بِسۡمِ ٱللَّهِ ٱلرَّحۡمَٰنِ ٱلرَّحِيمِ

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NUTRITIVE EVALUATION OF SOME ACACIA FRUITS

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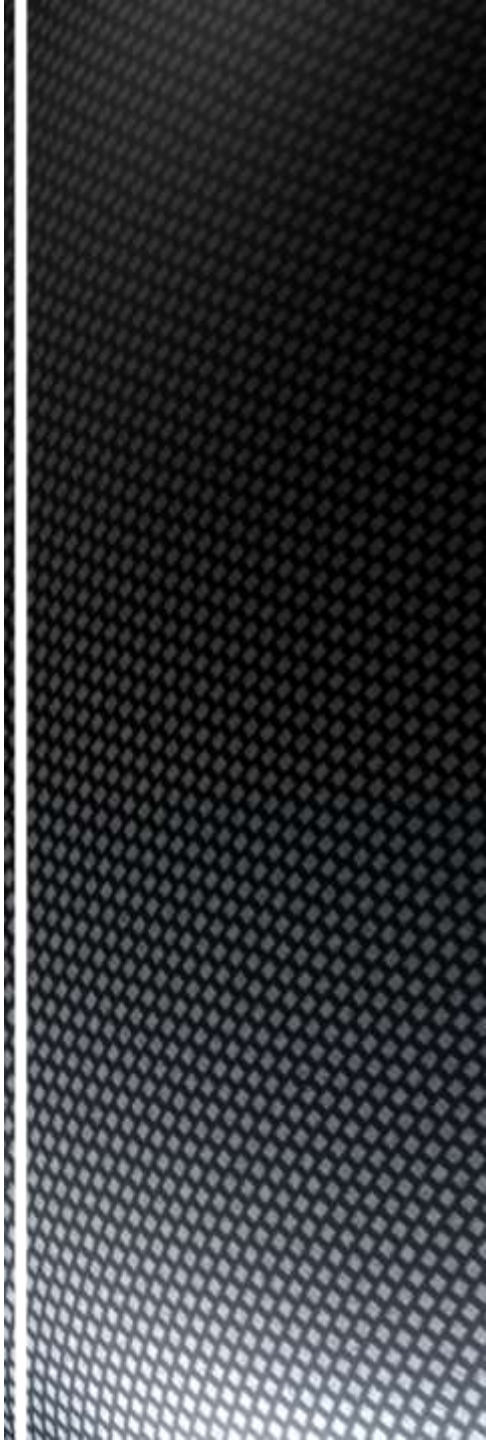
Introduction

- Free grazing of rangelands is the most common feeding system for livestock. During the short wet season grasses grow and mature rapidly producing abundant biomass. The body condition of the grazing animal is at its best during this period, but with the onset of the dry season both quantity and quality of the pasture herbage decline and fail to meet the maintenance requirement of grazing animals.
- The nutritional inadequacy of the dry season grazing imposes a major constraint on sustainable livestock production under traditional systems where grazing constitutes the only source of feed for livestock.



- Fodder trees and shrubs represent an enormous potential source of protein for ruminants in the tropics. Until relatively recently, these feed resources have been generally ignored in feeding systems for ruminants, mainly because of inadequate knowledge on various aspects of their potential use, as well as initiatives associated with the development of more innovative systems of feeding.

- Most Acacia trees have short lifespans of 15 to 30 years. Consequently, they tend to grow quickly and can reach heights in excess of 40 feet. In addition to the stunning yellow and white blooms, the Acacia produces a dry seedpod as its fruit. Each pod is about three inches long and contains five to six brownish black seeds. The combination of its feathery leaves, globular flowers and dry seedpods creates a dramatic appearance during the tree's peak growing years.

Material and Methods

- **Samples collection:**
- Several browse plant species' fruits were collected (where) at June (2014,)from Bahari North Khartoum , putting into consideration, the feeding behavior, the preference of the animals and species that were dominant and most frequently browsed.
- Samples were collected manually the fresh samples were weighed and store in cloth bags for air drying. Each bag had a label showing the plant collected, Table (1) show botanical and local name of the sample.

- **Laboratory sample preparation:**

The samples were thoroughly mixed and ground in a hammer mill (0.1) with stainless steel knives (Glen Greston, Stanmore. Type D.F.11.4

Table (1):

Botanical Name	Local Name
Acacia tortilis	Seyal
Acacia seyal	Taleh
Acacia mellifera	Kitir
Acacia nilotica	Sunt

Laboratory analysis:

- Proximate analysis for chemical component, dry matter, crude protein, either extract, crude fiber, ash and nitrogen free extract were determined according to AOAC (1984).

Dry matter:

- Weight crucible then added on it 2gm from sample and placed on oven at 105c for 18 hour (offer night) . Then cooled and weight.
- Moure = weight crucible +weight of sample –weight after oven/weight of sample*100
- Dry meats = 100 –Moure.

Crud protein:

- By Kejldal method measured in three stages, Stage one Digestion, in kejldal flask weight 1gm of sample add 25ml H_2so_4 consented then placed in room digestion, up to be clear, then placed to volt metric flask and complete to 100ml.
- Stage two distillation by mark cam apparatuses, take 5ml butted in mark cam distillation add 10ml NaoH N 40 gradually, then resaved in conceal flask with 25 ml Boric acid and indicator (methyl reed& Bromogresoal) up to 75 ml.
- Stage three Titration, titration agents Hcl N 0.02 up to begging change caller. Then take reading from bioraete.
- Cp =N*6.25
- N =T*14*0.02*20*100/weight of sample *1000.

Ash:

- Weight crucible, weight 2gm of sample butted in crucible and replace in fiercer oven at 550c for 3 hour, then cooled and weight.
- Ash = weight after 2fiercer – weight of crucible /weight sample*100

Either Extract:

- Weight round bottle before extract , weight 2gm of sample and butted in custobana and replace in to Colum of saxhlat, add 150ml of petroleum ether, then open the saxhlat apparatuses four%5- 6h, then collected petroleum ether and cooled the round bottle and weight.
- E.E = weight of round bottle after – weight of round bottle before /weigh of sample *100
- **NFE (cHo):**
- NFE = DM – (Cp+ CF+EE+Ash).

Tow stage digestibility:

- This method is variously known as the in vitro method or Tilley and Terry method named after Tilley and Terry (1963) who were the first use this technique which is tow stage technique .In vitro digestibility was determined according to Rumen fluid was collected from local breed calve the morning before feeding

The Microbial digestibility:

- The rumen fluid was strained and mixed with buffer in ratio 1:4 carbon dioxide was providing in steay over the buffer / rumen fluid mixture out the mixing and dispensing procedure.
- In second stage (0.05g) of the sample were weighted into test tube which were incubated in water bath 39 degree centigrade for 48 hours after the addition of the buffer /rumen fluid mixture 40ml of buffer / rumen fluid mixture was dispensed into each test tube.

Enzyme digestibility:

- Tubes test were filtered and put them in enzyme digestibility after the addition of pepsin (2mg) and Hcl (100ml) .mixture test tubes were located water bath 39 degree centigrade for 48 hours .The insoluble residue was filtered off and dried and weighted.

Gas production test: ((Menk *et,al* 1979).)

- Dried samples 200 mg of each treatment were incubated with rumen liquor and buffering solution (1:2) into calibrated glass syringes (100ml), in water bath, the temperature was 39 + 0.5ºC. The volumes of gas were measured and recorded at zero. 2, 4, 6, 8, 12, 24, 48, 72 and 96 hours. Cumulative gas production data were fitted to the model of Orskov and McDonald.Y = b (1-exp-ct)
- Where:
- b = the potential gas production(ml), c = the gas production rate (ml/h), t = incubation time (h), y = gas production at time (t) The OMD of silage was calculated using equation of Menke
- OMD (%) = 14.88 + 0.889GP + 0.45CP + XA
- Where:
- GP = is 24 h net gas production (ml / 200 mg), CP = Crude protein (%), XA = Ash content (%)
- ME (MJ/Kg DM) content of silage was calculated using equation of Menke as follows:
- ME (MJ/kg DM) = 2.20 + 0.136GP + 0.057CP + 0.0029 CP2
- Where:
- GP = is 24 h net gas production (ml/200mg), CP = crude protein
-

Anti nutritional factors determination:

Tannin determination:

- Quantitative estimation of tannin was carried out using the modified vanillin –Hcl method of (Price et al 1978).

Absorbance was red and spectrophotometer (Jenway 6305 UV/Vis spectrophotometer) and concentration of the condensed tannin was determined from to the standard curve.

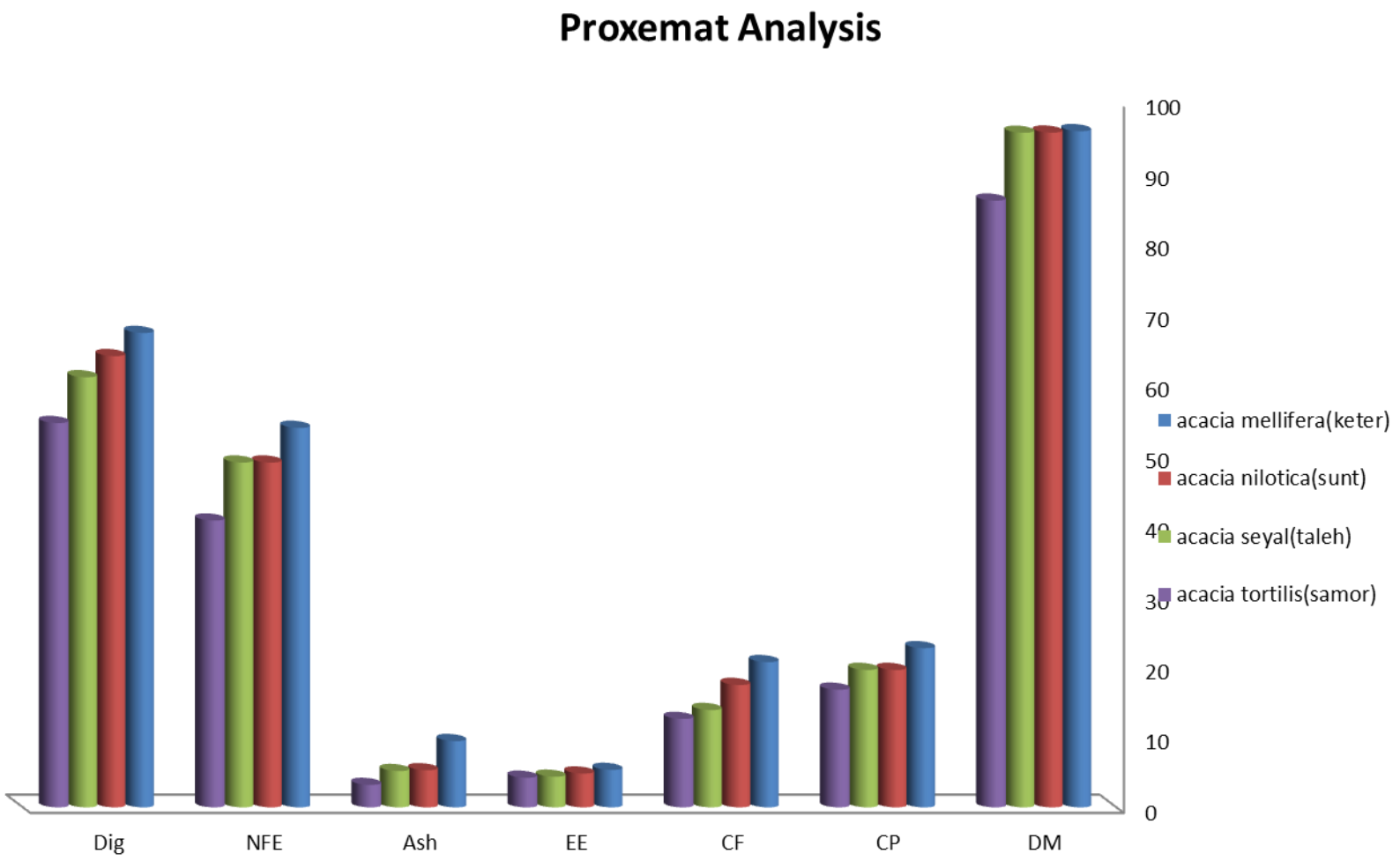
Saponin determination:

- Saponin determination was done using the method of AOAC (1990). Saponin extraction was done using tow different solvents .The first solvent, acetone, was used to extract crud lipid from the samples, while the second solvent (ethanol or methanol) was used for extraction of the saponin proper.
- 2.0g of the sample was folded into a thimble and put in Soxhlet extractor and reflux condenser fitted on top. Extraction was done with acetone in a250cm3 capacity round bottomed flask for 3 hours , after which the apparatus was dismantled and another 150cm3 capacity round bottomed flask containing 100cm3 of methanol was fitted to the extractor and extraction was carried on another 3 hours .
- The weight of the flask was taken before and after the second extraction in order to make the change in weight.
- At the end of the second extraction, was recovered by distillation and the flask was oven –dried to remove any remaining solvent in the flask.
- The flask was then allowed to cool and weigh of the flask taken .Then
- Sp=A-B/SM
- Where A=mass of flask and extract, B =mass of empty flask
- SM=sample mass

Statistical analysis:

- The experiment was conducted following the Completely Randomize Design (C.R.D)

Results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40
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10
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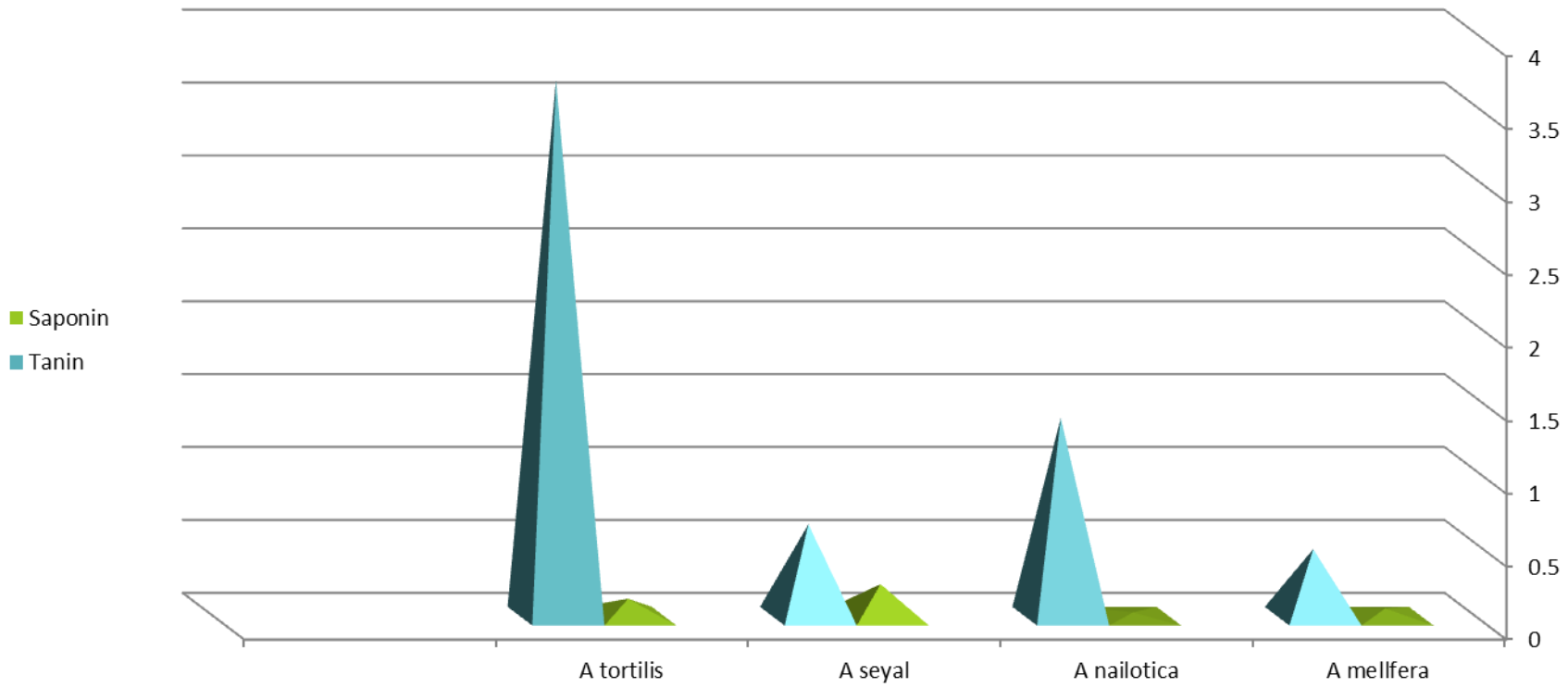
acacia mellifera(keter)
acacia nilotica(sunt)
acacia seyal(taleh)
acacia tortilis(samor)
Dig
NFE
Ash
EE
CF
CP
DM


Saponin
Tanin
4
3.5
3
2.5
2
1.5
1
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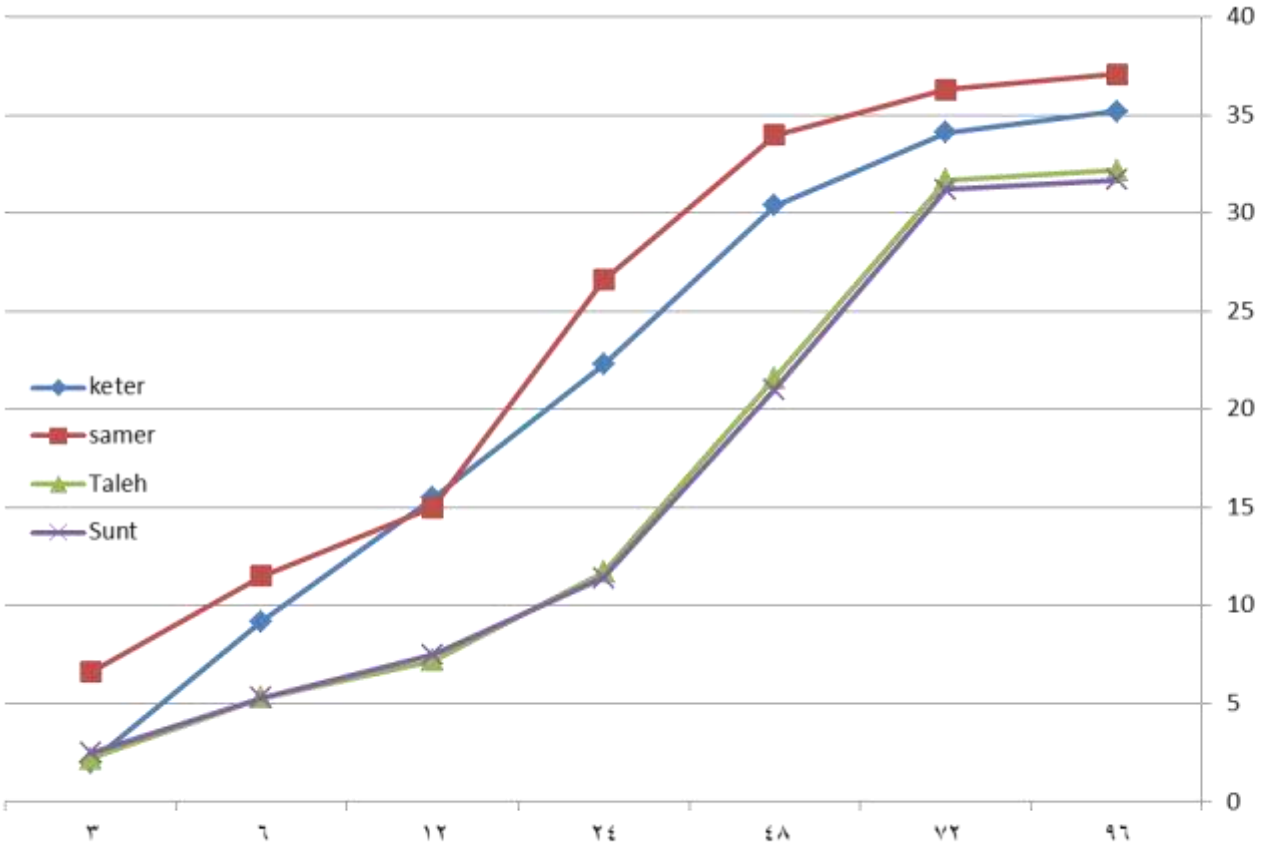
A tortilis
A seyal
A nailotica
A mellfera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CONCLUSION AND RECOMMENDATIONS

- This study showed that Acacia fruits (Pods and seeds) could provide part of the solution to shortage of Protein feedstuffs during the dry season to supplement low quality forage grazed by ruminant livestock.
- The digestibility of the fruits could be improved by coarsely crushing them if used as supplementary feeds.