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# FEEDING FODDER BEET FOR GROWING BUFFALO CALVES

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## ABSTRACT

Twelve growing buffalo calves with an average weight of 121.7 Kg were divided randomly into three similar groups (four animals each). Each group was assigned randomly to one of the following three dietary treatments : Control ration C {70% concentrate feed mixture CFM+30% rice straw), fodder beet ration, FB {52.5% CFM+17.5 fodder beet+30% rice straw} and fodder beet silage ration , FBS {52.5% CFM+17.5 fodder beet silage +30% rice straw) on DM basis. The experiment was extended for 90 days.

The results showed that animals received fodder beet ration (FB) recorded the highest values of all nutrients digestibility followed by fodder beet silage ration (FBS) treated animals. FB treated group had significant ($P<0.05$) increases in OMD, CPD and NFED, while FBS treated group had the highest values in CFD ($P<0.05$). FBS group had the lowest value of ruminal pH followed by FB group then the control group. FB group recorded the highest TVFA's value at 4hr post feeding (11.91 Meq/100ml.) followed by FBS group (11.84 Meq/100ml.) then control group (10.13 Meq/100ml.) . FB and FBS groups had none significantly higher TN values than control group whereas, fodder beet treatments decreased ruminal NPN and NH3-N compare with control group. Results also, indicated that fodder beet groups (FB and FBS) recorded the highest ($P<0.05$) values of ruminal true protein nitrogen (TPN) concentration (53.2 and 51.5 Mg/100ml) compared to control group (44.9 mg/100ml).

Blood serum parameters of FB treated group had highest values of serum TP, Albumin, A /G ratio and glucose, then FBS group had higher values of serum TP, Albumin, A /G ratio and glucose than those of control, however, a significantly ($P<0.05$) higher values was detected for only the serum Albumin and A /G ratio. The treatment with fodder beet either fresh or silage did not affect the serum transaminase enzymes concentration in growing buffalo calves. Calves fed FB ration recorded the highest value ($p<.05$) of daily gain (0.708 kg) followed by calves fed FBS ration (0.679 kg), and then control group (0.632 kg). Fodder beet treated group showed more efficient feed conversion values of DM and CP (7.37 kg and 814.5 gm / kg LBW, respectively), followed by fodder beet silage treated animals (7.66 kg and 835.8 gm / kg LBW, resp.) then, control group (8.23kg and 973.1 gm / kg LBW, resp.).

**Keywords:** Fodder beet, silage, digestibility, rumen parameters, blood parameters, performance, buffalo calves.

## INTRODUCTION

In Egypt there is a great shortage in ruminant feeds particularly in the summer and early autumn. Meantime, the common concentrate production is not quite enough and become very expensive. So, feeding fresh fodder beet roots (FB) or ensilage of FBR, as a method of conservation, may contribute in solving some of these problems. Fodder beet roots could be recommended as one of the highest producing forage in loamy and reclamation areas and it was found to be a good source of energy for animal feeding ( Rammah *et al.*, 1984). Fodder beet plant is not sensitive and can tolerate the unfavorable conditions of reclaimed soils such as saline, alkaline calcareous and sandy lands in addition to high water irrigation salinity (Abou-Deya 1991).

One of the advantages of use FB as forage crop that it is a high yielding crop in terms of DM, TDN, and DM and the root has a high ME content . Also it can be considered as a low-input crop utilizing farm resources in comparison with other forage crops. Moreover, it is well known that silage are normally cheaper per unit of SV than concentrates, consequently, feeding fresh fodder beet roots or ensilage reduce the costs of animal protein and allow the country to save part of the land to raise more wheat in winter and more corn or rice in summer (Abd El-Sattar and Nour 1997).

The objective of this study was to investigate the effects of replacing a significant proportion of concentrate feeds mixture with either fresh or silage of fodder beet on growing buffalo calves performance, nutrients digestibility, some blood biochemical parameters, feed conversion and economical efficiency.

## MATERIALS AND METHODS

This study was carried out at the experimental station of the Milk Replacer , (MRRC) and laboratory of Animal Nutrition, Animal Production department , Faculty of Agriculture , Ain Shams University, Shoubra El-Kheima. Twelve growing buffalo calves, with an average weight of 121.7 Kg were divided randomly according to their live body weight into three similar groups (four animals each).Calves were individually fed according to NRC (1984).

**Experimental rations.** The rations were composed of concentrate feed mixture (CFM) and Rice straw. The intended ratio of concentrate to roughage was 70:30 on DM basis. The roughage part of the ration was similar for all treatments and the concentrate part was different between the three treatments Table (1). The chemical composition of the main rations ingredients in the experimental, on DM basis are tabulated in Table (2) and the chemical composition of the experimental rations are shown in Table ( 3).

**Table (1): Percentages of the different ingredients of the Experimental ration ( % on DM basis ).**

| Items | Control Ration (C ) | Tested Ration 1 (FB) | Tested Ration 2 (FBS) |
|---|---|---|---|
| Concentrate feed mixture % | 70.00 | 52.50 | 52.50 |
| Rice straw % | 30.00 | 30.00 | 30.00 |
| Fodder beet (FB) % | 0.00 | 17.50 | 0.00 |
| Fodder beet silage (FBS)% | 0.00 | 0.00 | 17.50 |

Fodder beet roots silage was prepared after harvesting by removing beet tops. The roots were wilted for one week then during ensiling fodder beet roots, they were chopped using fodder beet chopping machine, mixed with bean straw and rice straw by the rate of 150 kg/ton fodder beet roots and ensiled as described by Mahmoud *et al.,* (1992). After 40 days the silo was opened, color and odor were examined and samples were taken for chemical analysis before feeding. The experiment was extended for 90 days.

Table (2): Chemical composition of the different ingredients in the experimental ration.

| | Nutritional nutrients % ( % on DM basis | | | | | | |
|---|---|---|---|---|---|---|---|
| Items | DM | OM | CP | CF | EE | NFE | ASH |
| Concentrate feed mixture* | 90.6 | 87.3 | 13.9 | 13.8 | 2.9 | 56.7 | 12.7 |
| Rice straw | 89.9 | 84.17 | 3.37 | 36.8 | 1.1 | 42.9 | 15.83 |
| Fresh Fodder beet roots(FB) | 13.3 | 89.7 | 10.1 | 8.9 | 1.9 | 68.8 | 10.3 |
| Fodder beet silage (FBS) | 22.7 | 89.3 | 8.9 | 16.1 | 1.6 | 62.7 | 10.7 |

* CFM consisted of 25 % undecorticated cottonseed meal , 35 % corn , 25 % wheat bran 4 % rice bran , 5 % rice hulls , and 3 % molasses . 2 % limestone and 1% salt .

Table (3): Chemical composition of the experimental rations .

| Items | OM | CP | CF | EE | NFE | ASH |
|---|---|---|---|---|---|---|
| Control ration (C ) | 86.4 | 10.7 | 20.8 | 2.36 | 52.56 | 13.6 |
| Tested Ration 1(FB ) | 86.8 | 10.0 | 19.84 | 2.19 | 54.77 | 13.2 |
| Tested ration2(FBS) | 86.7 | 9.87 | 21.1 | 2.14 | 53.59 | 13.3 |

**Digestibility trials.**

Three animals from each experimental treatment were used in a digestibility trial after one month of the beginning of the experiment. A grap sample method (Forbes and Garrigus ,1948) was used and acid insoluble ash was applied for determining nutrients digestibility as a natural or internal marker (Van Keulen and Young, 1977 ) . Faeces grap samples were collected handily at 10.0 am. for five successive days from each animal . The dried feces samples from each animal were mixed and saved for chemical analysis.

**Rumen fluid sampling.**

Three animals from each group (the same animals of the digestibility trial ) were used to obtain the rumen fluid after two months from the beginning of the experiment at 0 and 4 hr. of the morning feeding. About 200 ml of ruminal fluid was collected from each animal by aspiration through a stomach tube. The ruminal fluid was strained through four layers of cheese cloth, pH was measured immediately by digital pH-meter, and two ml tolliween and 2ml paraffin oil were added to each sample and then stored at –20°C till analysis.

**Blood samples**

were taken from the same three animals of the digestibility trial at the same day of the beginning of the digestibility trial before morning feeding from the jugular vein and left 3 hr at room temperature to coagulate, then centrifuged at 4000 r.p.m. for 15 minutes, then blood serum was separated and stored at - 18 C for chemical analysis.

**Methods of analysis**

The concentrate feed mixture, fresh fodder beet , silage of fodder beet , rice straw and feces samples were analyzed according to A.O.A.C., (1995) methods.

**Rumen fluid :**

PH values were determined by using electronic digital pH meter , concentration of ammonia was determined by applying Conway method (1957), total nitrogen and non-protein nitrogen were determined by the

modified semi-microkjeldahl digestion method according to A.O.A.C. (1995), true-protein nitrogen was calculated by subtracting the non-protein nitrogen content from total nitrogen content and ruminal total volatile fatty acids were determined by steam distillation as described by Warner (1964).

**Biochemical analysis of blood serum.**

Total protein was determined as described by Armstrong and Carr (1964). Albumin was determined as described by Doumas *et al.*, (1971). Globulin was calculated by subtraction, and A/G ratio was calculated by dividing .Urea was determined by the method of Curtius and Marce (1972). Glucose was determined calorimetrically according to the method of Siest et al., (1981). Serum transaminases (GPT) activity and (GOT) were determined calorimetrically according to the method of Reitman and Frankel (1957).

**Statistical analysis:**

The data were analyzed according to statistical analysis system SAS (1998) and Duncan (1955). The following model was used to describe the data of rumen parameters.

$$Yijk = u + Ri + eik + Pj + (RP)ij + eijk,$$ where

Ri = is the effect due to tested ration i. Pj = is the effect due to time j.

While the data of digestibility trials blood parameters ADG and FC used the following model

$$Yij = u + Ri + eij$$ Ri = is the effect due to tested ration i.

## RESULTS AND DISCUSSION

The data presented in (Table 4) clearly indicate that animals received fresh fodder beet ration (FB) recorded the highest values in DM ,OM , CP , EE and NFE digestibility followed by fodder beet silage ration (FBS) treated animals. FB treated group had significant ($P<0.05$) increase in OMD, CPD and NFED, while FBS treated group had the highest values in CFD($P<0.05$ ). Consequently, fodder beet ration had the highest TDN value (62.97%) followed by fodder beet silage ration (61.92%) then the control ration (59.14 % ) . Gabra et al. (1992) revealed that the replacing of concentrates by fodder beet silage significantly increased all nutrients digestibility. Mahmoud et al. (1992) reported that the feeding of fodder beet roots silage for lactating cows increased all nutrients digestibility. FB exhibited more efficiency for increasing nutrients digestibility. This might be due to that fodder beet ration (FB) had the highest values of NFE and the lowest CF value. During ensiling fodder beet silage contained an amount of poor quality roughages such as bean straw or rice straw to be mixed with the ensiled roots to reduce its humidity. That might affect nutrients digestibility of silage to be lower than FB. On the contrary, FBS had higher value of CF % . Several investigators showed an improvement in CF digestibility due to ensiling due to its positive effect on hemicelluloses digestibility (Gabra *et al.*, 1987 and Dewar *et al.*, 1989) .

It may be of interest to note that the incorporation of fodder beet roots in the tested rations serves three purposes.(a) it reduces the fiber content compared with control (b) improves digestion coefficients and nutritive value (and c) provides more readily available energy which improves protein utilization ( Mahmoud *et al.*, 1992 and Bendary *et al.*,1993 ).Also, Salewski(1991) reported that fodder beet is highly digestible and energy-rich

forage. Its nutritive and physiological effects are similar in part to those of concentrates. In ruminant rations, especially hay or grass silage-based diets, sugars slowly released by rumen fermentation activate microorganisms that degrade organic matter in preserved grass. Digestibility of the total diet is thereby increased, increasing transit time and stimulating feed intake.

**Table (4): Effect of tested rations on nutrients digestibility of growing buffalo calves.**

| Items | Treatments | | | |
|---|---|---|---|---|
| Digest % | Control (C) | T1 (FB) | T2 (FBS) | ± SE |
| DM | 62.6 | 65.1 | 63.9 | 1.12 |
| OM | 65.3 b | 70.6 a | 68.1 ab | 1.03 |
| CP | 66.1 b | 72.3 a | 70.3 b | 0.63 |
| CF | 51.9 b | 53.6 ab | 54.9 a | 1.31 |
| EE | 68.7 | 70.3 | 69.9 | 1.36 |
| NFE | 71.6 b | 76.1 a | 74.8 ab | 0.86 |
| **TDN** | **59.14** | **62.97** | **61.92** | |
| **DP** | **7.07** | **7.25** | **6.87** | |

**a,b,c Means per each row per each item are different (P<0.05).**

Results of Table (5) clearly showed nearly similar values of pH for control and FB group , while FBS group showed lowest pH value at zero hr. At 4hr post feeding, FB and FBS groups had almost similar lower values of pH than control group. In all treatments, values of pH significantly decreased (P<0.05) at 4hr post feeding than at zero hr. The reduction in pH may be a reflection of the significant increase in lactic acid production and increase TVFA's concentration in the rumen. This assumption is in agreement with the conclusion of Roddy and Roddy (1985) who stated that the pH values were inversely related to TVFA's concentration in the rumen.

Regarding to TVFA's concentration the presented data (Table 5) indicated that FBS and FB groups had slightly higher TVFA's values at zero hr (8. 62 and 8.53 ) than control group (8.46 Meq/100ml ) while FB group recorded the highest TVFA's value at 4hr post feeding (11.91 Meq/100ml.) followed by FBS group (11.84 Meq/100ml.) then control group ( 10.13 Meq/100ml.). These increases with FB and FBS treatments might be due to that the inclusion of fodder beet to buffalo calves diet increase available carbohydrate to the rumen bacteria and improve energy and protein supply consequently enhance microbial protein synthesis. Zitnan (1993) concluded that the highest level of rumen fermentation (Rumen volatile fatty acid concentration (VFA) and propionate was highest) occurred in fattening calves replaced half of the energy from barley in its diet by fodder beet .Feeding fodder beet increased ME intake and tended to decrease the ratio lipogenic / glucogenic VFA, by increased propionate and butyrate at the expense of acetate (Eriksson 2003).

Results concerning total nitrogen (TN) and its fractions ($NH_3$, NPN & TPN) (Table 5) indicated that FB and FBS groups had slightly higher TN values than control group (89 and 88.6 vs 84.7 Mg/100ml.) however , the differences between them was not significantly, whereas, fodder beet treatments decreased NPN compared with control group (35.9 and 37.2 vs 39.8 Mg/100ml.) and decreased NH3-N (17.2 and 17.2 vs 18.4 Mg/100ml) for

FB and FBS groups compare with control group. Results also, indicated that fodder beet groups (FB and FBS) recorded the highest (P<0.05) values of true protein nitrogen (TPN) concentration (53.2 and 51.5 Mg/100ml) compared to control group (44.9 Mg/100ml). The beneficial effects of these results might be attributed to increased content of including protein in the microbial mass by the aid of the high-energy content and high nutritive value of fodder beet (TDN) which led to a reduction in $NH_3$ loss via rumen wall and to enhance microbial protein synthesis which consequently increased ruminal TN and TPN concentration .These increases with FB treatment might be due to the increases in digestible protein amount available for animals fed FB ration. The mechanisms of this effect may indeed lie in a rumen microbial response to the feeding of fodder beet by improving protein synthesis and the quantity of microbial protein and undegraded dietary protein passing into the small intestine (Fisher *et al.*,1994).Also, Eriksson et al.(2004) concluded that the capacity of fodder beets to facilitate faster microbial growth than barley/oats grain will be exploited.

**Table (5):Effect of tested rations on rumen parameters of growing Buffalo calves.**

| Rations | | pH | TVFA | TN | NPN | TPN | NH3-N |
|---|---|---|---|---|---|---|---|
| | | | Meq/100ml. | mg/100ml. | | | |
| C | 0h | 6.9 | 8.46 | 72.7 | 33.9 | 38.8 | 14.8 |
| | 4h | 6.51 | 10.13 | 96.7 | 45.6 | 51.1 | 21.9 |
| Overall m. | | **6.71** | **9.3** | **84.7** | **39.8** | **44.9** b | **18.4** |
| FB | 0h | 6.88 | 8.53 | 74.3 | 30.6 | 43.7 | 14.7 |
| | 4h | 6.39 | 11.91 | 103.7 | 41.1 | 62.6 | 19.6 |
| Overall m. | | **6.64** | **10.22** | **89** | **35.9** | **53.2** a | **17.2** |
| FBS | 0h | 6.8 | 8. 62 | 75.1 | 31.1 | 44.0 | 13.9 |
| | 4h | 6.41 | 11.84 | 102.2 | 43.3 | 58.9 | 20.4 |
| Overall m. | | **6.61** | **10.23** | **88.6** | **37.2** | **51.5** a | **17.2** |
| SE | | ±0.03 | ±0.16 | ±0.96 | ±0.64 | ±0.76 | ±0.46 |
| | **0 hr** | **6.86 a** | **8.54 b** | **74 b** | **31.87 b** | **42.17 b** | **14.47 b** |
| | **4 hr** | **6.44 b** | **11.29 a** | **100.9 a** | **43.33 a** | **57.53 a** | **20.63 a** |
| SE | | ±0.02 | ±0.15 | ±0.75 | ±0.55 | ±0.64 | ±0.38 |

**a,b,c Means per each row per each item are different (P<0.05).**

Regarding to the sampling time , in general, data indicated that values of TVFA's, TN, $NH_3$, NPN and TPN significantly increased (P<0.05) at 4hr post feeding than at zero hr .

Data of blood serum parameters (Table 6) showed that FB treated group had highest values of serum TP, Albumin and A /G ratio , then FBS group had higher values of serum TP, albumin and A /G ratio than those of control , however , a significantly (P<0.05) higher values were detected for only the serum Albumin and A /G ratio ,. These results might be due to the higher digestible protein and high energy intake for fodder beet and fodder beet silage treated animals than control group consequently , due to the higher microbial protein synthesis which increased ruminal TPN concentration, which led to more absorbed amino acids . Alert et al.(1994) investigated protein and amino acids flow in the digestive tract from various carbohydrate sources using 2 bulls ( from 285-398 and 285-408 kg ), fitted with duodenal

re-entrant cannulae, and they were given 10 diets containing 60% concentrates . they concluded that amino acid synthesis was highest when cattle were given fodder beet or sugar beet pulp and lowest in dried sugar beet pulp.

Regarding the effect of feeding fodder beet on serum glucose, FB treatment achieved the highest (p>0.05) value, followed by FBS treatment then the control group. This increase in serum glucose might be due to the higher NFE content, low fiber content and to the parallel increase in nutrients digestibility and TDN of the rations containing FB or FBS. This may be led to an increase in propionic acid production and thus increased glucose synthesis. Feeding fodder beet increased ME intake and tended to decrease the ratio lipogenic / glucogenic VFA, by increased propionate and butyrate at the expense of acetate (Eriksson, 2003). In the present study, the treatment with fodder beet either fresh or silage did not affect the transaminase enzymes concentration in growing buffalo calves.

**Table (6): Overall mean of blood serum constituents in tested buffalo calves.**

| Items | Treatments | | | |
|---|---|---|---|---|
| | Control (C) | T1 (FB) | T2 (FBS) | + SE |
| total protein (gm / 100 ml) | 6.73 | 6.97 | 6.76 | 0.09 |
| Albumin (gm / 100 ml) | 3.52 b | 3.87 a | 3.76 a | 0.06 |
| Globulin (gm / 100 ml) | 3.21 | 3.1 | 3.00 | 0.075 |
| A / G ratio | 1.10 b | 1.25 a | 1. 25 a | 0.031 |
| Glucose(mg / 100 ml) | 61.6 | 64.2 | 63.90 | 0.89 |
| GPT(units/ 100ml). | 26 | 25.10 | 27.90 | 0.82 |
| GOT(units/ 100 ml). | 118.50 | 116.3 | 121.90 | 1.8 |

**a,b,c Means per each row per each item are different (P<0.05).**

**Animal performance:**

Experimental animal performance expressed as DM1, CPI, absolute gain, average daily gain , Feed conversion and economic efficiency are shown in Table (7). Recording highest value of absolute and daily gain, FB ranked the first (63.72 and 0.708 kg) (p<.05) followed by FBS (61.11 and 0.679 kg). The lowest values were recorded for control group (56.88 and 0.632 kg). These results are in harmony with those of O'-Kiely and Moloney (1990). They concluded that whole crop fodder beet silage and its effluent have a high nutritive value for finishing cattle and increased daily weight gain from 0.91 to1.17. Also, Zitnan(1993) reported that fattening calves replaced half of the energy from barley in its diet by fodder beet had higher daily gain (973 gm) compared with control (untreated calves) (885gm) . Moreover, O'-Kiely and Moloney( 1999) showed that feeding Friesian steers whole-crop fodder beet ( WCFB) silage increased live weight gain from 761 to 983 (P<0.01) g daily. These increases in the absolute gain and average daily gain with fodder beet treatments may be attributed to results previously obtained in digestibility trials (Table 4) which showed that all nutrients were more digested with fodder beet treatments Consequently, fodder beet ration had the highest TDN value (62.97%) followed by fodder beet silage ration (61.92%) then the control ration (59.14 % ) (Table 4). Also, FB and FBS

treatments which showed the beneficial effects of rumen parameters especially values of rumenal true protein nitrogen (TPN) that recorded the highest (P<0.05)) concentration (53.2 and 51.5 mg/100ml) with FB and FBS treatments compared to control group (44.9 mg/100ml) (Table 5). Moreover, they had the same trend with the results previously obtained of serum albumin and A/G ratio (Table 6 ).

**Feed conversion.** Feed conversion (FC) is expressed as amount of DM fed (kilograms or CP grams) to produce one-kilogram live body weight (Table 7).Data clearly indicate that fodder beet treated group showed more efficient feed conversion values of DM and CP ( 7.37 kg and 814.5 gm / kg LBW , respectively) , followed by fodder beet silage treated animals which had more improvement in DM and CP efficient values (7.66 kg and 835.8 gm / kg LBW , respectively) than control group (8.23kg and 973.1 gm / kg LBW , respectively).

**Table (7): Effect of tested rations on performance of growing Buffalo calves.**

| Item | Control (C) | T1 (FB) | T2 {FBS} |
|---|---|---|---|
| Duration days | 90 | 90 | 90 |
| No of animals | 4 | 4 | 4 |
| Initial Wt (kg). | 122 | 119 | 124 |
| Final Wt (kg).. | 178.9 | 182.72 | 185.11 |
| Abs. Gain(kg).. | 56.88 b | 63.72 a | 61.11 ab |
| Daily gain (kg).. | 0.632 b | 0.708 a | 0.679 ab |
| DMI (Kg) | 5.2 | 5.22 | 5.2 |
| CPI (gm) | 615 | 576.7 | 567.5 |
| Feed conversion | | | |
| DMI (Kg)/ (Kg)gain | 8.23 | 7.37 | 7.66 |
| CPI (gm)/ (Kg)gain | 973.1 | 814.5 | 835.8 |
| Cost of total feed consumed ( LE) | 671.4 | 559.8 | 559.8 |
| Price of Total gain (LE) | 853.2 | 955.8 | 916.65 |
| Net revenue, L.E | 181.8 | 396 | 356.9 |
| Relative revenue % | 27.1 % | 71 % | 63.7 % |

The cost of feeding was estimated according to the market prices, during period of experiment . The prices were: concentrate feed mixture 1600 (L.E.) / ton , fodder beet roots 80 (L.E.)/ ton , fodder beet silage 140 (L.E.) / ton and rice straw 150 (L.E.) / ton. The common price of one-kilogram live body weight of finishing buffalo calves was 15 (L.E.).

It could be concluded that replacing 25 % of concentrate feed mixture with fodder beet in the ration of growing Buffalo calves improved DM conversion by 11.7 % and CP conversion by 19.5 % compared to control group. Whereas feeding fodder beet silage recorded more efficient values of DM conversion by 7.4 % and CP conversion by 16.4 % compared to control animals .

These improvement resulted from replacing CFM by either feeding fodder beet or fodder beet silage might be attributed to their effect on live body weight gain although they consumed approximately the same quantity of DM and lower quantity of CP(576.7 and 567.5 gm) for calves group fed FB

and FBS , respectively compared to control group (615 gm) .Also ,due to their positive effects on the digestibility and metabolism of buffalo calves which led to an improvement in efficiency of feed utilization .Fodder beet treatment recorded the highest live body weight gain (63.72 kg) and the lowest feed cost (559.8 L.E ) followed by fodder beet silage treated animals, (61.11 kg LBWG ) and the same lowest feed cost (559.8 L.E) , while , the control group recorded the lowest live body weight gain (56.88kg) and the highest feed cost (671.4 L.E ).Consequently, fodder beet group had the highest net revenue and relative revenue % (396 L.E and 71 %) followed by fodder beet silage ration (356.9 L.E and 63.7 %) then the control ration (181.8 L.E and 27.1 %) .

It could be concluded that replacing 25 % of concentrate feed mixture with fodder beet in the ration of growing Buffalo calves improved the performance of growing buffalo calves , improved feed conversion, increased average daily gain,reduced Cost of feed consumed, consequently, increased the net revenue.

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# تغذية بنجر العلف للعجول الجاموسى النامية

**أحمد ممدوح منصور**
**قسم الإنتاج الحيواني – كلية الزراعة-جامعة عين شمس.**

أجريت هذه التجربة في محطة التجارب الزراعية بالقناطر الخيرية بالنسبة لزراعة وكافة العمليات الزراعية وحصاد محصول بنجر العلف وبعد ذلك أجريت الدراسة بقسم الإنتاج الحيواني و مركز أبحاث بديلات الألبان التابع لكلية الزراعة-جامعة عين شمس. وتهدف تلك الدراسة إلى معرفة أثر الاستبدال الجزئي لمخلوط العلف المركز عند مستوى٢٥ % (على أساس المادة الجافة DM ) وذلك من عليقه العجول الجاموسى النامية) ببنجر العلف الطازج أو سيلاج بنجر العلف على الأداء الإنتاجي -حيث قسمت الحيوانات إلى ثلاث مجموعات الأولى غذيت على بنجر العلف طازجا بينما قدم للأخرى سيلاج بنجر العلف وغذيت المجموعة الأخيرة على العليقة المقارنة ( Control). أستخدم في هذه الدراسة 12 عجل جاموسى بمتوسط وزن ١٢١ كجم تم تقسيمها إلى ثلاث مجموعات متشابهة ثم وزعت عليها المعاملات عشوائيا واستغرقت الدراسة ثلاثه أشهر بينما تم سحب عينات الدم بعد شهر من بداية التجربة وذلك لتقدير المكونات الكيماوية المختلفة لسيرم الدم . وتم إجراء تجربة هضم مزرعية باستخدام طريقة grape sample وتم جمع عينات من سائل الكرش قبل تناول الوجبة الصباحية مباشرة و بعد مرور ٤ ساعات من تناول الوجبة الصباحية

**أظهرت النتائج:**

أن مجموعة البنجر الطازج أعطت أعلى زيادة في معاملات هضم المادة الجافة و المادة العضوية والبروتين الخام ومستخلص الإثير والكربوهيدرات الذائبة و كانت ا لزيادة معنوية في معاملات هضم المادة العضوية والبروتين الخام. والكربوهيدرات الذائبة .وكذلك ارتفعت معاملات هضم المادة الجافة و المادة العضوية والبروتين الخام ومستخلص الإثير والكربوهيدرات الذائبة لعليقة مجموعة السيلاج عن مجموعة المقارنة و التي أعطت أقل قيم لمعاملات الهضم السابقه. وتميزت مجموعة السيلاج في أنها أعطت أعلى زيادة معنوية في معامل هضم الألياف الخام

– **مقاييس الكرش:** أنخفض تركيز ايون الأيدروجين في مجموعة البنجر الطازج و مجموعة سيلاج ا لبنجر عن مجموعة المقارنة . و أرتفع تركيز الأحماض الدهنية الطيارة بمجموعتى البنجر الطازج و مجموعة سيلاج ا لبنجر عن مجموعة المقارنة.أنخفض تركيز الأمونيا و تركيز المواد الأزوتية غير البروتينية بمجموعتى البنجر الطازج و مجموعة سيلاج ا لبنجر عن مجموعة المقارنة وكانت الاختلافات غير معنوية .و ارتفع تركيز النيتروجين الكلى بمجموعتى البنجر الطازج و مجموعة سيلاج ا لبنجر عن مجموعة المقارنة وكانت الاختلافات غير معنوية بينما ارتفاع تركيز نتروجين البروتين الحقيقى بمجموعتى البنجر الطازج و مجموعة سيلاج ا لبنجر عن مجموعة المقارنة و كان الارتفاع معنويا .

**سيرم الدم** – سجلت مجموعة البنجر الطازج أعلى قيمة غير معنوية في جلوكوز سيرم الدم و في البروتين الكلى و كانت الزيادة معنوية فى الألبيومين ونسبه الألبيومين: الجلوبيولين وتلتها في الزيادة مجموعة السيلاج لكل من الجلوكوز و البروتين الكلى و كانت الزيادة معنوية فى الألبيومين و ونسبة الأ لبيومين : الجلوبيولين. أما مجموعة المقارنة فقد أعطت أقل قيم لكل من الجلوكوز و البروتين الكلى والألبيومين ونسبة الألبيومين : الجلوبيولين. و لم تتأثر قيم الأ نزيمات الناقلة لمجموعة الأمين ( GOT , GPT,) بالمعاملات الغذائية.

زاد معدل النمو اليومى معنويا بمجموعة البنجر الطازج ( ٧٠٨ جم ) و غير معنوي لمجموعة سيلاج ا لبنجر ( ٦٧٩ جم ) عن مجموعة المقارنة (٦٣٢ جم ) .و أظهرت ا لمجموعة المغذاة على البنجر الطازج أعلى زيادة معنوية في كفاءه تحويل الغذاء من مادة جافه ، البروتين الكلى) يليها المجموعة المغذاة على السيلاج عن مجموعة المقارنة . سجلت ا لمجموعة المغذاة على البنجر الطازج أعلى زيادة معنوية في الكفاءة إلا قتصادية يليها المجموعة المغذاة على السيلاج) عن مجموعة المقارنة .