Sudan University of Science and Technology

College of Graduate Studies

Improvement of Nutritive Value of grinded Bagasse

تحسين القيمة الغذائية للبقاس المطحون

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Dedication

To my parents, as none small, As Dedicate to my brothers, sisters and all members of my family.

To my Wife, who stayed with me for the success of this research.

To my sons served you so much.

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Abstract

This study was conducted in the Department of animal production ,College of Agricultural studies, Sudan University of Science and technology during the period December 2015 to January 2017,the objective of the study was to improve the nutritional value of bagasse treated Chemically. Where treated bagasse with three treatments are water (200ml) and Urea with rate 4% of the weight of dry matter dissolved in 200 ml water and Urea and molasses (4%, 30%) respectively .the samples were Stored in poye bags and closed tightly and placed for 2, 3, and 4, weeks in order to determine the best period of fermentation or incubation with wast The results showed that the period of appropriate fermentation with three weeks to waste of most of the components in low dry matter, Crude fiber and increase Ash ,Energy and fat conten, while indicating that the fermentation period for the second week is the best in increasing the crude protein and decline nitrogen Free Extract. Observed in the experiment Crude protein content had obtained a change significantly increase by treatment find in the treatment of urea increased from(4.69%) to (14.36%) at Two week .

Minerals happened to change significantly observed an increase in the rate of post treatment raised from 5.38% to 8.07% in the treatment of urea and molasses. Also nitrogen Free Extract obtained had a significant change has decrease percentage from 36.19% before treatment to 17.56% after treatment of the urea treated. It also noticed the decline some improvements in the content of the crude fiber content which decreased from 44.95% to 29.16% in the fermentation period for the third week in all transactions as such as increase the fat content from 2.97% to 7.73%.such as treatment urea and molasses.

The metabolizable energy noted the changing of significant and find the increase has shifted from 8.79% Mj/Kg to 9.10% Mj/Kg in the treatment of urea and molasses.

المستخلص

اجريت الدراسة بقسم الانتاج الحيواني كلية الدراسات الزراعية جامعة السودان للعلوم والتكنولوجيا خلال الفترة من ديسمبر 2015 الى يناير 2017 كان الهدف من الدراسة هو تحسين القيمة الغذائية لبقا س قصب السكر المطحون المعامل كيميائيا حيث تم دراسة التركيب الكيميائي للبقاس المطحون بعد معاملته بثلاثة من المعاملات هي الماء ؛ اليوريا ؛ واليوريا والمولاس ؛ اضيفت اليوريا 4% من وزن المادة الجافة مذابة في مائتين مل ماء واليوريا والمولاس (4%؛ 30%) على التوالي مذابة في مائتين مل ماء و مئتان مل ماء فقط .خزنت العينة في اكياس نايلون واغلقت باحكام ووضعت لفترة 2؛ 3؛ 4؛ اسابيع وذلك للوقوف على افضل فترة تحضين او تخمير مع المخلف.

اظهرت النتائج ان فترة التخمير المناسبة مع المخلف لفترة ثلاثة اسابيع لمعظم المعاملات في انخفاض المادة الجافة والالياف الخام وزيادة الرماد والطاقة والدهون بينما تشير فترة الاسبوع الثاني هي الافضل في زيادة البروتين الخام وانخفاض في المستخلص الخالي من النيتروجين .

لوحظ في التجربة محتوى البروتين الخام قد حصل له تغيير معنوي زيادة بفعل المعاملة فنجد في معاملة اليوريا زاد من (4,69%) الى (14.36%) في فترة التخمير في الاسبوع الثاني المعادن حصل لها تغيير معنوي لوحظت زيادة نسبتها بعد المعاملة من 5.38% الى 8.07% في معاملة اليوريا والمولاس . ايضا المستخلص الخالي من النيتروجين حصل له تغير معنوي قد انخفضت النسبة بعد المعاملة كانت قبل المعاملة 36.19% واصبحت بعد المعاملة 17.56% في معاملة اليوريا.

كما يلاحظ انخفاض محتوى الالياف الخام من 44.95% الى 29.16% في فترة التخمير للاسبوع الثالث في كل المعاملات و زيادة محتوى الدهون من 2.97% الى 7.73% وذلك في معاملة اليوريا والمولاس، الطاقة المتمثلة لوحظ فيها تغيير معنوي فنجد الزيادة تحولت من 8.79% ميجاجول للكيلوجرام الى 9.10% ميجاجول للكيلوجرام في معاملة اليوريا والمولاس حيث كان ذلك في الاسبوع الثاني.

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CHAPTER ONE

INTRODUCTION

Sudan has a great potential for animal production and ranks first in the Arab World livestock population MARFR (2009) . Its estimated to be around 104million head of which the Cattle around 29840,Sheep 39483,Goats 30837, and Camels 4751 million heads According to the Ministry of Animal Resources , Fisheries & Rang lands of the Sudan (2012).

Feeding these animals really problem in Sudan because animals are owned mainly by nomadic groups who depend on poor range land for their animal feeding. Most livestock producers need a high quantity of good quality forage during the mid to late summer and winter months. Forge/fodder production is amajor limiting factor for livestock production in Sudan. The total available forages for animals in the Sudan are estimated to be about 86 million tons of dry matter , Abu Swar and Darrag, (2002). And also Indicated that the green forage production in the northern states 0.5 million tons, the central states 1.25 million tons and the eastern and Khartoum states 2.75 million tons. According to the statistical records of the Ministry of Agriculture and Animal Wealth for the years (2008-2009), the estimates of production for the year (2009) 4.2 million tons is well behind the need for forage estimated for the same period 8 million tons pointing to a fodder gap of about 48%.

Concentrates are very expensive and not available in great amount in production areas, so there are many difficulties that made concentrates out of reach for more farmers.

Agro-industrial residues are fibrous material termed by-products when profitable use in made out of them otherwise termed waste products

Barreveld,(1982).According to AbuSwar and Darrag,(2002) pasture and range provide about 85% of the national animal feed resources, agro-industrial by-products and crop residues contribute 11%,and cereal grains and forages about 4% of the total animal feed .These by-products characterized by low content of protein, minerals and vitamins as well as high content of indigestible fibre due to lignifications of cellulos.

In Sudan there are many sugar-cane companies producing more than one million tons of sugarcane bagasse is generally with high fiber and low protein contents which, may result in poor animal performance. Therefore, sugarcane bagasse needs to improve nutritive value before use as animal feed, Natthapong (2013) Various chemicals have been used to improve nutritive value of sugarcane bagasse .

The objective of this study was to improve the nutritive value of sugar can bagasse treated with urea and molasses .

To evaluate the effects of using different ways of fermentation of grinded sugar cane bagasse .

CHAPTER TWO
LITERATURE REVIEW
2.1.1 Location

Sudan lies in northeast Africa between latitudes 40 and 220 north and longitudes 22o and 380 east . Covering an area of 2.5 million km2, it has a predominantly rural population of about 30 million, which is growing at the rate of 2.6% per annum according to the World Fact book the July (2006) population estimate was 41 236 378 with a 2.55% growth rate.

The country is traversed by the River Nile and its tributaries which have varying degrees of influence on irrigated agriculture and livestock production systems. There are also a large number of seasonal rivers and water courses; large ones, such as the Gash and Baraka, originate within the Ethiopian highlands, form two inland deltas in Sudan, and are important for flood irrigation agriculture. Also there is a vast resource of groundwater, estimated at about 9 000 billion m3, which has a varied distribution, quantity and quality in different parts of the country, with the Nubian Sandstone acquifer the most important.

2.1.2 Land area, arable and pastoral areas

Of about 84 million ha of arable land with reasonably fertile soils, 1.63, 8.21 and 7.93 million ha respectively were under irrigated agriculture, traditional rain-fed cultivation and mechanized farming in the 1994/95 season. The National Comprehensive Strategy aims to considerably increase these areas.

Forests and woodlands cover about 64.36 million ha while rangelands are estimated to cover 24 million ha (National Committee on Food Security, 1996)

Forage from rangelands is estimated to provide, depending upon the region, from 55–80% of the national herd feed requirements.

2.2 Ruminant sector

Livestock form an important component of the agricultural sector, with production mainly based on traditional pastoral systems (90% of the livestock in the country belong to the traditional pastoral production systems). The Ministry of Animal Wealth estimates the camel, cattle, sheep and goat population in (2012) at 104 million heads, respectively as well as 45.550 million poultry .

Livestock provide milk, meat, hides and skins, hair, manure, animal draught and transport, subsistence and incom.The contribution of the agriculture sector to the GDP in 1999 was 49.8%, of which 27.5% was from the plant production component and 22.3% was contributed by livestock.

Live animals (especially sheep eg. in 2003 some 1 351 685 live sheep were exported), meat and hides and skins are important items in the country's exports and contribute significantly to foreign exchange earnings. Considerable quantities of dairy products are imported with some 66, 104 tones of milk equivalents imported in FAO (2003).

2.3 Animal nutrition

The term nutrient is applied to any feed constituent or group of constituents of the same general composition that are of' aid in support of life. Proteins, carbohydrate, fats, water, minerals, dry matter and vitamins are the general nutrients. Each type of nutrients has some special function to perform. The nutrients are found in all living organisms, plants or animals Sunder and Sri (2005).

2.3.1 Water

Water is essential for all living bodies. Water acts in the body as a solvent in almost all vital activities like digestion, absorption, intermediary metabolism excretion and of reproduction and maintains homeothermy. Water is important as the excretion of urine, sweat and saliva and production of milk depends on it. The body of animal consists of 60% of water. If no foods are given to animals they live for 4 weeks together on water but if water is not given by any source. It dies in days Sunder and Sri (2005).

2.3.2 Dry mater:

The dry matter is available in foodstuffs as organic and inorganic material as shown above.

2.3.3 Carbohydrates:

Carbohydrates are the compounds of carbon with hydrogen and oxygen. The carbohydrates are the chief sources for the supply of energy to the animal body, for the maintenance of the body temperature and they are also necessary for the functioning of the organs, work and production. While surplus carbohydrates are converted into fat and stored in the body Sunder and Sri (2005).

2.3.4 Proteins

Proteins are complex organic compounds containing nitrogen, carbon, hydrogen, oxygen and occasionally phosphorus and sulphur. They are essential constituents of animal and vegetable cells. Proteins are required for building of muscles for the growth or development of the animal body for the production of milk and eggs. Sunder and Sri (2005).

Protein is the basic structure used to make all tissue – muscle, bone, skin,hair, organs and milk. but protein is needed daily as the body is constantly repairing itself and replacing lost cells and tissue. Protein is made up of amino acids. Animals use the amino acids from digested protein to build and replace tissue. Because of the rumen microbes, cattle can make all the amino acids they need as long as there is enough protein in the diet. Microbes in the rumen use NPN to make amino acids; cattle can then use the amino acids made by the microbes.

Protein requirements of cattle and feed content of protein is usually expressed as Crude protein (CP). Crude protein = nitrogen x 6.25 to estimate the protein value of the feed, Some of CP is not available to the cow, and CP from different feeds may not be used at the same efficiency so nutritionists often use metabolizable protein (MP). Most protein entering the small intestine will be digested and absorbed for various body functions John, William and Scott (2005)

2.3.5 Lipids

The lipids (fats and oils) are a group of substances found in plant an animal tissues, insoluble in water, but soluble in Benzene, Ether and Chloroform. They are important sources of stored energy Sunder and Sri (2005).

2.3.6 Minerals

Minerals are important for a variety of functions in the animal. Some minerals along with proteins form structures like bone and teeth. other minerals help transmit nerve impulses, while certain minerals are important to enzymes or carrying oxygen.

Minerals can be divided into two types – Macro and Micro. The different macro and micro minerals important to cattle are listed calcium, potassium, phosphorus, sodium,. Macro minerals are needed in ounces or grams per day.

Micro minerals, on the other hand, are needed in milligrams or parts per million **(PPM)** are listed sulfur chloride, magnesium, Copper Chromium, Iron,Cobalt, Iodine, Manganese, Selenium, Molybdenum, Zinc, Nickel. Micro minerals are often called trace minerals John et al (2005) .

2.3.7 Vitamins:

Vitamins are organic compounds and are effective in small amounts in promoting the health of animals, improving their appetite and digestion, stimulating growth and increasing the productive capacity of animals.

Vitamins are essential for transformation of energy and regulation of metabolism. They are synthesized by plants and are found in animals as a result of food intake or of the activity of micro organisms in the gut.There are about (15) vitamins, but more important in feeding of animals are Vitamins A.D.E.K.B and C. Each vitamins has a specific function, Sunder and Sri (2005).

2.3.7.1 Vitamin A

It is essential for body growth vision, reproduction and maintenance of healthy epithelial tissue, The deficiency of this vitamin causes infertility in breeding animals, The growth stunted and eyes are blind, Sunder and Sri (2005).

2.3.7.2 Vitamin D

is synthesized in animal body by the action of Ultra-violet rays though the sun light. Vitamin - D promotes the health of animal. It is essential for absorption of calcium and phosphorus, The deficiency of this vitamin results in deposition of calcium in bones, knee joints and Hock joints are swollen, Sunder and Sri (2005).

2.3.7.3 Vitamin E

It acts as biological anti-oxidant in the body, The deficiency of this vitamin causes muscular dystrophy (White muscles), Sunder and Sri (2005).

2.3.7.4 Vitamin K

is essential in blood clotting process, Dairy animals never show the deficiency of this vitamin, Sunder and Sri (2005).

2.3.7.5 Vitamin B complex

All vitamins B complex are soluble in water and function is the transformation of energy in the body. All green leaves are rich in Vitamin - Bz, grains are rich in Vitamin B, and all cereal grains and milk is rich in vitamin - B6 (Pyridoxine) Other B Complex group includes Niacin, pantothenic acid, Biotin, Choline, Vit B 12 (cyaroo cabalamine).In ruminants Vitamin - B is synthesized in the body. Hence no supplement of Vitamin - B is required in feed, Sunder and Sri (2005).

2.3.7.6 Vitamin C

This is water-soluble vitamin. Green leafy vegetable and citrous fruits are good sources of vitamin - c. This is essential for man pigs, where as in farm animals, they synthesis vitamin - C from Glucose in the body. Therefore the deficiency of this vitamin is not observed in farm Sunder and Sri (2005).

2.4 Classifications of Feeds

All feeds can be classified into specific categories based on their primary function in the diet, whether the feed is a protein or energy feed, for example. A basic understanding of the classification of feed and the nutrient content of common feeds will make it easier for producers to make feeding decisions.Feeds fall into two main groups: roughage/forage or concentrates. John et al (2005).

2.4.1 Concentrates.

A feed or feed mixture which supplies primary nutrient (proteins, carbohydrates and fat) at higher levels but contains less than 18% crude fibre and more than 60% TDN, Concentrates are classified as energy rich and protein rich concentrates. The crude protein will be less than 18% in energy rich concentrates. And more than 18% in protein rich concentrates. John et al (2005).

2.4.2 Roughages:

Roughages as described ,by Abu Swar (2005) plant materials available to consumed by and animal from forage plants, grasses and /or agricultural by Products, Cheeke (2005) described roughages as bulky feeds ,high in fiber and low in energy. Roughages are bulky feeds containing relatively large amount of less digestible material i.e. crude fiber more than 18% and low (about 60%) in total digestible nutrients (TDN) on air day basis, Roughages are subdivided in to two major groups i.e. succulent and dry roughages based on the moisture content.

Succulent feeds usually contain moisture from 60-90%, where as dry roughages contain only 1015% moisture. For the sake of convenience succulent feeds are again classified into ‘pastures, cultivated fodder crops, tree leaves, silage and root crops. Dry roughages are dried plant materials, which are preserved for usage in summer and in unforeseen climatic conditions Sunder and Sri (2005).

2.5 Succulent roughages.

2.5.1 Pastures:

Young rapidly grown grasses in the wastelands are rich in protein and highly palatable. Better to feed in right growth stage, Pastures form the oldest form of livestock feed. The word pastures refer to land on which different types of edible

grasses and other plants grow or are grown for grazing livest Permanent pastures are those covered with perennial or self-seeding animal species of plants . Temporary pastures are those planted with quick growing crops like Sudan grasses and millet to provide supplemental grazing during lean season Sunder and Sri (2005). And According to AbuSwar (2005) divided pastures Into Natural pastures :

Natural pastures are plants that grow naturally by rain fall water .
these include : rasses and legumes .According to the climate and soil type national pastures were classified into dry land pastures, brush pasture wood land pasture and artificial pastures.

2.5.2 Forages:-

Forage is plant material (mainly plant leaves and stems) eaten by grazing livestock. historically, the term Forage has mean only plants eaten by the animals directly as pasture, crop residue, or immature cereal crops, but it is also used more loosely to include similar plants cut for fodder and carried to the animals, especially as hay or silage. Fageria (1997).

2.5.2.1 Grasses

There are approximately 600 genera and 8,500 species of grasses found throughout the world, making the grass family one of the largest and most widely distributed plant families.

Grasses are the dominant plants in prairies and savannas but can also be found wherever plants can grow, under a wide variety of environmental conditions from arctic marshes to tropical swamps, In fact, 25% of the world’s vegetation belongs to the grass family. Grasses not only provide food for humanity, but also provide nourishment in the form of cereal grains (as discussed previously) or forage for livestock. There is actually more land dedicated to forage crops than to all other crops cultivated. The nutritive value of the forage grasses is not in the form of stored starch (as in the grains) but cellulose and hemicelluloses from the vegetative cell walls. Herbivores are able to digest these compounds through the action of symbiotic microorganisms within their digestive tract. Forage can be consumed directly during grazing FAO, (2005).

2.5.2.2 Legumes:-

Legumes are worthy of a comprehensive study for their economic importance. Their timber is used for furniture, buildings, railway sleepers, agricultural implements, transmission poles, oil mills, huts and fences, firewood and charcoal production. Tannins used in leather industry are produced from the pods and leaves of some legume species.

Legumes have many other uses: medicinal, food (sources of plant proteins), insecticides and fodder for domestic animals especially in arid areas of north and central Sudan. Stabilization of sand dunes utilizes the Acacia species to hinder desert creep e.g. the gum belt in the Sudan is a natural buffer zone between the desert proper in the north and the tall grass savanna in the south. This is of high importance not only to the Sudan, but also worldwide. Some legumes are used as shade trees for agricultural crops. Nassir and Widad (2007).

2.5.3 Hay and hay making

the most common source of stored feed is hay. If hay is harvested at the proper stage of plant growth and undamaged by weather, it can provide nutrients at the lowest possible cost, except for pasture or silage. Feeding hay is also one of the best ways to increase year- round carrying capacity, as forage is harvested during periods of rapid, excess growth and then fed during stress periods. To make the best use of hay in your operation, you need to consider several factors: the quality of the hay, the cost of feeding and the factors influencing losses, including hay making, storage and feeding systems. The primary objective of any hay-feeding program is to provide plenty of high-quality hay to meet the animals' nutritional needs. Many factors affect the quality of hay: soil fertility, the stage of forage maturity when harvested, the moisture available during the growing season harvesting conditions, and storage. Bade and Sim (2011). **W**hen pasture growth is limited, some type of stored feed must be provided to grazing animals, Hay is one of the most versatile stored feeds available because Accumulated forage from periods of excess growth can be cut for hay, which minimizes waste and It can be stored for long periods of time with little loss in nutritional value if protected from weather also can be produced and fed in large or small amounts ,It can be produced and fed either mechanically or manually such as can supply the nutrient requirements of most classes of livestock and A large number of crops can be used to produce hay.

Since hay is such a widely used stored feed, it is important to understand the factors that influence hay quality and the criteria used to evaluate hay quality. This information can then be used to develop a feeding program that will be the most effective and efficient in meeting each producer's goals Bates (2007).

2.5.3.1 Importance of Hay Quality

Hay quality is usually measured by the amount and availability of nutrients contained in the hay, The estimation of protein, fiber and digestibility of a hay can all be used to determine quality. The ultimate test of hay quality, however, is animal performance. Quality can be considered satisfactory when animals consuming the hay perform as desired. Three factors which influence animal performance are:

*intake hay must be palatable if it is to be consumed in adequate quantities to produce the desired performance.

*digestibility and nutrient content once the hay is eaten, it must be digested and converted to animal products.

*toxic factors the hay must be free of components that are harmful to the animals Bates (2007).

2.5.3.2 Factors Affecting Hay Quality

There are many factors that will influence hay quality, some of which can be manipulated by the producer. These are Plant species ,Stage of maturity ,Curing and handling conditions ,Soil fertility and Seed quality Bates (2007).

2.5.4 Silage

Silage-making is a management tool that allows producers to match feed resources (forages, crop residues, agro industrial byproducts,) with feed demand for a dairy herd, The basic function of silage-making is to store and preserve feed for later use with minimal loss of nutritional qualities. In modern animal agriculture, hay-making of excess pasture preceded silage making as the primary method of preservation on the farm; however, silage making has progressively replaced hay making as the technique of choice in some parts of the world. Silage making is less dependent than hay-making on good weather conditions and can be extended to a great variety of forage crops (corn, sorghum, immature cereal grains, etc.) and locally available agro-industrial by products (sugar beet pulp, brewers grain, etc.). Actually, the practice of silage making evolved in parallel with the success of corn as a high yielding crop that is preserved extremely easily in a silo. Michel (2005).

Silage making has become an important tool for producers to manage crop production and dairy herd feeding programs in many production systems around the world, However, silage making requires considerable capital and labor investments on the farm; it also demands a fairly high level of technical expertise. The understanding of how ensiling works to preserve a crop by fermentation is important. Michel (2005).

2.6 Crop residues and Agro industrial by products:-

In the agricultural literature, crop residues' refer to the fibrous parts of cereals, sugar cane, roots and tubers, dried fruits, etc. Their common features include the fact that they comprise the parts that are not consumed by humans after the harvest, and also that they have low feed value for animals and a very low or non-existent feed value for monogastric animals. FAO (2014).

In sudan crop yield about 22 million tons dry matter Abu Swar and Darrag, (2002). the production of the agricultural byproduct in Sudan (2003-2004) is (18710696 tons), According to the ministry of agricultural and forestry Department of pasture and forage in Sudan MAFR,(2005).

The agro industrial residues represent important sources of animal feeds in such developing countries as Sudan. In the developed countries they depend on the improved pastures and good quality feeds for feeding their animals. In Sudan the decrease of the productivity of range lands and the limited forage production beside the increase of sorghum straw prices; all these factors increased the importance of byproducts for ruminant feeding Abeer (2010) .

Agro-Industrial By-Products (AIBP) are the important source of protein supply for livestock. In Pakistan, livestock productivity is very low as compared to developed countries, mainly due to underfeeding. The use of AIBP as a part of feed for livestock reduces the cost of production, improve the quality of feed, ensure regular feed supply even during slump period (December-January and May-June) and ultimately increase the profit margin of livestock farmers. Abrar and Sindhu et al (2002).

The abundant supply of crop residues and agro-industrial by products at reasonable prices could enhance production and reduce cost of compounded feeds while not adversely affecting the performance of the animals. Iyeghe (2002).

Generally, agro-industrial byproduct are listed as energy, protein and combined protein/energy sources Aregheore, (1998). Energy sources are rich in fermentable carbohydrates and low in protein. An example is molasses (75 % DM, 4.1 % CP and 12.7 GE MJ/kg DM) - a by-product of the sugar industry. Protein sources are derived from oilseeds after oil extraction. Their cakes are valuable sources of protein in livestock diets, Onyeonagu and Njoku (2010).

The potential value of crop residues and agro-industrial by products in ruminant livestock nutrition is well known, but little information has been published on their actual utilization as livestock feed or their availability to smallholder farmers in these countries. Where they are available most of them are haphazardly used because farmers lack storage facilities and knowledge on how to use them effectively in animal diets Aregheore (2000).

Crop residues and agro-industrial by product are divided by Preston and Leng,(1986),into four main categories these are :-

2.6.1 Feed residues

This group includes straw and stovers , which have high fiber, low digestibility and low nitrogen content.

2.7 Sugar industry by-products.

2.7.1 Molasses

Molasses is a product of the sugar refining industry, functions primarily as an energy source and can be fed at levels up to 30% of the diet high mineral content. Molasses is often included in manufactured feed at level 2 to 5% to inc rease palatability. It reduces dustiness and fines and acts of pellet binder to improve pellet quality. It is suitable for use as liquid feeding for ruminants. In many developing countries, abundant supplies of molasses are available, at provides the major fermentable carbohydrates. These may be used as energy source in ruminant feeding practices, also in the production of ethanol and bakery yeast Cheeke, (2005).

In addition to that it is used in fermentation of rumen and beer Tag Eldin, (2009).

Molasses is not a highly traded commodity even at national level. Actually, it is often used as source of energy by factories, or as **'**bitumen**'** on roads plied bythese factories**'** trucks. molasses from the sugar industries were considered as pollutants and therefore burnt, Iyeghe . (2002).

The total molasses production in sudan (ton) in (2000-2008) of factores is Algenaid 182.289 ton, Halfa 163.416, Senar 164.770, Assalaya 188.03, Kenana 837.586 ton .The amount of molasses represented 33% from the production of the sugarcan. Acording to Sudanese sugar company SSC (2009) and Kenana sugar company KSC, (2009) and According to The economic output of the detritus of the food industry(2011) Journal of the Faculty of scientific economy the total of molasses production per ton (2000-2011).is 2178.1 ton , Yaser and Abdul Qader (2011).

2.7.1.1 Molasses uses as the following:-

For the purposes of direct consumption through the use of waste in other industries and issued to meet the needs of factories instruments and provide some other needs. also Used in animal feed, through the manufacture of concentration rations and it can To contribute to the production of ethanol used as fuel for cars.

molasses enters in the production of stimulant industries including alcohol industry vinegar industry acid anhydride and yeast fodder Yaser and Abdul Qader (2011).

2.7.2 Bagasse :-

Bagasse is a highly fibrous by product after sugar cane is crushed to remove sucrose. Many sugar milling factories around the world release large quantities of bagasse as a part of their byproducts, some even dispose it as a waste. Traditionally, past research has more or less focused on utilization of bagasse for production of energy, fabrication boards and paper manufacture as well as for the production of insulation materials. In addition the one major potential use of bagasse is as a feed stuff for cattle Revers (1988), however its low digestibility limits its use in the row state Anakalo,(2009).

Bagasse is used as a basal diet, it's important to give the correct supplementation in order to obtain satisfactory physical and economic responses.The supplementation must take account of the productivity of the animals (e.g. Growing fattening, lactating, and etc.) poultry litter in particular considered as a better source of non- protein nitrogen (NPN) than urea ,Shahowana et al (2013) and Mahala et,al (2007).

Bagasse is the main by-product of sugarcane industry. It contains 60 %-70% carbohydrates, mostly in the form of polysaccharides, and is a potential source of dietary energy for animals. The major limitation of bagasse as feed is its low digestibility which is due to association of lignin with cellulose and hemicelluloses Suksombat, (2004).

Sugarcane bagasse is one of a highly fibrous residue remaining after extraction of juice from cane stem which can be used as a source of roughages for rumenants. Sugar cane bagasse annual production in Sudan is more than three million tons. Small proportions of these quantities are burnt during the production cycle of sugar and the rest creates problems of its disposal Utilization of Sugarcane bagasse for animal feeding is limited due to their bulkiness that hinders their transport to areas of consumption and their poor digestibility due their high content of fiber which contain more than 60% of its dry matter in the form of cellulose, hemicellulose and lignin. and found that sugarcane bagasse contained about 50% cellulose, 27.9% hemicellulose, 9.8% lignin and 11.3% cell content that included 1.3% CP Mohamed et al (2013).

2.7.2.1 Constraints limiting the use of SCB :-

The limitation in availability of energy to the ruminant animals from ligno-cellulose of agricultural by-products is due to physical and chemical association between structural carbohydrate and lignin and the crystalline arrangement of the cellulose polymer in plant cell wall and . It is clear that, with respect to animal feeding, the major biological constraints the use of sugarcane bagasse are the vast amount of lingo-cellulosic material which has a very low digestibility. A potential for the use of sugarcane bagasse as a ruminant feed may be realized through the development of physical, chemical and biological treatments to disrupt the lingo-cellulose complex. Alkali, acid and oxidative reagent treatments are kinds of chemical treatments for roughages and .Ammoniation of low quality roughages with urea or ammonia solution improved digestibility and nutritive value .Mohamed , et al (2013).

Table (1) Bagasse production in sudan (Tons)

Year	Quantity per sausan ton	Percentage
2000 – 2001	128.3000	7.3
2001 – 2002	145.5000	8.3
2002 – 2003	149.6000	8.6
2003 - 2004	165.7000	9.5
2004 – 2005	152.3000	8.7
2005 – 2006	151.8000	8.7
2006 – 2007	161.1000	9.2
2007 – 2008	154.9000	8.9
2008 – 2009	158.0000	9.1
2009 – 2010	188.0000	10.8
2010 – 2011	190.0000	10.9
Total	17452000	100

Yaser and Abdul Qader (2011) .

2.7.2.2 Physical and chemical components of bagasse:-

Bagasse is the fibrous residue from crushed cane similar in composition to wood, except that it has a much higher moisture content, about 50% compared with as little as 10% in some hard wood.The other components of bagasse are complex of pentoses, lignin and cellulose. On a dry weight basis bagasse has more pentosans,less lignin and much the same cellulose contents as wood Ahmed, (1996).

Paturu (1982), pointed out that the moisture content of bagasse in general was between (46-52%), fibre (43-52) and soluble solid (26%). Blackburn (1984) reported that the pH of sugar cane (bagaase) in general was between (4.9) and (5.5).

Rintu and Ashok (2002) analyzed bagasse as follows: ash (3.22-5.5%), sulphur (0.1-0.15%), potassium (0.73-0.97%), cellulose (32- 48%), hemicellulose (19-24%) and lignin (23-32%) .

Costa et, al . (2015) Sugar cane bagasse is one of a fibrous residue remaining after extraction of juice from cane stem and could be used as roughages source for ruminants (Ahmed et,al 2013).However, sugar cane bagasse has been reported containing low protein 3% ,high cellulose 40% ,hemicelluloses 35% and lignin 15% .

El-Sayed et al (2001) Studied the effect of different chemical treatments

urea solution 3% to Identify the possible methods that could be used for improving the nutritional quality of some crop residues .they found that chemical treatments improved the nutritional quality of crop residues than that untreated .

Mason and Owen (1985) recommended urea treatments for improving the nutritive value of poor quality roughages .

Abd-Elrahim (2005) report effect of molasses and urea

Additives on fermentation and chemical composition of some silages one of the bagasse treated and untreated , bagasse untreated DM(97.44%), CP (1.95%), CF (25.99%), Ash (3.3%), EE (1.39%) and ME (11.4MJ/kg) while the bagasse treated incubation period 28 days, DM (32.34%), CP 3.04%), CF (42.66%), Ash (5.58%), EE (1.22%), ME (9.52MJ/kg).

Mohammed et al (2013) findings the chemical composition of raw and treated bagasse ground protein content improved in all treatments ,the ensiling raised CP from (2.18%) of raw sugar cane bagasse to (10.40%) for the ensiling for 28 days, Ash from (2.70 to 6.96%), DM (96.1%)of raw and decreased in (2,3 weeks) (95.6, 95.7%) respectively and increased in four weeks to (96.40%) and EE (0.84%) of raw to (0.86%)

Intesar (2003) indicated analyzed bagasse treated with urea as a results of Dry matter (89.64), Croud protein (2.88-2.25), Croud fiber (46-51), Ash (3.19-4.28).

Fatima et al (2011), they are findings of chemical treatment to improve the nutritive value of sugar cane

bagasse treated with urea his follow Dm (96.20%), CP (5.20%), CF (43.70%), EE (1.30%), NFE (42.10%), Ash (7.70%) and bagasse untreated of DM (91.90%) CP (1.80%), CF (49.50%), EE (1.16%), NFE (42.24%) and Ash (5.30%).

Shoky Mesbah (2008) found that chemical composition of treated sugar cane bagasse with urea as affected by time of incubation periods, (2, 3, and 4 weeks) , Two weeks DM (94.21), CP (7.59), CF (40.60), EE (2.29), NFE (44.53), Ash (4.99) . Three weeks (95.23, 7.74, 40.12, 2.13, 45.27,4.74.) respectively ,Four weeks (96.33, 9.78, 37.21, 2.12, 44.45, 6.44).respectively and untreated (88.94, 2.17,45.53, 2.38, 46.70 and 3.65).respectively.

AFFRCS (1999) reported that who found the DM of bagasse silage treated with urea (24.8%) and other component CP (5.7%), CF (31.9%), Ash (3.2%) and E(1.7%).Chemical composition of sugar cane bagasse % as reported by some authores they are findings showed that is DM (88.63-94.57) with and average of (91.30), CP (1-3.95) with and average (2.48), EE (0.7-4.5) with and average (2.18), CF (26.72 –51.78) with and average (38.17), NFE (36.82-58.6) with and average (48.59), Ash (2.25-9.95) with and average (5.01), Om (85.8-94.6) with and average (9o.62).

Abu-Raya (1967) DM (89.5), CP (1.5), EE (0.8), CF (41.1), NFE (42.4), ash (3.7).

Marshall and Vanhor (1975) DM (93.8), CP (3.1), CF (34.9), Ash (3.3).

Abdel-Malik et al (1978) DM (92.47), CP (2.95), CF (26.72), EE (1.85), NFE (58.6), Ash (2.25).Shakweer (2003) DM (94.57),CP(2.66), EE(4.05)CF (36.78), NFE (48.75),Ash (7.56).

Bussuny et al (2003) DM (88.63) CP (2.86), EE (3.83), CF (51.78), NFE (36.82), Ash (5.31).

Preston (2003) DM (91.0), CP (1.0), EE (0.7), CF (49.0), Ash (3.0).

Boraei (2003) DM (89.14), CP (3.95), EE (1.85), CF (27.85), NFE (56.40), Ash (9.95).

Mc Donald et.al, (1991) Molasses has also been added to the silages to increase dry matter concentration , fermentation rate and production of lactic acid.

Pereira et al (1990) found that hemicelluloses content of sugar cane bagasse treated with urea 3.5% was decreased from 29.84 to 15.90% and CP was increased from 2.59 to 8.76%. Tiwari,et al (2013) shows that chemical composition of SCB treated with different levels of urea (5%) for different incubation periods ,(2, 3, 4) weeks enhance CP content from 2.70 to 14.35% ,indicated that level 4% at the periods (2, 3, 4) found is (10.46,7.74), (8.09, 7.38) and (10.92, 9.20) respectively.

Chin (2001) indicated that urea treatment of bagasse reduced CF from 47.3 to 34.1%.

2.7.2.3 The nutritive value of bagasse :-

Sugarcane bagasses are secondary byproducts derived during the industrial process of sugar production; its main components are cellulose, hemicelluloses and lignin, the nutritive value of bagasse and pith is low for ruminants. The primary factors limiting the utilization of crop residues are its higher crude fiber and low protein contents, low digestibility and palatability. To improve the nutritive value of such agriculture residues, it is important to breakdown the linkages among cellulose, hemicellulose and lignin by mechanical, chemical or biological and /or biochemical treatments.The possibility of biological treatment to deal with agricultural wastes has a great appeal as an alternative method to another expensive one; in terms of money and energy (chemicals) and to avoid the pollution hazards. Dawson *et al.,* (1990).

Represents bagasse waste part of reeds after draw juice or solution the weight of the bateyes, contains- Diabetes percent range between 20-30% main component is cellioulose 47% fibers by the humidity rate Dropping molten materials 3%.

2.7.2.4 Localy use:

The observe 90% of bagasse used in the production of steam for Kinetic energy management as well as thermal power to heat during the season, and used in the production of energy used in the maintenance operations inside the factory. used bagasse in poultry farms to cover (a) Assist in the process of dry and drought and of the earth, Aded to soil to increase agricultural feature porosity retain moisture and used animal feed after blend with other components (molasses) and also use in the production of wood CD, Yasser (2011).

2.7.2.5 The global use :-

Bagasse with great interest the economic importance in some countries including the United States of America, where it was noted that the paper mills and then produce 2-5% of the sail panels cardboard boxes used in freight operations, in addition to the production of the sail panels insulation and silk industry. Yasser and Abd ElQader (2011) .

Factors limiting the utilization of Agro industrial by products in sudan :- as reported by Abu Swar and Darrag,(2002).

1- Most of the roughages are produced in the rain fed area and expand in a very wide area where no source of drinking water are available for the animals in most of the year.
2- These by products are owned by the farmers who lack the experience and money to use the modern technology to treat and utilize these by products .
3- The high cost of collection and transportation of byproducts specially they have low density and low nutritive value .
4- The absence of agricultural grazing co-operation .
5- The production area is very far from the marketing area so the cost of transportation is very high.
6- Unawareness of the environmental benefits by using agro-industrial by products as animal feeds.
7- The absence of the techniques of binding, pressing and treatment of these by-products (Abu Swar and Darrag, 2002b).

2.8 Biological treatment of agricultural by- products

Biological treatments comprise composting ensiling, fungal growth and enzyme addition Suksombat,(2004). Application of agro-industrial by-product in bioprocess may serve dual purpose providing alternative substrates and help to reduce environmental pollution that their disposal may otherwise cause Ramli et al.(2005). the effect of biological treatments is through developing necessary enzymes to break or loose the bond between lignin and other carbohydrate in cell wall material, or decomposed lignin .several researchers reported that the use of microbes such as fungus with roughages increased dry matter digestibility, palatability and intake Ramli et al.(2005) and Okano (2005).

2.9 Physical treatments :-

Physical treatment includes soaking, chopping, grinding, pellet ting , steaming under pressure and gamma radiation Suksombat,(2004). These treatments were all found to have positive effect in enhancing digestibility of roughages .Sandev and Karaivanov,(1977). Indicated that irradiation decreased cell wall constituents in some agricultural wastes. Grinding forages increased the dry matter intake and digestibility Sundstol and Owen,(1984). Pelletting of roughages also increased dry matter intake and digestibility Babiker,(2009).

2.10 Chemical treatments:-

Chemical treatments were applied at wide scale to improve the nutritive value of poor quality roughages, Sundstol ,et al,(1978). State that selection of particular chemical methods depend of several factors such as its effectiveness on digestibility and /or feed intake ,cost and treatment, availability and its residual effect that could be toxic to animals and human directly or through pollution of soil and water sources moreover the selected chemical should be non-hazardous to be handled by workers and non-corrosive to machinery. the digestibility of crop residues is mainly due to lignifications of the cell wall material .lignin is very indigestible .However it is very susceptible to degradation and destroyed by oxidizing agents such as hydrochloride Cheeke,(2005).There are many chemicals of crop residues like sodium hydroxide , ammonia, urea, alkaline hydrogen peroxide solution and ozone Cheeke,(2005).Sodium hydroxide is the most commonly used,it has some disadvantages that it has contamination effect to soil ,hazardous nature of chemical and the increase of sodium load in the animals. So alternative alkalis may be used , Church et al.(1998). Reported that the use of sodium hydroxide improve roughages utilization to greatest extent. for diets containing 15-25% straw treated with sodium hydroxide the daily gain was improved. Also Feed conversion ratio was more efficient, because the digestibility of straw was increased from 43% to 62%.

2.10.1 Ammonia :-

The ammonization is and alternative to sodium hydroxide treatment. The ammonia either as mmonium hydroxide or gaseous ammonia. The ammonia has some advantage that is solubilizes hemi cellulose improving it is accessibility to microbial enzymes. Also it provides asource of supplementary nitrogen that can be used by rumen microbes Cheeke, (2005).

2.10.2 Urea:-

Urea is the non protein nitrogen compound (NPN) which contains 46% nitrogen .it is the most common source of NPN in ruminant feeding, NPN must be fed with an energy source that is readily available to the rumen. It should not make up more than 1% of the total diet or 3% of the concentrate mix. Urea is often used in lick tanks or liquid protein supplements to increase the CP value of the product or added to silage to boost the CP level. Santon and Whitter (2008).

Chapter Three

Material Methods

3.1 Area and time of the experiment

This study was conducted at the Department of Animal production , College of Agricultural Studies , Sudan university of Science and Technology , Shambat ,Bahri, Sudan, at the Period from december 2015 to January 2017.

3.2 Grinding of bagasse:

3.2.1 Physical treatment of bagasse

The grinding of the bagasse used in this study were grinded in small piecess in the grinder in the animal production department, college of Agricultural studies Sudan university of science and technology.

3.2.1.2 Chemical treatment :

3.2.1.2.1 Water treatment

In this experiment the grinded bagasse was treated with water (200ml for 2Kgs of grinded bagasse and thoroughly and mixed to be homogenous .

3.2.1.2.2 Urea treatment

the required amount of urea (80g) was dissolved in 200ml water and sprayed on 2kg of grinded bagasse and thoroughly and mixed to be homogenous.

3.2.1.2.3 Urea and molasses treatment

The amount of urea (80g) and molasses amount (600g) dissolved on 200ml water, the treated bagasse were thoroughly and mixed to be homogenous the ensiled prior to fill in an airtight poye bags, were compressed tightly closed and then stored for (14, 21, 28)days in shaded place at normal room temperature of 35° C to ensure fermentation on the feed store with three replicates for each ensiling period .at the end of each ensilage period samples were prepared to chemical analysis . Where increased crude protein content in the bagasse plants in the fermentation period, which as a result of water loss from bagasse plants occurred as a result of evaporation during the fermentation process, and for the loss of material is protein, as happens a result microscopic neighborhoods that have been active and have proliferated during the fermentation process Dirar, (1993) .

3.3 Chemical analysis of bagasse:

The proximate chemical analysis of raw and ensiled bagasse ground ,was etermined according to A. O. A. C. (2000). Samples analyzed on nutrition Lab , faculty of Animal production ,university of Khartoum.

3.3.1 the analysis of dry matter of bagasse

Sample is dried in an oven to obtain aconstant weight, the loss in weight is the moisture .moistures may be determined in two stages,drying at 60C which yields air dry sample and drying at 105C overnight 135C for two hours which yield atotal dry sample ,A.O.A.C(2000).

3.3.2 the analysis of Crude protein of bagasse

Kjeldahal method is used to determine the total nitrogen content and then the crude protein found by multiplying with a factor 6.25 the sample is digested in H_2SO_4 using $Cuso_4$ a catalyst converting N to NH_3 which is distilled and titerated, A.O.A.C(2000).

3.3.3 the analysis of Crude fibre of bagasse

The total in fibrous feed is determined using the neutral detergent procedure. The fibre includes cellulose, hemicelluloses and lignin as major component sample is boiled in fibre solution for one hour and later ashing at 55C, A.O.A.C(2000).

3.3.4 the analysis of Fat of bagasse

In determining the lipids (ether extract) sample is placed in continuous extractor for about 16 hour and subjected to extraction using petroleum ether. Weight increased is the lipid, which is expressed as percentage determined of total volatile fatty acid by steam distillation is described. Distillate titrated against 0.05N NaoH, A.O.A.C(2000).

3.3.5 the analysis of Ash of bagasse

Burning sample in muffle furnace set at 55C gives a total mineral content, As a result the organic constituent such as protein ,carbohydrate and lipids dis appear, A.O.A.C(2000).

3.3.6 the analysis of Metabolizable energy of bagasse

The estimate of the metabolizable energy (Mj/kg) and organic matter digestibilitydry roughage feed from following equations Menken and steingass,(1988).

3.5 Statistical analysis:

The data obtained from the experiment were subjected to analysis of variance using SPSS computer programmed (1984). Means were examined for significance by Duncan's multiple range tests. four different treatments of silage material A. B. C and D (control), replicates for each treatments additives, to determined which treatment is different.

Chapter Four

Results

4.1 Proximate analysis:

Data of chemical composition as seen in table (1) and figure (1) showed that were significant differences between treatments (A, B, C) and control (P<0.05) used in the percentage dry matter and demonstrated that the highest proportion in treatment (A) at 4week (87.40), while the lower percentage record (83.78)at 3week in treatment (C). also observe the percentages of dry matter the different treated were nearly to remain constant , except for period 2 and 3 weeks in treatment (C).

Table (1): Chemical composition of Dry matter (%) of the experimental treatments:

Treatments	**Weeks**		
	2	**3**	**4**
Control	94.18^{a}		
A	86.46^{e}	86.85^{c}	87.40^{b}
B	85.19^{h}	85.71^{g}	86.59^{d}
C	84.23^{i}	83.78^{j}	86.32^{f}
$Lsd_{0.05}$	0.0689^{*}		
SE±	0.02236		

4-2 Protein content:

Table (2) and figure(2) shows the chemical composition of raw and treated of sugar cane bagasse . protein content improved significantly ($p<0.05$) in all treatments. The ensiling raised Crude protein from (4.69) of raw sugar cane bagasse to 7.76, 7.90, 8.16, 9.52 and 14.36% for the treatment period of 2, 3 and 4 weeks respectively.

Table (2): Chemical composition of Crude protein (%) of the experimental treatments:

Treatments	Weeks		
	2	3	4
Control	4.69^{g}		
A	5.52^{f}	6.62^{e}	7.18^{d}
B	14.36^{a}	8.16^{c}	7.31^{d}
C	7.76^{b}	9.52^{b}	7.90^{c}
$Lsd_{0.05}$	0.3232^{*}		
SE±	0.1049		

4-3 Crude fiber content:

The result indicated that the table (3) and figure (3) the crude fiber content improved significantly ($p<0.05$) in treatments . The ensiling increased Crude fiber from (44.95%) of raw sugar cane bagasse to 49.36%, 48.51%, 47.71% and 45.22% intreatments A , B at 2and 4 weeks respectively . while the crude fiber decreased to 39.89%, 41.64% and 29.16% at 3 week respectively , except the treatment (C) decreased to 35.7%, 29.16% and 31.08% for the treatment period of 2, 3 and 4 weeks respectively.

Table (3): Chemical composition of Crude fiber(%) of the experimental treatments:

Treatments	**Weeks**		
	2	**3**	**4**
Control	44.95^{e}		
A	49.36^{a}	39.89^{g}	47.71^{c}
B	48.51^{b}	41.64^{f}	45.22^{d}
C	35.70^{h}	29.16^{j}	31.08^{i}
$Lsd_{0.05}$	0.09744^{*}		
SE±	0.03162		

4-4 Fat content:

Table (4) and figure (4) chemical treatments the lowest figure percentage of fat content compared with the untreated being 2.97% to 0.45% at(2 and 3 weeks) in all treatments, while the third week referring to the highest rate (7.73%) of treatment (C) followed by a much smaller percentage (4.22%) in treatment (B).

Table (4): Chemical composition of Fat (%) of the experimental treatments:

Treatments	Weeks		
	2	3	4
Control	2.970^{c}		
A	2.250^{d}	4.225^{b}	1.645^{e}
B	1.040^{g}	1.235^{f}	0.850^{h}
C	1.110^{g}	7.735^{a}	0.450^{i}
$Lsd_{0.05}$	0.09744^{*}		
SE±	0.03162		

4-5 Ash content:

The result in table (5) and figure (5) pointing to the Ash proportion in treatments and control ($P<0.05$)there were significantly different percentage, where the highest proportion recorded in all treatments (7.24%, 7.57%, 8.07%) at 3weeks respectively, while the record (7.12%) at 4weeks in treatment (C).

Table (5): Chemical composition of Ash (%) of the experimental treatments:

Treatments	**Weeks**		
	2	**3**	**4**
Control	5.385^{f}		
A	4.560^{h}	7.575^{b}	4.670^{g}
B	3.720^{i}	7.240^{c}	3.370^{j}
C	6.340^{e}	8.070^{a}	7.120^{d}
$Lsd_{0.05}$	0.000689^{*}		
SE±	0.0002236		

4-6 Nitrogen free extract:

The result in table (6) and figure (6) indicated that there were significant differences between treatments (A, B, C) and control (P<0.05) found in the percentage Nitrogen Free Extract and demonstrated the highest percentage of NFE in treatment (C) at 4 week, recored (39.78%) while the lowest figure treatment (B) at 2 week reported (17.56%).

Table (6): Chemical composition of Nitrogen Free Extract (%) of the experimental treatments:

Treatments	**Weeks**		
	2	**3**	**4**
Control	36.19^{b}		
A	24.76^{i}	28.19^{f}	26.20^{h}
B	17.56^{j}	27.44^{g}	29.81^{d}
C	31.33^{c}	29.30^{e}	39.78^{a}
$Lsd_{0.05}$	0.3375^{*}		
SE±	0.1095		

4-7 Metabolizable energy

According the data in table (7) and figure (7) pointed that the percentage of Metabolizable energy content in the treatments were significantly (P<0.05) differ percentage of ME content, where increased the percentage from 8.79% of raw bagasse to (9.10 MJ/kg) in treatment (C)at three weeks, also respect decreased to (7.69 and 8.22%) at two and four weeks in that treatment.

Table (7): Chemical composition of Metabolizable energy (%) of the experimental treatments:

Treatments	**Weeks**		
	2	**3**	**4**
Control	8.79^{b}		
A	7.30^{h}	7.28^{i}	7.53^{g}
B	6.93^{j}	8.09^{d}	7.58^{f}
C	7.69^{e}	9.10^{a}	8.22^{c}
$Lsd_{0.05}$	0.000689^{*}		
SE±	0.0002236		

CHAPTER FIVE

Discussion

Chemical treatment were applied at wide scale to improve the nutritive value of poor quality roughages, Sundstol et al (1978). EL-Sayed et al (2001) who Found that chemical treatments improved the nutritional quality of crop residues that than untreated, also Mason and Owen (1985) recommended that urea treatments for improving the nutritive value of poor quality roughages .

Results of chemical composition of untreated and treated of grinded Bagasse with different treatments are presented in table (1) the data obtained showed that dry matter content was decreased after transaction in different cases, this finding was similary report effect of molasses and urea additives on fermentation of the bagasse treated and untreated declined from 97.44% of raw to 32.34% Abd- Elrahim (2005), However Intesar (2003) indicated analyzed bagasse treated with urea as a result dry matter (89.64%), while Mohammed et al (2013) Findings that the ensiling bagasse grinding dry matter decreased from 96.1%of raw to 95.6% and 95.7% at 2 and 3 weeks respectively and increased to 96.40% at four weeks.

The chemical composition of the raw and treated sugar cane bagasse grinding in table (2) indicated that urea treatment improved crude protein content was significant with increase of incubation period .the protein content raised from 4.69% of raw to 14.36% of bagasse treated, this result were similar to that obtained by Mohammed et al (2013) who Found that the protein content increased from 2.18% of raw to 10.40%. while Tiwari et al (2013) SCB treated with different levels of urea (4%) for different incubation periods , pointed that protein content increased respectively from 2.70 to (10.46%), (8.09%) and (10.92,) at the periods (2, 3, 4) weeks. Also Shoky (2008) showed that chemical composition of treated sugar cane bagasse with urea as affected by time of incubation periods (2, 3, and 4 weeks) the protein content was raised from 2.17% to 7.59%, 7.74%, 9.78% respectively. Pereira et al (1990) found that hemicelluloses content of sugar cane bagasse treated with urea the Crude protein was increased from 2.59% to 8.76%.

The table (3) shows increase in the percentage of crude fiber in bagasse treated with water and urea, especially in the length of the fermentation (49.36%,48.51%) and (47.71%,45.22%) at the second week and fourth week respectively, this results are similar to the finding of preston (2003) who pointed that the increased to 49% and Intesar (2003) Found that ranging between 46% to 51% ,while shows it were significantly differences at the third week in all treatments where the proportion dropped from 44.95% of raw to 39.89%, 41.64%, 29.16% respectively . this studied nearly to Shoky (2008) reported that chemical composition of treated sugar cane bagasse with urea as affected by time of incubation periods, as a results 40.60%, 40.12% and 37.21% respectively, As Low percentage of crude fiber influence the treatment of urea and molasses notes during the period to 35.70%, 29.16% and 31.08% this similar report by some authors they were showed decreased in crude fiber to 36.78%, 27.85% and 31.08% , Shakweer (2003) , Boraei (2003) and AFFRCS (1999), as well as Mohammed (2003) indicated that urea treatment of bagasse reduced CF from 47.3% to 34.1%.

Table (4) shows that chemical composition of sugar cane bagasse treated and untreated of fat content. The results show that significantly differ in all treatments, As such as indicates the highest value recorded (7.73%) and the lowest value (0.45%) in treatment (C), except treatment (A) recorded (4.23%) this is like to reported by Shakweer (2003) pointed that fat content (4.05%) in ensilage bagasse and increase that obtained by Bassuny et al (2003) who found that fat content (3.83%).

Data presented in table (5) the Ash content higher from 5.38% to 8.07%, 7.57%,7.24% after treated at three weeks , the Ash content increase in this studied were similar to the result obtained by Fatima et al (2011) they are findings of chemical treatment to improve the nutritive value of sugar cane bagasse treated with urea Ash increased from 5.30% of raw to 7.70% and Shakweer (2003) found that Ash content (7.56%) while this result was Lower than the finding of Boraei (2003) who pointed that Ash increased to 9.95% and also reported that the ensiling bagasse Ash content increased from 2.70% of raw to 6.96% Mohammed et al (2013) and Intesar (2003) indicated to analysis bagasse treated the Ash increased from 3.19% to 4.28%.

The chemical composition of Nitrogen Free extract in table (6) describes the bagasse treated and untreated. where the results indicate that significant difference in all treatments compared to the control , recorded the highest rate in the treatment (C) at four weeks (39.78%) and the lowest rate in the treatment (B) at second weeks (17.56%). This result is less than Shoky (2008) which pointed that improving the nutritional value is influenced by time of incubation period (44.53%, 45.27% and 44.45%) respectively. Fatima et al (2011) found that improving the nutritive value of bagasse treated with urea is (42.10%). As more than (36.82%) ensiling bagasse treated as reported by Bassuny (2003).

Table (7) indicates the metabolizable energy in the bagasse ground treated with urea and molasses is effected by the length of the period which increased from 8.79% of raw to 9.10% at third week, similar reported (9.52%) obtained by El- rawi (2005) and indicate the treatment(C) is the best energy recorded (7.69%, 9.10% and 8.22%) at the period respectively.

Conclusion and Recommendations

- The present Study concluded that crop residues supplemented with urea and molasses an important potential as a feed for animal .
- Treatment of sugar cane bagasse with urea increasing the nutritive value of crude protein and decrease content of crude fiber.
- Improving the nutritional value of bagasse treated can be used as an alternative to feed concentration in animal feed ,which reduces production costs.
- Chemical treatments for improving the nutritive value of poor quality roughages
- Further studies required with different ratios of urea and molasses the influence of bagasse treated on improving the nutritive value specially in raising the protein and energy value.

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Appendix

TheTable (1) Chemical analysis for untreated bagasse and treated in two weeks:

Item	DM	CP	CF	Fat	Ash	NFE	bMEJ/kg
Unt,Bagasse	94.17	4.68	44.95	2.97	5.37	36.19	8.79
T1.Water Tr	86.44	5.35	49.34	2.27	4.57	24.91	7.30
	86.48	5.69	49.39	2.23	4.55	24.62	7.29
T2. Urea Tr	85.16	14.45	48.48	1.05	3.73	17.45	6.93
	85.22	14.28	48.54	1.03	3.71	17.66	6.93
T3.Urea,	84.20	9.84	35.71	1.12	6.34	31.19	7.68
Molasse Tr	84.26	9.67	35.69	1.10	6.32	31.48	7.69

The table (2) Chemical analyses for untreated bagasse and treated in three weeks:

Item	DM	CP	CF	Fat	Ash	NFE	bMEJ/kg
Unt,Bagasse	94.17	4.68	44.95	2.97	5.37	36.19	8.79
T1.Water Tr	86.83	6.45	39.87	4.24	7.57	28.70	7.29
	86.86	6.79	39.92	4.21	7.58	28.36	7.29
T2. Urea Tr	85.70	8.08	41.61	1.23	7.25	27.53	8.10
	85.73	8.24	41.67	1.24	7.23	27.35	8.10
T3.Urea,	83.76	9.60	29.10	7.74	8.08	29.24	9.10
Molasse Tr	83.79	9.43	29.22	7.73	8.08	29.35	9.10

The table (3) Chemical analyses for untreated bagasse and treated in four weeks:

Item	DM	CP	CF	Fat	Ash	NFE	bMEJ/kg
Unt,Bagasse	94.17	4.68	44.95	2.97	5.37	36.19	8.79
T1.Water Tr	87.37	7.09	47.68	1.67	4.68	26.25	7.59
	87.42	7.26	47.73	1.62	4.66	26.15	7.48
T2. Urea Tr	86.57	7.23	45.19	0.90	3.38	29.87	7.58
	86.61	7.39	45.25	0.86	3.36	29.75	7.58
T3.Urea,	86.30	7.81	31.08	0.50	7.13	39.78	8.22
Molasse Tr	86.35	7.98	31.07	0.40	7.11	39.79	8.22

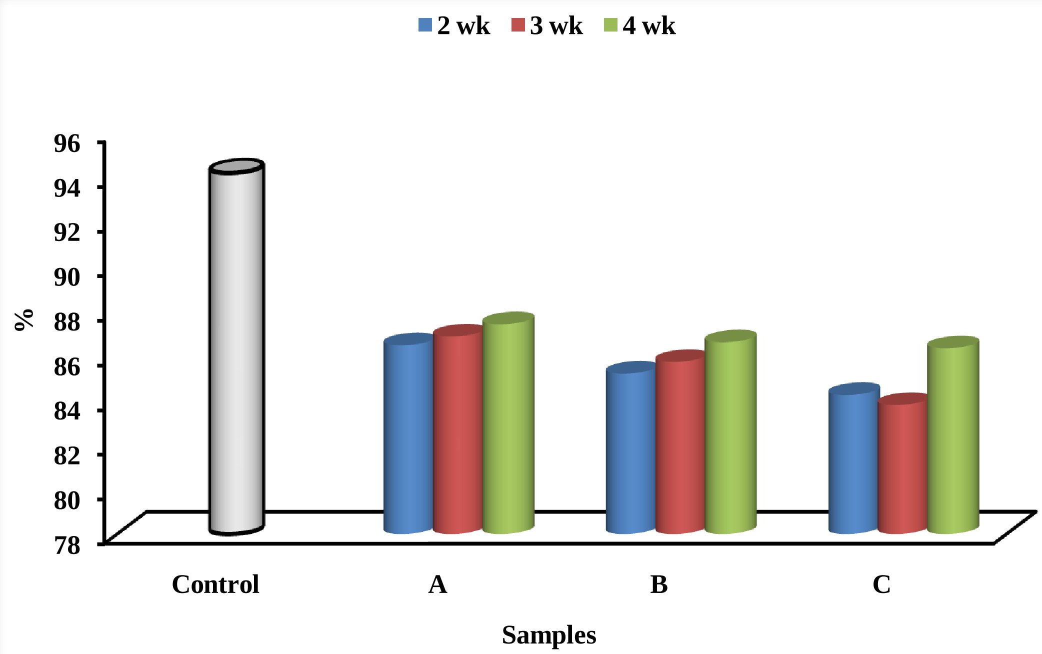

Fig. (1): Dry matter

Figure (1) degradation of Dry matter ingrinded treated bagasse

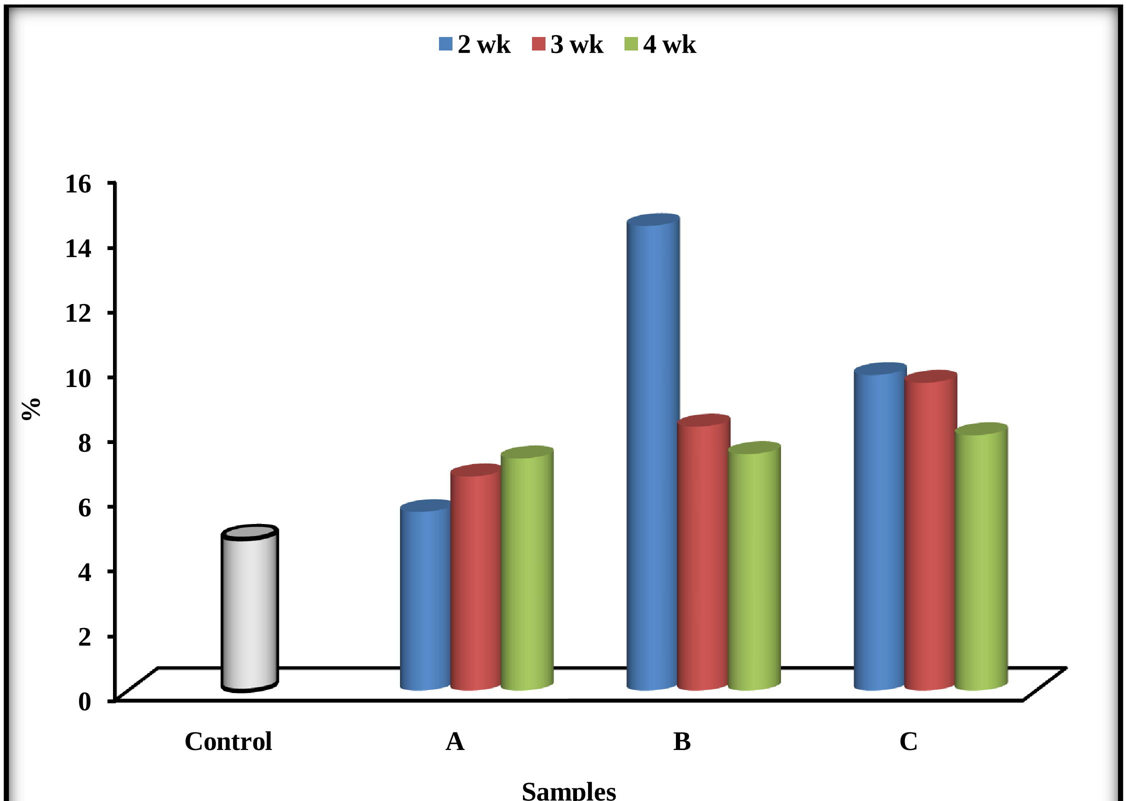

Fig. (2): Crude protein

Figure (2) degradation of Crude protein in grinded treated bagasse:

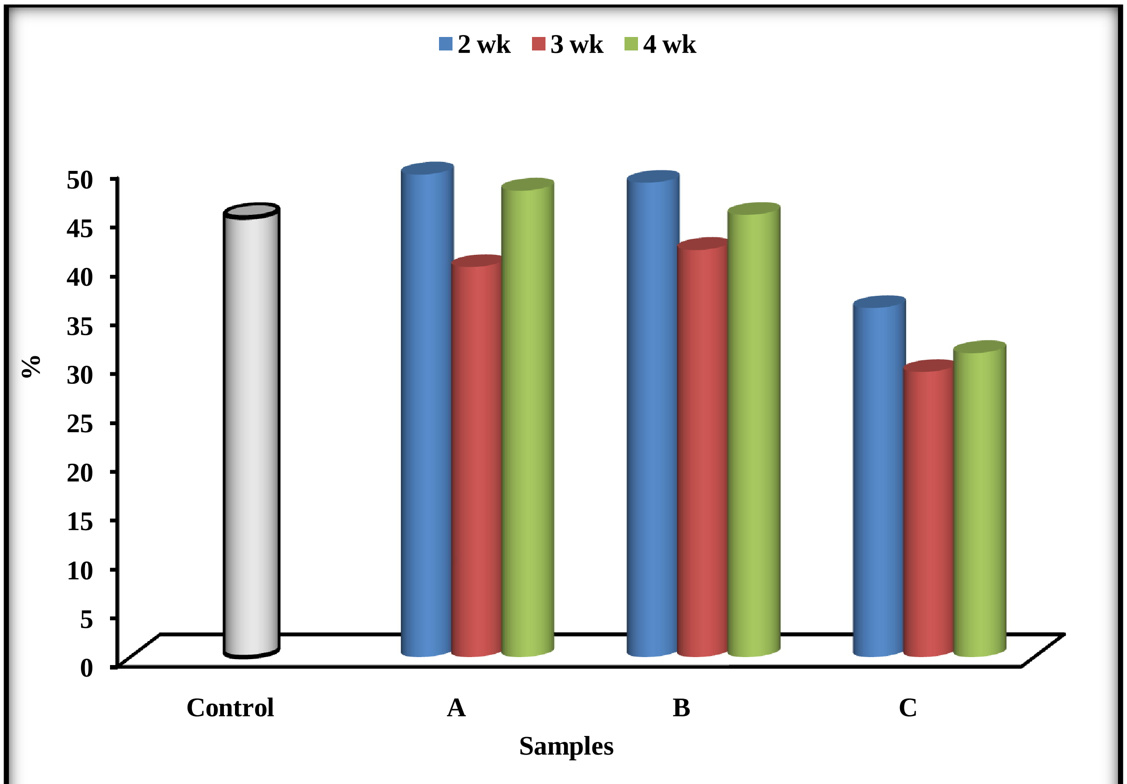

Fig. (3): Crude fibre

Figure (3) degradation of Crude fiber in grinded treated bagasse:

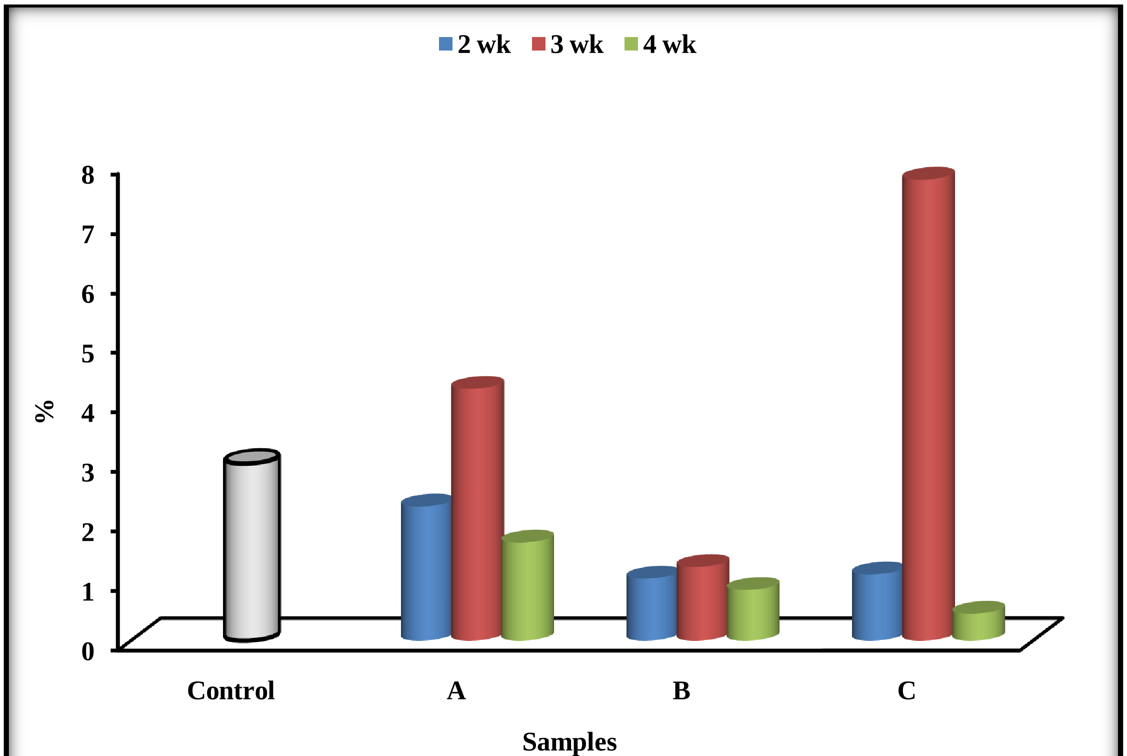

Fig. (4): Fat content

Figure (4) degradation of Fat in grinded treated bagasse:

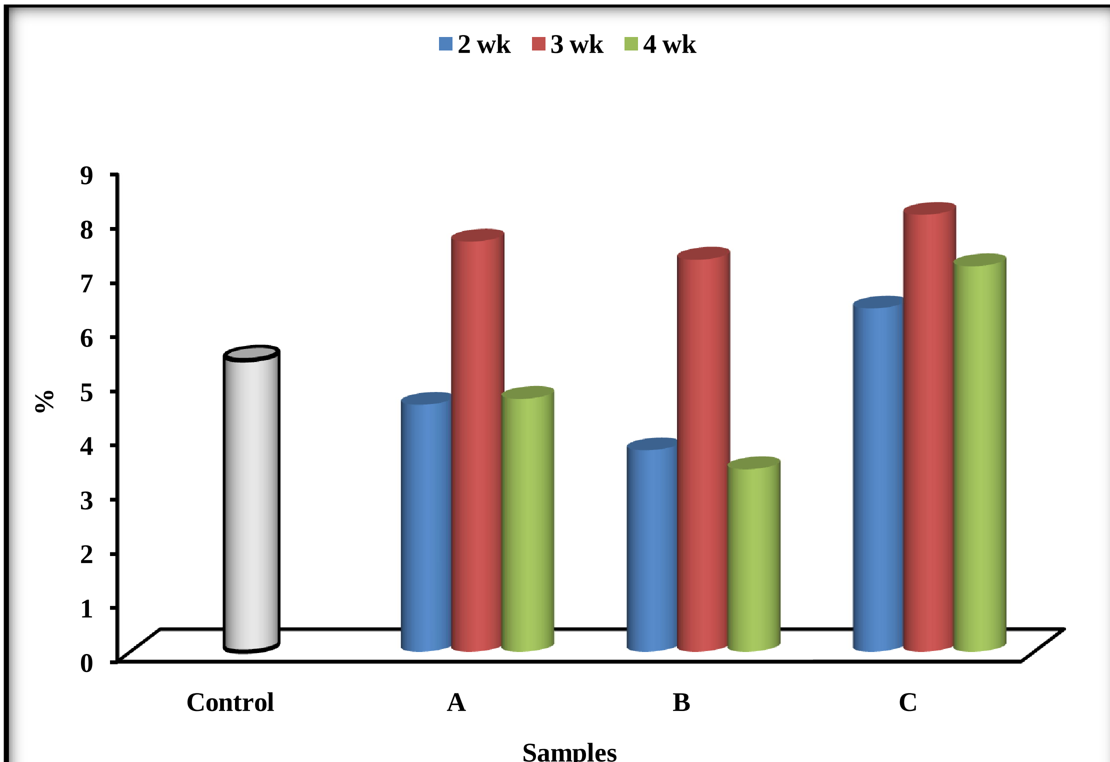

Fig. (5): Ash content

Figure (5) degradation of Ash in grinded treated bagasse:

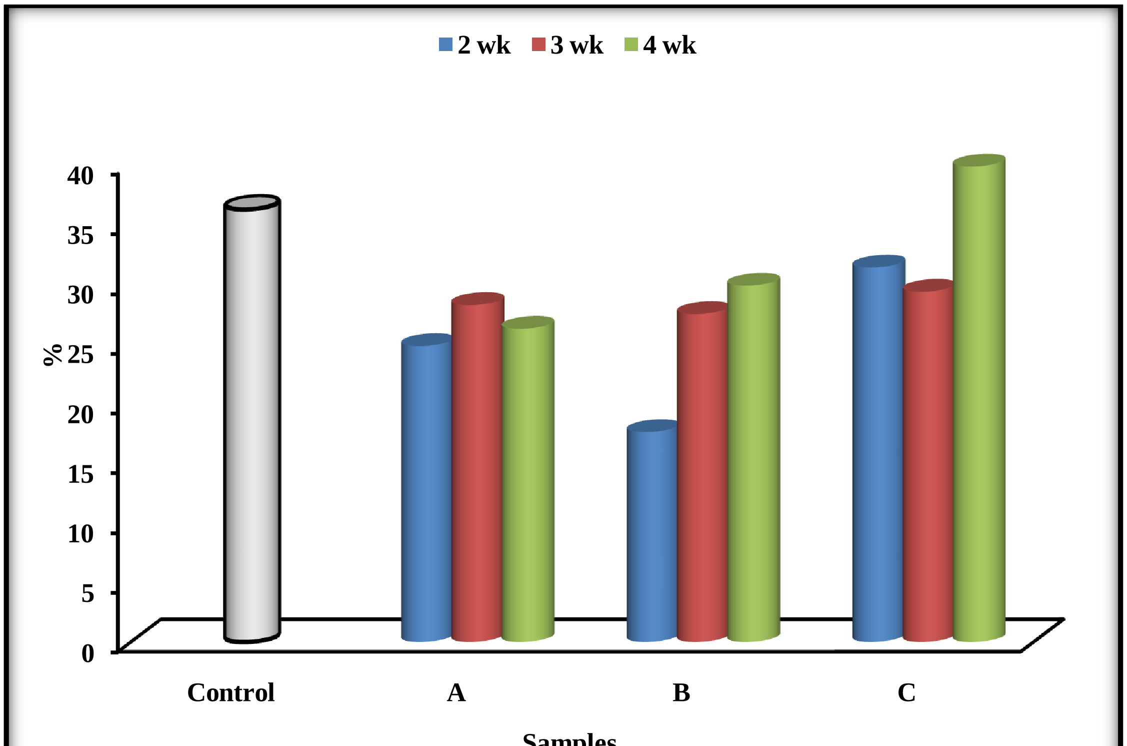

Fig. (6): NFE

Figure (6) degradation of Nitrogen Free Extract in grinded treated bagasse:

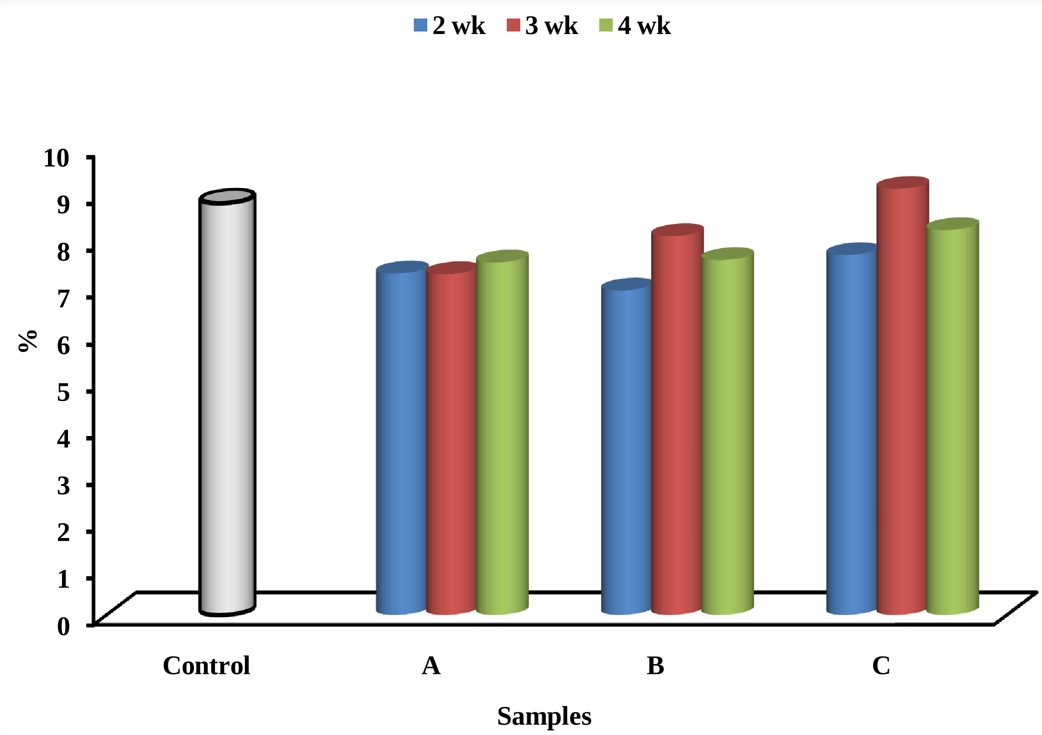

Fig. (7): ME

Figure (7) degradation of Metabolizable energy in grinded treated bagasse: