

DEDICATION

To my parents,

Wife and daughter,

Brothers,

Sisters

and colleagues

With love and respect

Hamza

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All praise belongs to Allah, the Almighty for his unlimited support. Peace and blessings of Allah be on his prophet and messenger Mohammed and his pious companions and followers.

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ABSTRACT

The present study was conducted to investigate the effect of feeding cassava leaves at different inclusion levels and their utilization as a natural milk preservative for Sudanese Nubian goats. The study also included the effect of feeding cassava leaves on some productive characters of Sudanese Nubian goats. A total of 25 Sudanese Nubian goats were used as experimental animals. Initially 12 lactating does were divided into three groups based on matchability in live body weight, age and parity number, and assigned to three cassava leaves inclusion levels (0.0, 15 and 20%) as a preliminary experiment.

The results of the preliminary experiment revealed that titratable acidity percentage of the milk of goats fed on 20% cassava leaves was lower than those fed on 0.0% and 15% cassava at 5th, 6th and 7th hour post-milking. Also, it was found that fewer milk samples from the group maintained on 20% cassava showed positive results (spoiled) at the 7th hour after milking, compared to the other two groups (0.0, 15 and 20%). The results of the preliminary experiment suggested that cassava leaves inclusions didn't affect the keeping quality of goats raw milk, and there is a possibility of preservative effects if the cassava leaves inclusion increase. Accordingly, cassava leaves inclusion rate (15%) was doubled (0.0%, 20%, 30%).

The results of the new inclusion level indicated that titratable acidity percentage of raw milk of goat fed on 30% cassava leaves was significantly ($P < 0.05$) lower than those raised on 0.0% and 20% cassava leaves at 5th, 6th and 7th hour post-milking. Also, the clot-on boiling results elucidated that milk samples of goats offered 30% cassava leaves was significantly ($P < 0.05$) better than those fed on 0.0% and 20% cassava leaves at the 7th hour. However, the resazurin reduction test

revealed that all samples from the three groups showed disc reading below 4.

The results indicated that does fed on 20% cassava leaves produced significantly ($P < 0.05$) more average daily and total milk yield than the other two groups (0.0% and 20% cassava leaves). Moreover, does fed on 30% cassava leaves were found to be more persistent and tended to reach their peak yield later than the other two groups.

Milk fat, protein, total solids, solids not fat and ash% were not significantly ($P > 0.05$) affected by cassava inclusion levels.

Dry matter intake recorded during lactation period revealed that goats maintained on 20% cassava leaves consumed more dry matter (DM), crude protein (CP) and metabolizable energy (ME) than those raised on 0.0% and 30% cassava leaves levels. When dry matter intake was expressed as percentage of live body weight, both does fed on 20% and 30% cassava leaves consumed more DM than those maintained on the control ration (2.3, 2.7, 2.7%).

It was observed that goats fed on 30 % cassava leaves gained weight(.5 kg) during the lactation period while those offered 0.0 and 20% cassava leaves lost weights (3.3 ± 1.2 and 2.0 ± 0.4 kg respectively).

The same cassava leaves inclusion levels were used to investigate their effects on goats performance during the last 4 weeks of gestation. The results showed that goats maintained on 20% cassava leaves tended to eat insignificantly ($P > 0.05$) more DM, CP and ME, and also it secured higher daily weight gain (225/g) than those fed on the control ration and 30% cassava leaves.

The present results disclosed that, cassava leaves inclusions increased total dry matter intake, and inclusion up to 20% exerted better

performance. No deleterious effects were observed when the two cassava leaves inclusions were fed during this period (4 weeks prior to kidding).

Cassava leaves inclusion levels secured insignificant ($P > 0.05$) effects on birth weight, the respective recorded average birth weight for kids in the three groups were 2.3 ± 0.37 , 2.3 ± 0.03 and 2.54 ± 0.12 kg for the does fed (0.0, 20 and 30% cassava leaves respectively). Does fed on 30% cassava leaves born slightly heavier kids than those raised on 0.0 and 20% cassava.

13 kids born to the present does were used to investigate the effect of cassava leaves inclusions on kids post-weaning performance (8 weeks post-weaning). The kids were divided into three groups and then assigned to the cassava inclusions (0.0%, 20%, 30%). The results indicated that weaning weights were not affected by the three cassava leaves inclusions. (8.8 ± 1.42 , 7.8 ± 0.95 and 8.0 ± 1.0 kg for the three groups respectively).

It was observed that kids raised on control ration consumed insignificantly ($P > 0.05$) more DM, CP and ME than those fed on either 20% or 30% cassava leaves. But, kids maintained on 30% cassava leaves secured the highest daily weight gain (45.3 g) compared to those fed on the control ration (24.4g) and 20% cassava leaves (32.5g) in the same period (8 weeks post-weaning).

From the results of the current study, it can possibly be concluded that cassava leaves can be safely incorporated into goats rations at a level of 30% without adverse effects on production performance. 20% cassava leaves inclusion gave a better production performance, whereas, 30% level, maintained longer milk shelf-life.

بسم الله الرحمن الرحيم

ملخص الدراسة

أجريت هذه الدراسة لمعرفة اثر تغذية الماعز النوبي السوداني بمستويات مختلفة من أوراق نبات الكسافا بغرض زيادة محتويات عنصر (الثابوثيانيت) في كذب وبتالى تنشيط نظام (اللاكتوبيروكسيدز) الطبيعى في اللبن الخام المنتج ومن ثم زيادة مدة حفظة . وقد شملت الدراسة اثر هذه المستويات علي الادارة الإنتاجي التركيب الكيمياءى للبن.

تم استخدام مجموعة مكونة من ٢٥ ماعز نوبي، في بداية التجربة استخدمت ١٢ ماعز حلوب قسمت إلي ثلاثة مجموعات وغذيت علي ثلاثة علائق تشمل ٣ مستويات من أوراق نبات الكسافا (٥% ، ١٥% و ٢٠%) كتجربة أولية.

أوضحت نتائج التجربة الأولية ٠ أن نسبة الحموضة المعاييرة بلبن المجموعة التي غزيت علي ٥% و ١٥% أوراق كسافا في الساعات ٥ ، ٦ ، ٧ بعد الحلب علي التوالي.

اختيار التجبن عند الغليان لعينات اللبن من المجموعة التي عذبت علي ٢٠% أوراق كسافا أعطى نتائج سالبة اى لم يتخثر (بعد ٧ ساعات من الحليب أكثر من عينات اللبن من المجموعة التي غذيت علي ٥% و ١٥% او ورقة كسافا علي التوالي .

خلصت التجربة الأولية علي أن تغذية المستويات المختلفة من أوراق نبات الكسافا ليست لها اثر معنوي علي زيادة مدة حفظ اللبن الخام المنتج لكن إذا ما عدلت هذا المستويات قد يظهر الأثر الحافظ علي اللبن المنتج. وفقا لذلك تم تضعيف المستوى (١٥%) ليصبح المستوى الجديد (0% ، ٢٠% ، ٣٠%) .

او ضحت النتائج بعد هذا التعديل أن نسبة الحموضة في لبن المجموعة التي أعطيت ٣٠% أوراق كسافا كانت معنويا اقل من $0.05 >$ من نسبة الحموضة في لبن المجموعات التي غذيت علي ٥% و ٢٠% أوراق الكسافا في الساعة ٥ ، ٦ ، ٧ بعد الحلب علي التوالي.

أيضا بينت نتائج اختبار التجبن عند الغليان في الساعة السابعة بعد الحلب. أن اللبن الخام المنتج من مجموعة الماعز التي غذيت علي ٣٠% أوراق كسافا كانت معنويا أ >

٠.٠٥) أفضل من لبن المجموعتين الأخيرتين (٥% و ٢٠%) في نفس الساعة بينما أوضحت نتائج اختبار الرزاز وريين المختزل في الساعة السابعة بعد الحلب أن اللبن الخام من كل المجموعات أعطى قراءه اقل من ٤.

المجموعات التي عذبت علي مستوى ٢٠% أوراق كسافا استهلكت كمية اكبر من المادة الجافة والبروتين الخام والطاقة الممتلة في فترة الادلرر مقارنة بالمجموعتين التين غذيتا علي (٥% و ٣٠%).

عندما عبر عن كمية المادة الجافة المستهلكة كنسبة من الوزن الحي وجدان المجموعتين (٢٠% و ٣٠%) استهلكتا كحمية اكبر من المادة الجافة مقارنة بالمجموعة التي عذبت علي العليقة القياسية.

أشارت نتائج الدراسة إلي أن المجموعات التي غذيت علي ٢٠% أوراق كسافا أعطت متوسط إنتاج لبن يومي وكلى أكثر معنويا (أ > ٠.٠٥) من المجموعتين الأخيرتين .

كما وجد أن المجموعة التي غذيت علي ٣٠% أوراق كسافا كانت أكثر مثابرة (٠.٨٩).

من تلك التي غذيت علي ٢٠% أوراق كسافا (٠.٤٩) والتي غذيت علي العليقة القياسية (٠.٤٣) ، كما أنها وصلت إلى قمة انتاجها في نهاية الأسبوع الثالث (٣.٧) بينما تلك التي غذيت علي ٢٠% كسافا وصلت إلى خمس انتاجها في بداية الأسبوع الثالث (٣.١) المجموعة التي أعطيت علبت عليقة قياسية وصلت إلى خمسة انتاجها في نهاية الأسبوع الثاني (١.٩).

لم تؤثر مستويات لوراق الكسافا علي أي من مكونات اللبن الكيميائية والدهن - البروتين - المواد الصلبة الكلية - المواد الصلبة الادهنية والرماد).

لو حظ أن مجموعة الماعز التي غذيت علي ٣٠% كسافا قد إلى اكتسبت وزن (٠.٥كلم) خلال فترة الإدرار بينما تلك التي غذيت علي ٥% و ٢٠% فقدتا جزء من أوزانها(٣.٣ و ٢كلم) علي التوالي .

استخدمت نفس هذه المستويات (٥% و ٢٠% و ٣٠%) مثل ٤ أسابيع من غابة الحمل لمعرفة اثر هذه المستويات علي بعض الخواص الإنتاجية خلال هذه الفترة. أو ضحت النتائج أن المجموعة التي غذيت علي ٢٠% كسافا أستهلكت كمية اكبر من المادة الجافة والبروتين الخام والطاقة المتمثلة وكان معدل الزيادة اليومي في الوزن اعلي (٢٢٥ جرام/يوم) مقارنة بالمجموعتين الأخريتين (١٥٠ و ١٠٠ جرام/يوم) كسافا علي التوالي. واستنتج أن مستوى ٢٠% كسافا أعطى أداء أفضل من باقي المستويات. كما لوحظ أنه ليس لأوراق الكسافا اي اثر طار على صحة الماعز هذا الفترة.

لم تؤثر مستويات الكسافا معنويا ($0.05 > P$) علي وزن السخلان عند الولادة ، ولوحظ أن المجموعة التي غذيت علي ٣٠% كسافا أعطت سخلان أثقل بقليل من سخلان المجموعتين الأخريتين.

تم اختيار ١٣ سخلا ولدت للمجموعة السابقة لدراسة اثر هزة المستويات (٠ ، ٢٠ ، ٣٠%) علي أداء السخلان في مرحلة بعد الفطام (٨ أسابيع بعد الفطام) أوضحت النتائج أن المستويات الثلاث لم تؤثر معنويا علي وزن السخلان عند الفطام. بالرغم من أن مجموعة السخلان التي غذيت علي المجموعة القياسية (٠% كسافا) قد استهلكت كميته اكبر من المادة الجافة والبروتين الخام والطاقة الممثلة، إلى أن السخلان في المجموعة التي غذيت علي ٣٠% أوراق كسافا كان لها اعلي معدل كسب يومي (٤٥.٣ جرام) مقارنة بالمجموعة القياسية (٢٤.٥ جرام) والمجموعة التي غذيت علي ٢٠% أوراق كسافا (٣٢.٥ جرام) ، خلال الفترة ٨ أسابيع بعد الفطام.

خلصت التجربة علي انه يمكن إدخال أوراق نبات الكسافا إلى علايق الماعز النوبي السوداني حتى ٣٠% بأمان دون التأثير علي الخواص الإنتاجية ومكونات اللبن. استخدام مستوى ٢٠% أوراق كسافا أعطى اثر أفضل علي الأداء الانتاجي للماعز في مرحلة الإدرار والأسابيع الأخيرة من الحمل ، بينما مستوى ٣٠% أوراق كسافا أوضح إمكانية إطالة مدة حفظ اللبن الخام عند تغذية الماعز الحلوب بهذا المستوى.

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