat helps the body to absorb vitamin A, vitamin C and vitamin E. These vitamins are fat soluble which means they can only be absorbed with the help of fat. Excessive dietary fat intake has been linked to increase risk of obesity, coronary heart disease and certain type of cancer. Protein in sample A is found to be 2.7799% while in sample B is found to be 2.7994%.All these are above the standard value of WHO with the value of 1.80%. Protein is an important building block of bone, muscle, cartilage and skin. Your body uses it to build and repair tissue. Red blood cell contains a protein compound that carries oxygen throughout the body, it digest and regulate. High protein diets have also been shown to be helpful with reducing fat, losing weight increasing

satiety, or a feeling of fullness and retaining muscle. Carbohydrates in sample A is found to be 73.6518% while in sample B is found to be 7.7150%. All these are below the standard value of WHO with the value of 80.59%. They act as an energy source, help control body glucose and Insulin metabolism, participate in cholesterol and triglycerides metabolism and help with fermentation. The amount of carbs you consume affect your body sugar, taking in a lot of carbs can raise blood sugar level, high blood sugar (hyperglycemia) can put you at risk for diabetics. Some people who do not consume a lot of carbs have low blood sugar (hypoglycemia).

CONCLUSION

Wheat plays a vital role in enhancing the nutritional value of culinary preparation, understanding the proximate composition of wheat is essential to evaluate their potential contribution to a balanced diet and overall human health. These studies assess the proximate composition of wheat. The findings demonstrated that wheat exhibit varying concentration of carbohydrates, protein, fat, moisture, and ash. The result of the analysis revealed significant difference between the mean values of the wheat with moisture ranging from 8.6956% to 7.1082%, Ash 10.8374% to 9.8522%, Fat 4.0358% to 4.5248%, Protein 2.7799% to 2.7994%, and Carbohydrate 73.6513% to 77.1500% respectively.

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