IMPACT OF FEEDING SUGAR BEET PULP SUPPLEMENTED WITH UREA OR TREATED WITH *TRICHODERMA HARZIANUM*ON LACTATING BUFFALOES PERFORMANCE

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SUMMARY

Nine multiparous lactating buffaloes with average body weight of 604±35 kg were served in this experiment after two weeks from parturition. They were assigned into three equal groups each of three buffaloes. These three groups were fed three tested rations in a Latin square design (3×3). The three experimental rations were; T_1 (concentrate feed mixture that contained 15% wheat straw, as total mixed ration, TMR, control ration), T_2(60% TMR+40% sugar beet pulp(SBP) supplemented with 2% urea) and T_3(60% TMR+40% SBP treated with Trichoderma H.). Results indicated that treatment 2 (T_2) increased the dry matter, organic matter and crude fiber digestibility's 4.14, 4.65 and 3.61% above T_1, while the increment levels were 9.13, 9.28 and 20.89% for T_3 above T_1. The total digestible nutrients of the tested rations were 60.54, 66.12 and 67.92 for T_1, T_2 and T_3, respectively. Differences were significant ($P<0.01$). Milk yields (7% fat corrected milk, 7%FCM) were 11.07, 11.19 and 13.55 kg/ head/ day when T_1, T_2 and T_3 respectively were fed. The difference between T_3 and either T_1 or T_2 was significant ($P<0.01$). Milk fat and protein % were increased significantly ($P<0.01$) when feeding T_3 than feeding T_1 or T_2. Milk fat % was 7.52, 7.25 and 8.41While; milk protein % was 4.15, 4.31 and 4.97 when T_1, T_2 and T_3 were fed respectively. The efficiency of kg 7% FCM / kg DMI was enhanced ($P<0.01$) by feeding on T_2 or T_3 than feeding on T_1. Plasma cholesterol and triglyceride concentrations were significantly ($P<0.01$) decreased with feeding on T_2 or T_3 than feeding T_1. It is concluded that feeding on 40% SBP rations supplemented was 2% urea or treated with fungi (Trichoderma H.) were beneficial. Treatment of SBP with fungi and its inclusion in lactating buffaloes ration at 40% level was the most effective treatment.

Keywords: Sugar Beet Pulp, TRICHODERMA HARZIANUM, Urea, Digestibility, FeedingValue, Blood Metabolites, Milk production and composition, Buffaloes

INTRODUCTION

Sugar beet pulp (SBP) has long been recognized as a valuable animal feed. Wet exhausted pulp typically contains from 6% to 12% dry substance. It may be sold in this case or dried to 87–92%dry matter and pelleted (Sergey,2016). The tabulated feeding value expressed as total digestible nutrients (TDN) is 72%.It is high in digestible energy about 94% of corn energy value. The cell wall contents expressed as acid detergent fiber (ADF) is 31% while, the nitrogen content as crude protein (CP) is low 9.1%, (Greg Lardy, 2016).Enriching the N content of SBP by urea supplementation in amount as 2% just before feeding, the CP content became 14.4% and the digestibility of CP was 66.24 % when lambs fed 100% USBP (Khaliel, 2009).There are many means to enhance the digestibility of fiber fractions of plant cell wall; one of these is microbiological treatment. Some strains of fungi *Trichoderma Harzianum* (*T.H.*) possess the character of secreting enzymes that degrade cellulose or cell wall constituents in general (Aly *et al*., 2012).

Buffalo's milk is preferred by the Egyptian consumers due to its high fat content, white color and its flavor. However, milk yield per lactating buffalo is still low;itis in the range of 4-10 kg/day (Hagos and Mokhtar, 2015). Feeding lactating buffaloes with SBP either as it is or after 2% urea supplementation or after microbiological treatment in amount as 40% of the whole ration may help in increasing the productivity of our lactating buffaloes.The aim of the present work wasto investigate the effect of SBP supplemented with urea or treated with *T. H.* fungion the performance of lactating buffaloes.

MATERIALS AND METHODS

Experimental design and rations formulation:

The experimental work of the present study was carried out in the farm of Animal Production Department, Faculty of Agriculture, Minia University. Nine lactating multiparous buffaloes of 604 ± 35 kg average initial body weight were applied in a Latin squire (3×3) experimental design. Buffaloes were assigned in three equal groups. Each treatment was offered to 9 buffaloesafter two weeks from parturition for 33 days, in three successive periods each of 33 days(28 days for adaptation and 5 days for milk, feces and blood samplescollection)**.**

As shown in (Table, 1) three treatments (T_1, T_2, and T_3) were formulated containing 0%SBP (the control), 40% ureated sugar beet pulp (2%USBP) and 40% sugar beet pulp treated with fungi (SBP*T. H.*), respectively. Rations were formulated to meet 110 % of the buffaloes (*Bubalus bubalis*)Metabolisable energy (ME) and metabolisable protein (MP) requirements for maintenance and productionaccording to AFRC (1993) recommendations for dairy cattle plus 10% as safety margin. Milk yield, and composition, body weight change, feed efficiency, digestibility and some blood metabolites were studied.Sugar beet pulp (SBP) was obtained from the Sugar and Integrated Industries Company in Abo korkas, Minia Governorate.

Table 1. Components of rations used in this experiment

Ingredients %	Treatments		
	T1 (control)	**T2(USBP)**	**T3 (SBP*T. H.*)**
Wheat bran (WB)	45	27	27
Yellow Corn (YC)	21.5	12.9	12.9
Soy bean meal (SBM)	15	9	9
Wheat straw (WS)	15	9	9
Dry yeast meal (YM)	0.5	0.3	0.3
Lime stone ($CACO_3$)	2	1.2	1.2
Sodi. chloride (Na CL)	0.7	0.42	0.42
Mineral & vit. Mix.*	0.3	0.18	0.18
2% USBP	0	39.2 SBP (40)0.8 urea	0
SBPT. h. with M.	0	0	40
Total (%)	**100**	**100**	**100**

*Mineral and vitamin mixture was added as 3Kg/ ton of feed. Each 3kg contain Calcium Phosphate (Dibasic Calcium, 14gm), Phosphorus (11gm), Magnesium (60 g), Iron (30 mg), Manganese (40 mg), Copper (4 mg), Zinc (50 mg), Iodine (0.3 g), Cobalt (100 mg), Selenium (100 mg), Vit. A(10 M. IU), Vit. D3 (2 M. IU), Vit. E(10g), Vit. K (1 g), vit B1 (1g), Vit B2 (5g), Vit B6 (1.5g), Vit B12 (10mg), biotin (50 mg), folic acid (1g) and Ca carbonate as carrier up to 3kg. produced by United Breather Company,Egypt for dairy cattle.

Preparation of tested sugar beet pulp:

Preparation of sugar beet pulp supplemented with 2% urea (2% USBP):

Sugar beet pulp was supplemented with 2% urea to perform (2%USBP). It was included in the tested ration in amount that represents 40% of the TMR. The required amount of urea (2% of the SBP W/W) were dissolved in suitable amount of water (3liter) and mixed thoroughly with the SBP to insure complete distribution of urea, just before feeding.

Preparation of SBP treated withfungi (Trichoderma Harzianum.):

Ten Plastic barrels each of 100-liter capacity were used. The amount of 17.5 kg of SBPplus35 kg of water nourished with minerals media (350 gm. urea, 262 gm ammonium sulphate, 17.5 gm live dry yeast (*Saccharomyces Cerevisiae*) and 87.5 gm. magnesium sulphate) were mixed. 3.5 Liter liquid mediainoculated with *T. Harzianum* fungi culture 5 days old were added and mixed. The incubation period of the mixture was 7 days under room temperature and non-sterile conditions. At the end of the fermentation period it was evacuated and spreaded in a thin layer for sun drying (Sherien, 2005 and Abd El-Maged, 2006).

Feeding and management:

Buffaloes were housed in a shaded yard for individual feeding. Fresh water was available along the experiment. Buffaloes wereindividually fed at 9 am and 6 pmwhile, they were hand milked twice daily at 9.15 am and 6.15 pm. The feed residuals were weighed and the amounts consumed were calculated. Buffaloes were weighed at the beginning and at the end of each period before access to feed. The mean dry matter intake (DMI) in the last week of each period was considered in the calculation of digestibility and feeding value of the experimental rations.

Sampling and laboratory analysis:

Through the collection of period fecal samples from the rectum of each animal were taken in days 29, 31 and 33 at 10 am and 7 pm. Composite sample for each animal in each period was performed. Samples were kept in deep freezer till the end of each period. Samples were dried to a constant weight at 65^{o}C, grind and kept in tightly tied glass jars for each animal when fed each treatment, separately. Acid insoluble ash (AIA) as an internal marker was used for digestibility coefficient calculations according to (Van keulen and young, 1977). The feed and feces samples were analyzed according to A.O.A.C. (2006). Cell wall fractions were determined as VanSoest *et al.* (1991). The nutritive values as total digestible nutrients (TDN), digestible crude protein (DCP) and metabolizable energy (ME) of the experimental rations were calculated.

Milk yield was recorded daily and milk samples,10 ml / kg milk produced from morning and afternoon milking of each animal, were collected on day by day of each animal in the collection period and analyzed for total solids, protein, fat and ash percentage by using high Speed Milk Analyzer (MILKOSCOPE, Model: Julie C8 Automatic) after calibration.

Blood Samples Collection:

Heparinized blood samples were collected fromthe jugular vein of each buffalo in two tubes at the end of each period at 10 am after hand milking once in a period (10 ml/ animal/ tube). The first tube was used for measuring hematological parameters, while, the second was centrifuged at 5000 r.p.m for 10 minutes to separate plasma. Plasma samples were harvested and stored at -20 ^{o}C till analysis. Whole blood samples were analysed shortly after collection ofhemoglobin (Hb, gm/dl), packed cell volume (PCV, %), white blood cell counts (WBC's $\times10^3$/mm^3) and red blood cell counts (RBC's $\times10^6$ /mm^3). The Hb concentration was determined using cyanomethemoglbin method (Drabkin and David, 1946). The PCV was determined using microhematocrite tubes with a microhematocrite centrifuge at 12000 r.p.m for three minutes. Total WBC's and RBC's were counted using the double improved Neubauer chamber as described by Daice and Lewis (1991).Plasma triiodothyronine (T_3) and thyroxin (T_4) ng /ml were determined by a direct solid-phase I_{125} radioimmunoassay techniques using commercial kits (Coat-A-count TKT3 and TKT4) at the laboratory of atomic energy authority radioisotopes department central LAB. Glucose (mg/dl), cholesterol (mg/dl), triglycerides (mg/dl), urea (mg/dl) and albumin (g/dl) were determined using commercial kits according to the Trinder (1969), Tietz and Saunders (1995), Ellefson and Caraway (1976), Stein (1987) and Tietz and Saunders, (1990), respectively. Total protein (g/dl), AST and ALT (IU/L) were determined using commercial kits according to Tietz (1994) and Young (1990), respectively. All these determinations were done at the laboratory of Animal Production Department Faculty of Agriculture Minia University using T80 UV-Spectrophotometer 2014 (UK).

Statistical analysis:

Statistical analysis was performed by application the least squares procedure described in SAS. (2003) using the following model:

$$\mathbf{Y_{ijk} = \mu + T_i + R_j + C_k + E_{ijk}}$$

Where, μ = The overall mean; T_i= The fixed effect of treatments (i = 1, 2 and 3); R_j= The fixed effect of rows (periods, j = 1, 2 and 3); C_k = The fixed effect of Columns (animals, **k** = 1, 2 and 3) and E_{ijk}= The experimental error (**0** and δ^2). Factors under investigation were assumed to be fixed except the error term which was assumed to be random and normally distributed (**0** and δ^2). Significance subclass means were detected using Duncan's test (1955).

Costs of ingredients in the rations fed to lactating buffaloes:

The price of each feed ingredient (L.E) on one ton basis was, sugar beet pulp (3000), soybean meal (9000), wheat bran (4100), yellow corn (5400), wheat straw (1200), lime stone (150), sodium chloride (500), urea (3400), premix (6000), K_2 So_4 (3000), $(NH_4)_2$ So_4 (4000), Live dry yeast (9000) and dry yeast (3000). The price of one kg fat corrected milk (FCM) was8 L.E. The price of each ration fed (L.E) on one-ton basis were 4635.5 for control ration (T1), 3981.3 for ration (T2) and 4041.3 for ration (T3).

RESULTS

Nutritional analysis of rations offered to lactating buffaloes:

The DM content of the tested rations ranged from 91.17 to 93.27%. The lowest value was for T3, while the highest value of DM was for T2. On dry matter basis the OM was 91.73 % (T1), 93.06% (T2) and 91.75% (T3). The CP content ranged from 16.03 to 18.00%. The highest concentration of CP was for T3, while the lowest concentration was for T1. Treatment T3 showed a reduction in crude fiber content (CF, 17.5%) while, (T2) had the highest concentration of CF (19.53%).

Table 2. Nutritional analysis of the tested rations offered to lactating buffaloes

Items	Treatments		
	(T1, control)	(T2, USBP)	(T3, SBP*T. H.*)
DM	93.05	93.27	91.17
	On 100% DM basis.		
OM	91.73	93.06	91.75
CP	16.03	16.11	18.00
CF	18.00	19.53	17.50
EE	6.02	4.00	4.25
NFE	51.68	53.42	52.00
NDF	44.04	51.35	42.03
ADF	25.18	27.00	24.15
ADL	5.50	5.71	5.10
Cell	19.68	21.29	19.05
H-Cell	18.86	24.35	17.88
Ash	8.27	6.94	8.25

DM= Dry matter. **OM**= Organic matter. **CP**= Crude protein. **CF**= Crude fiber. **EE**= Ether extract. **NFE**= Nitrogen free extract. **NDF**= Neutral detergent fiber. **ADF**= Acid detergent fiber. **ADL**= Acid detergent lignin.
Cell= cellulose. **H-Cell** = hemicellulose.

The highest value of EE content was 6.02 % for T1, while the lowest concentration was 4.00 % for T2. The NFE concentrations were 51.68, 53.42 and 52.0% for T1, T2 and T3, respectively. The concentrations of NDF, ADF and ADL % were the lowest in T3 than T1 and T2. The figures were 44.08, 51.35 and 42.03% for NDF, 25.18, 27.00 and 24.15% for ADF and 5.50, 5.71 and 5.10% for ADL in T1, T2 and T3, respectively. Concentrations of cellulose and hemicellulose were also the lowest in T3 than other treatments. The values were 19.68, 21.29 and 19.05% for cellulose and 18.90, 24.35 and 17.88% for hemicellulose in T1, T2 and T3, successively.

Digestibility coefficients and feeding value of tested rations:

Data presented in Table (3) illustrated that DM and OM digestibility coefficients were significantly (P< 0.01) increased by 9.13 and 4.79% for DM, 9.27 and 4.42% for OM when T3 was compared with feeding T_1 and T_2, respectively. Also, the values of DM and OM digestibility were significantly (P<0.01) increased by 4.14 and 4.65%, respectively when buffaloes fed T2 was compared with feeding T1. The values of DM digestibility coefficients were 62.54, 65.13 and 68.25 % for T1, T2 and T3, respectively, while OM digestibilitycoefficients were 65.22, 68.25 and 71.27% for buffaloes fed T1, T2 and T3, respectively.

As shown in Table (3), the CP digestibility coefficient was significantly (P < 0.01) affected by 2% USBP or SBP*T. H.*treatment. The values were 78.62 for T2 and 76.68 for T3 vs. 71.54% for T1. The increments were 9.89 and 7.18 % for T2 and T3 above T1, respectively. In the same trend, CP digestibility coefficient was significantly (P<0.01) greater by 2.53% when buffaloes fed T2 as compared with feeding T3.

Table 3. Digestibility coefficients and feeding value of the experimental rations

Nutrients	Treatments			± S.E	Sig.
	T1	T2	T3		
	Control	2%USBP	SBP*T.H.*		
DM	62.54^{c}	65.13^{b}	68.25^{a}	0.225	**
OM	65.22^{c}	68.25^{b}	71.27^{a}	0.280	**
CP	71.54^{c}	78.62^{a}	76.68^{b}	0.313	**
EE	65.92^{c}	68.07^{b}	69.29^{a}	0.278	**
CF	59.06^{c}	61.19^{b}	71.40^{a}	0.256	**
NDF	52.86^{c}	63.44^{b}	66.04^{a}	0.214	**
ADF	50.95^{b}	51.13^{b}	57.81^{a}	0.213	**
ADL.	10.01^{b}	10.30^{b}	15.83^{a}	0.216	**
Hemicellulose	58.82^{c}	60.50^{b}	68.54^{a}	0.249	**
Cellulose.	55.67^{c}	57.69^{b}	61.63^{a}	0.293	**
NFE	58.39^{c}	66.76^{b}	68.19^{a}	0.254	**
DCP	10.94^{c}	12.08^{b}	13.27^{a}	0.049	**
DCF	10.63^{c}	11.95^{a}	12.50^{b}	0.050	**
TDN[1]	60.54^{c}	66.12^{b}	67.92^{a}	0.137	**
NR[2]	1:4.53^{a}	1:4.48^{a}	1:4.12^{b}	0.023	**
DE (MJ/kg DM) [3]	11.17^{c}	12.20^{b}	12.53^{a}	0.025	**
ME (MJ/kg DM) [4]	9.40^{c}	10.45 ^{b}	10.77^{a}	0.025	**

Means in the same row with different superscripts a, b and c are significantly different. ** (P<0.01). DM= Dry matter. OM= Organic matter. CP= Crude protein. CF= Crude fiber. EE= Ether extract. NFE= Nitrogen free extract. NDF= Neutral detergent fiber. ADF= Acid detergent fiber .ADL= Acid detergent lignin. Cell= cellulose. H-Cell = hemicellulose. 1=TDN = DCP + (DEE ×2.25) + DCF + DNFE.
2= NR = DCP / (TDN-DCP). 3- DE = Digestible energy (MJ / kg DM) = {(0.04409 × TDN %) × 4.185}. (Mc Donald *et al*. (2010). 4- ME = Metabolisable energy (MJ / kg DM) =(-0.45+1.01 DE,NRC, 2001)x4.185

The values of EE and CF digestibility coefficients were significantly (P< 0.01) greater by 5.11 and 3.26 % for EE and 20.89 and 3.61 % for CF when buffaloes fed T3 or T2 were compared with feeding T1 the control ration, respectively. Also, values of EE and CF digestibility coefficients were significantly (P< 0.01) higher (1.79%) for EE and (16.68%) for CF when buffaloes fed T3 was compared with feeding T2. Digestibility ofEE were 65.92, 68.07 and 69.29 % for T1, T2 and T3, respectively while the CF digestibility were 59.06, 61.19 and 71.40% for lactating buffaloes fed treatments T1, T2 and T3, respectively (Table 3).

The NDF digestibility values (Table 3) were 63.44 and 66.04 % for T2 and T3, respectively vs. 52.86 % for T1. The results revealed that feeding rations contained 2% USBP or SBP*T. H.* had significant (P<0.01) effect on NDF digestibility. It was increased by 20.02 and 24.93 % for T2 and T3 as compared with T1, respectively. Also, NDF digestibility was significantly (P<0.01) improved by 4.10% when lactating buffaloes fed T3 was compared with feeding T2.

The values of ADF digestibility were 57.81 in T3 vs. 50.95 in T1 and 51.13 in T2. It was significantly (P<0.01) affected by SBP*T.H.* treatment. It was enhanced by 13.46 and 13.06 % for T3 when compared with T1 and T2, respectively. Also, the values for ADL were 15.83 in T3 vs. 10.01 in T1 and 10.30 % in T2. It was significantly (P<0.01) affected by SBP*T. H.* treatment. It was raised by 58.24 and 53.67% for T3 compared with T1 and T2, respectively.

Hemicellulose digestibility coefficient was significantly (P<0.01) greater for buffaloes fed rations T2 (60.50%) and T3 (68.54%) when compared with T1 (58.82 %), respectively. Such value was calculated to be greater by 2.86 and 16.52 % for feeding T2 or T3 as compared with feeding T1, successively. The difference between T2 and T3 was significantly (P< 0.01) greater by 13.29 % for T3 above T2.

Cellulose digestibility coefficients were 55.67, 57.69 and 61.63 % when buffaloes fed in the order T1, T2 or T3, respectively. The differences for T2 and T3 were significantly (P<0.01) greater by 3.63 and 10.71 % as compared with T1, respectively. In addition, the difference between T3 and T2 was significant (P<0.01). Feeding ration contained SBP*T. H*. increased the cellulose digestibility coefficient value by 6.83% when compared with feeding T2 (Table 3)

The values of NFE digestibility were significantly (P<0.01) increased by 14.33 and 16.78 % when lactating buffaloes fed T2 or T3 instead of feeding (T1) the control ration, respectively. Values of NFE digestibility were 58.39, 66.76 and 68.19 % for T1, T2 and T3, respectively. Even the increment in T3 above T2 was 2.14% (Table, 3), but it was significant (P< 0.01).

The digestible crude protein (DCP %) values were significantly (P< 0.01) greater by 10.42 and 21.30 % when buffaloes were fed rations contained 2% USBP (T2) or SBP*T.H.* (T3) than (T1). The values were in the order 12.08 and 13.27 vs. 10.94 %. The DCP was significantly (P< 0.01) increased by 9.85% for buffaloes fed T3 compared to T2.

The values of digestible crude fiber (DCF %) were significantly (P<0.01) greater by 12.42 and 17.59 % when buffaloes fed T2 or T3were compared with T1 (Table, 3). The difference when buffaloes fed T2was significantly (P<0.01) less than feeding T3 by 4.4%.

The TDNvalues on DM basis were 60.54, 66.12 and 67.92 % for treatments T1, T2 and T3, respectively. It was significantly (P< 0.01) increased by 9.22 and 12.19 % when buffaloes fed treatments T2 or T3 as compared with T1, respectively. Also, the TDN value was significantly (P< 0.01) higher by 2.72% for T3 vs. T2, (Table 3).

The nutritive ratio of T1, T2 and T3 were in the order 1:4.53, 1:4.48 and 1:4.12. There were significant differences (P<0.01) among treatments. The best value was recorded when T3 was fed (1:4.12). It was better than feeding both T1 by (10%) or feeding T2 by (8.52%).

The digestible energy (DE) and metabolizable energy (ME) values were significantly (P<0.01) greater by 12.18 and 2.70 % for DE and 14.57 and 3.06% for ME when T3 was compared with (T1) or (T2), respectively. Values of DE were 11.17, 12.20 and 12.53 MJ/kg DM while, the values of ME were 9.40, 10.45 and 10.77MJ/kg DM for treatments T1, T2 and T3, respectively.The values of DEandME for T2 were significantly (P< 0.01) greater than T1 by 9.22 % and 11.17%respectively.

Milk yield and its composition:

The actual milk yield (MY) was 10.50, 10.90 and 11.81 kg/h/d when T1, T2 and T3 was fed respectively (Table, 4). The results showed that the milk yield of T3 significantly (P<0.05) increased by 12.48 and 8.34% compared toT1 and T2 respectively.

The yields of 7% FCM were significantly (P<0.01) higher for T3 (13.55 kg/h/d) than T1 (11.07 kg/d) and T2 (11.19 kg/d). These increases were calculated to be 22.40 and 21.09 % for T3 compared with T1 and T2, respectively.

The calculated efficiency of kg 7% FCM produced per kg DMI was enhanced significantly (P<0.01) by T2 (0.76 kg FCM / kg DMI) and T3 (0.89 kg / kg TDMI) compared with T1 (0.66 kg / kg DMI), respectively. Also, the efficiency increased significantly (P<0.01) in T3 compared toT2.

The values of energy corrected milk (ECM, kg/h/d) were 16.92, 17.34 and 21.04 kg/d for T1, T2 and T3, respectively. It wassignificantly (P<0.01) increased by 24.35% and 21.34 %for (T3) as compared with T1 or T2 respectively.

Milk energy (MJ/kg milk) was 4.68, 4.61 and 5.17(MJ/ kg milk) in T1, T2 or T3 (Table, 4). Significant differences (P<0.01) were found as T3 was compared with both T1 and T2. The increments attained were higher for T3 than T1 or T2 by 27.70 and 25.24% respectively.

Milk fat (%) was significantly (P<0.01) enhanced by feeding T3.The enhancement value was 11.84 and 16.00 % for T3 compared with T1 and T2, respectively. The values were 7.52, 7.25 and 8.41 for T1, T2 and T3 respectively (Table 4). It is noticed that T2insignificantly reduced milk fat concentration by 3.59% compared with T1. In the same trend, T3 significantly (P<0.01) increased the milk protein (%) by 19.76 and 15.31 compared with T1 and T2. The values were in the order 4.77% (T3) *vs*. 4.15% (T1) and 4.31% (T2).Feeding T2 increased the milk protein concentration by 3.86% than T1.

Milk lactose was significantly (P<0.01) greater by 10.17 and 17.55% for buffaloes fed T2 as compared with T1and T3. The concentrations were 4.62, 5.09 and 4.33 forT1, T2 and T3, respectively. It is clear that feeding T3 significantly (P<0.01) reduced the milk lactose concentration by 6.28% than T1(Table 4).

Total solids concentrations were significantly (P<0.01) greater for T3 (18.6%) than T1 (17.51%) and T2 (17.45%). Such values were found to be greater by 6.23 and 6.59 % for lactating buffaloes fed T3 in comparison with feeding T1 or T2, respectively (Table 4).

Solids corrected milk (SCM) values were significantly (P<0.01) greater for buffaloes fed T3 (20.52 kg) than feeding T1 (16.61 kg) or T2 (17.03 kg), respectively. Such values were found to be greater by 23.54 and 20.49 % for T3 in comparison with T1 and T2, respectively.

Yield of milk fat was significantly (P< 0.01) higher for buffaloes fed T3 (992.87g/h/d) than T1 (789.59 g/h/d) and T2 (790.59 g/h/d). These increases were calculated to be 25.75 and 25.59 % for T3 above T1 and T2, respectively. The milk protein yield was increased significantly (P< 0.01) by 32.27 and 21.99 % for T3 when compared with T1and T2, respectively.Although the difference between T1 and T2was 8.43% no significant difference was observed. The values were 435.49, 472.19 and 563.34 g/h/d when T1, T2 and T3, were successively fed.

Significant difference (P<0.05) was found in milk lactose yield among the tested rations. The averages were 485.94, 554.65 and 510.95 g/h/d for T1, T2 and T3, respectively. It is greater when T2 was fed by 14.14% for T1 and by 8.55% for T3.

Table 4. Milk yield and it's composition of lactating buffaloes fed the tested rations

Items	**Treatments**			**± S.E.**	**Sig.**
	T1	**T2**	**T3**		
Milk Yield (kg/h/d)	10.50^b	10.90^b	11.81^a	**0.33**	*
7% FCM[1]	11.07^b	11.19^b	13.55^a	**0.39**	**
7% FCM/ TDMI, (kg/h/d)	0.66^c	0.76^b	0.89^a	**0.02**	**
ECM (kg/d)[2]	16.92^b	17.34^b	21.04^a	**0.60**	**
ME production. (MJ/kg M)[3]	4.68^b	4.61^b	5.17^a	**0.15**	**
Milk composition, %					
Fat%	7.52^b	7.25^b	8.41^a	**0.12**	**
Protein%	4.15^b	4.31^b	4.77^a	**0.09**	**
Lactose%	4.62^b	5.09^a	4.33^c	**0.10**	**
Ash%	1.22^a	0.91^b	0.89^b	**0.08**	**
Total solids%	17.51^b	17.45^b	18.6^a	**0.11**	**
Solid not Fat%	9.99	10.20	10.19	**0.15**	**N.S**
SCM (solid corrected milk)[4]	16.61^b	17.03^b	20.52^a	**0.55**	**
Yield of milk constituents (g/d)					
Fat (g/ h/d)	789.59^b	790.59^b	992.87^a	**29.5**	**
Protein (g/h/ d)	435.49^b	472.19^b	563.34^a	**20.2**	**
Lactose (g/h/ d)	485.94^b	554.65^a	510.95^b	**18.5**	*

** Significant difference at (P<0.01), * Significance different at (P<0.05). Means in the same row with different superscripts a, b, and c are significantly different. 1- 7%FCM = {(0.265 × milk yield)+ (10.5 × fat yield)}according to Raafat and Saleh, (1962). 2-ECM (Energy corrected milk) = (0.327 × milk yield + 12.86 × fat yield + 7.65 × protein yield) according to Dairy Records Management Systems, (2013).3-Milk Energy (MJ/kg) ={(0.0929 × fat %) + (0.0547× protein %) + 0.192),NRC, (2001) ×4.185}. 4- SCM (solid correct milk, kg/h/d) = (12.82 × milk fat yield) + (7.13 × milk protein yield) + (0.323 × milk production) according to Tyrrell and Reid(1965).

Average body weight, dry matter intake, TDN and feed efficiency:

Data presented in Table (5) showed the effect of feeding T1, T2 and T3 rations on body weight.The average body weight change (A.B.W.C) of nine dairy buffaloes from the beginning and at the end of feeding each treatment was 8.3, 6.1 and 4.5 kg for T1, T2 and T3, respectively. It was insignificantly affected by treatments.

Table 5. Average body weight, dry matter, TDN, ME intake and feed conversion efficiency

Items	**Treatments**			**± S. E**	**Sig.**
	T1	**T2**	**T3**		
IBW, kg	598.3	601.6	602.7	18.86	N.S
FBW, kg	606.6	607.7	607.2	19.04	N.S
A.B.W.C, kg [1]	8.3	6.1	4.5	2.00	N.S
DMI (kg/d) [2]	16.70^a	14.79^b	15.23^b	0.196	**
DMI/B.W % [3]	2.79^a	2.46^b	2.55^b	0.062	**
TDNI, (kg/d) [4]	10.12^{ab}	9.78^b	10.34^a	0.134	**
EFCTM (kg F/kg M)[5]	1.59^a	1.37^b	1.33^b	0.040	**
EFPCTMP [6]	6.20^a	5.15^b	4.81^c	0.204	**
M.E.I (MJ/h/d) [7]	156.98^b	154.55^b	164.02^a	2.425	*

** Significant difference at (P<0.01), * Significance different at (P<0.05). Means in the same row with different superscripts a, b, and c are significantly different 1- Average body weight changes. 2- Total dry mater intake. 3- Total dry mater intake / body weight%. 4- Total digestible nutrients intake = (TDN%* TDMI)/100. 5-Efficiency of feed conversion into milk = (DMI / Milk Yield). 6- Efficiency of feed protein conversion into milk protein = (DMI * CP% in the ration/ Milk Protein Yield). 7-Metabolisable energy intake = (ME * DMI).

The values of DMI were 16.70, 14.79 and 15.23 kg/h/day for lactating buffaloes fed treatments T1, T2 and T3, respectively. There were significant (P<0.01) differences among T1 and both T2 and T3. No significant difference was found between T2 and T3. The depression in DMI was 11.44% and 8.8% when T2 and T3 were fed compared with T1 (Table,5).The values of TDNI were 10.12, 9.78 and 10.34 kg/h/d for treatments T1, T2 and T3, respectively. The TDNI values were significantly (P<0.01) differed between T2 and T3 the difference achieve 5.73%level. No significant difference was noticed between T1 and either T2 or T3.

Theefficiency of feed conversion into milk was 1.59, 1.37 and 1.33 for T1, T2 and T3, respectively. The EFCTM values were significantly (P<0.01) improved when T2 or T3 were fed compared with T1. While, insignificant difference was found between T2 and T3.

Efficiency of feed protein conversion into milk protein (EFPCTMP) kg feed protein / kg milk protein showed that there were significant (P<0.01) differences among treatments (Table 5). The efficiency was improved by 22.42 and 16.93 % as rations T3 or T2 were fed in comparison with T1. Also, feeding T3 improved the efficiency of feed protein conversion to milk protein by 6.6% compared with T2. The values were 6.20, 5.15 and 4.81 for T1, T2 and T3, respectively.

Blood hematological and biochemical parameters:

Hemoglobin (Hb) concentrations were significantly (P< 0.01) increased by (13.57%) when (T3) was fed in comparison with T1 and by (7.49%) when T2 was fed. Also, significant (P<0.01) difference was found in Hb concentration whenT2 was fed as compared with T1.The increment was 5.66% for T2 above T1(Table,6).

There was no significant difference among treatments in packed cells volume % (PCV). The values were 35.11, 35.66 and 35.44% for T1, T2and T3, successively.White blood cell counts (WBC's) were not significantly affected by treatments. The counts were 8.12, 8.08 and 8.09×10^3 /mm^3 while, red blood cell counts (RBC's) were significantly (P<0.05) differed for buffaloes fed T2 or T3 than T1. No significant difference in total protein concentrations (TP, g/dl) of blood plasma and its fractions [Albumin (AL, g/dl) and Globulin (GL, g/dl)] were found among treatments. The values were 7.70, 7.56 and 7.87 for total protein, 3.65, 3.53 and 3.63 for albumin and 4.05, 4.03 and 4.24 for globulin(g/dl)for T1, T2 and T3, respectively. The ratio of A/G was 0.86, 0.88 and 0.90 when T1, T2 and T3 were fedn (Table, 7).

Table 6. Blood hematological parameters

Items	Treatments			±SE	Sig
	T1	T2	T3		
	Control	2%USBP	*SBPT.H*		
Hb (g/dl)	14.66^c	15.49^b	16.65^a	0.280	**
PCV %	35.11	35.66	35.44	0.435	NS
WBC's (x 10^3/ mm^3)	8.12	8.08	8.09	0.134	NS
RBC's (x 10^6 /mm^3)	7.03^b	7.54^a	7.63^a	0.117	*

Means in the same row with different superscripts a, b and c are significantly different. NS: not significant,* (P< 0.05) and ** (P < 0.01).

Table 7. Blood plasma biochemical parameters

Items	Treatments			±SE	Sig
	T1	T2	T3		
Total protein (g/dl)	7.70	7.56	7.87	0.13	**NS**
Albumin (g/dl)	3.65	3.53	3.63	0.10	**NS**
Globulin (g/dl)	4.05	4.03	4.24	0.11	**NS**
A / G ratio	0.86	0.88	0.90	0.04	**NS**
Glucose (mg/dl)	96.68^b	101.86^a	86.41^c	1.46	**
Urea (mg/dl)	26.21^c	31.41^a	28.92^b	0.36	**
Cholesterol (mg/dl)	74.55^a	43.09^c	54.94^b	0.73	**
Triglycerides (mg/dl)	37.24^a	34.83^c	35.99^b	0.20	**

Means in the same row with different superscripts a, b and c are significantly different. NS: not significant, * (P< 0.05) and ** (P < 0.01).

Plasma glucose concentrations were significantly (P<0.01) increased by 5.36 and 17.88% when buffaloes fed (T2) was compared with T1 and T3, respectively. Also, significant difference was found in blood plasma glucose concentrations whenT1 was fed compared with T3. The values of glucose concentrations were 96.68, 101.86 and 86.41 mg/dl for T1, T2 and T3, respectively. Also, the results indicated that significant (P< 0.01) increase was detected in blood plasma urea concentrations by 19.84 and 8.61% when buffaloes were fed (T2) compared with T1 and T3,respectively. Blood urea concentration when buffaloes were fed T3 was significantly higher (P<0.01), than T1. The difference level was 10.34%(Table, 7).

Plasma cholesterol and triglycerides (TG)concentrations were significantly decreased (P<0.01) for T2 or T3 compared with T1. The depression in cholesterol concentrations was 42.20 and 26.30% for T2 and T3 compared with T1. The depression was 21.57% for T2 compared with T3. The concentrations of plasma cholesterol were 74.55, 43.09 and 54.94 mg/dl for T1, T2 and T3, respectively.

Plasma triglycerides (TG) concentrations were 37.24, 34.83 and 35.99(mg/dl)for T1, T2 and T3, consecutively. The differences were significant (P<0.01) among treatments. The depression level approach 6.47 and 3.36% for T2 andT3 compared with T1. The decrease in TG concentration for T2 compared with T3 is 3.22%.

Liver enzymes (AST and ALT, U/ l) and hormones (T_3 and T_4 ng/ml) concentrations in blood of lactating buffaloes fed the tested rations:

Plasma concentrations of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) do not significantly differed among the tested rations. The values were 43.56, 40.42 and 43.42 (U/l) and 10.96, 12.20 and 11.84 (U/ l) for AST and ALT for T1, T2 and T3, respectively (Table 8).

Table 8. Liver enzymes and thyroid hormones concentrations of lactating Buffaloes fed the tested rations

Items	Treatments			±SE	Sig
	T1	**T2**	**T3**		
AST (U/ l)	43.56	40.42	43.42	1.42	NS
ALT (U/ l)	10.96	12.20	11.84	0.31	NS
T_3 (ng/ml)	1.13^a	1.09^{ab}	1.03^b	0.03	**
T_4 (ng/ml)	36.58^a	34.92^b	33.96^b	0.34	**
T_4 / T_3 ratio	32.46	32.38	32.91	0.87	NS

Means in the same row with different superscriptsa and b are significantly different. NS: No significant, ** significant (P<0.01).

Significant (P<0.01)decrease in plasma T_3 level (Triiodothyronine, ng/ml) was detected for T3compared with T1. The highest value was shown for T1 (1.13) while the lowest value was observed for T3 (1.03) as shown in Table (8).The values of T_3 were significantly (P< 0.01) higher 3.67 and 9.71% for T1 compared with feeding (T2) and (T3), respectively. While, values of plasma T_4(Thyroxin, ng/ml) were 36.58, 34.92 and 33.96 for T1, T2 and T3, respectively. The values of T_4 were significantly (P< 0.01) higher 4.75 and 7.71% T1 compared with (T2) and (T3), respectively. The (T_4/ T_3 ratio) was not significantly differed among treatments. It ranged from 32.38 to 32.91.

Economic Feature:

The feeding costs were 34.36, 23.97 and 25.28 L.E/h/day for lactating buffaloes fed T1, T2 and T3, respectively. It wassignificantly (P<0.01) decreased by 30.24 and 26.43% for T2 and T3 were fed in comparison with T1. The highest selling price of milk (L.E/h/ day) was 67.77 for T3 ,while the lowest value was 55.37 (L.E/h/day) T1. Significant (P<0.01) difference was found between T_3 and either T_1 orT_2 .The daily feed return (DFR) was 21.01, 31.98 and 42.49 L.E/h/day for T_1, T_2 and T_3, respectively. The DFR was increased by 52.21% for T2 in comparison with T1. In addition, T_3 was the best and attained greater DFR by 102.24 % compared with T1. The feed cost for one kg 7% Fat corrected milk was 3.10, 2.14 and 1.86 L.E for T1, T2 and T3, respectively. It was decreased by 40% for T3 in comparison with T1. Meanwhile, it wasdecreased by 30.97% for T2 as compared with T1. The highest superiority value calculated as DFR of the tested ration /DFR of the control ration was (202.22%), was recorded for T3. The superiority values of T2 above T1 was 152.19 considering the value for T1 equal 100 (Table, 9).

Table 9. Economical feature of the tested rations fed to lactating buffaloes

Items	Tested rations			± S.E	Sig
	T1	T2	T3		
DMI (kg/h/d)[1]	16.71	14.79	15.23	**0.19**	**
Price of kg F., LE[2]	4.64	3.98	4.04		
TFC (h/d., L.E)[3]	77.53^a	58.86^c	61.53^b	**0.34**	**
Milk yield (kg/h/d)	10.50^b	10.90^b	11.81^a	**0.33**	*
7% FCM (kg/h/d)	11.07^b	11.19^b	13.55^a	**0.39**	**
Price of kg (7%FCM)	8.0	8.0	8.0		
P.S.M. (h/d., L.E)[4]	88.56^b	89.52^b	108.4^a	**1.95**	**
D.F.R. (L.E)[5]	11.03^c	30.66^b	46.87^a	**1.85**	**
F. C. of kg FCM (L.E)[6]	7.00	5.26	4.54		
%Superiority (D.F.R)	100%	277.96%	424.93%		

** Significant different at (P<0.01). * Significant different at (P<0.05). Means in the same row with different superscripts a, b and c are significantly.**1-DMI =** dry matter intake, **2-P. of kg F. =** price of one kg feed**, 3-T.F.C= Total Feed Cost, 4-P.S.M. =** Price of selling milk**, 5-DFR (**Daily feed return) = Selling price of 7%FCM produced - Feeding cost. **6-F.C.of kg FCM** = Feeding cost per one kg 7% FCM.

The selling price of one Kg 7% Fat correct milk was 8 L.E. The price of one kg feed for control ration (T1), (T2) and (T3) was 4.64, 3.98 and 4.04 L.E/kg feed.

DISCUSSION

Variations in nutrients composition of SBP used in the different treatments could be explained in view of fungi treatment and urea supplementation (Table, 2).The nutritional composition of these experimental rations was comparable to each other. But it should be cleared that T3 was the highest in CP (18%), while it was the lowest in cell wall constituents (CF, NDF, ADF, ADL, cellulose and hemicellulose contents, Table 2).

The improvement attained in the feeding value due to urea supplementation or fungus treatment is true as the digestibility coefficients of all nutrients were significantly (P<0.01) improved for T2 or T3 compared with T1 (Table 3). Therefore, the feeding value expressed as TDN, DCP, DCF, DE MJ/kg DM and metabolizable energy (ME MJ/kg DM) were significantly (P<0.01) enhanced. These results are in agreement with (Khattab *et al.,* 2010, Ebeid, 2012 and Talha *et al*., 2005). These improvements in TDN values diluted the diminishing effect of treatments on DMI and not only minimizing the variance but also increased the figure of TDN intake (TDNI, Table 5).

Upon these findings, the milk yield expressed as actual (kg/h/d) or 7% fat corrected milk (7% FCM) was raised up. Accordingly, the efficiency of feed conversion to milk (kg feed/kg milk) being positively and significantly (P<0.01) enhanced. Moreover, the efficiency of feed protein conversion to milk protein was also positively and significantly (P<0.01) being better for T3 or T2 compared with T1 (the control ration), and an advantage was found for feeding T3 compared with T2. This result could be explained as the TDNI was greater and protein intake (PI kg/h/d) followed the same trend.The low figure of TDNI for T2 could be easily explained as the DMI was 11.44% below T1, while the TDN values for T2 was greater by 9.22%, however the difference in TDNI between T1 and T2 was not significant. Above all of these the digestible crude protein (DCP %) of T3 was 13.27% while the value for T2 was 11.95%, the differences was significant (P<0.01, Table 3). These lead to greater protein in milk and greater yield of milk protein (Table, 4). In this respect it should be remained in mind that the CP content of T3 was 11.73% greater than T2 (18.00 vs. 16.11% respectively). These results are in agreement with Talha *et al*. (2005), when they replaced 40 and 60% of lactating buffalo's dietary corn grain with SBP. The TDN values were in the range of 70.85 to 72.16% with no significant differences, while the highest value was for 40% replacement level. Milk yield ranged from 9.23 to 10.45 kg/d, milk protein % ranged from 4.04 to 4.16%. Significant differences were recorded in these characters. They recorded the efficiency of feed conversion to milk (kg feed/ kg milk) as 1.77, 1.51 and 1.56 for 0, 40 and 60% replacement dietary corn by SBP. They concluded that better efficient feed conversion ratio was for 40% replacement level. El-Ashry *et al.* (2000) replaced 0, 25 and 50% of the concentrate feed mixture with SBP in the ration of lactating buffaloes. They found that 50% replacement level rations gave the highest 4% fat corrected milk (12.11kg/day), milk fat % was increased from 6.23 to 7.10, while the milk protein% was increased too from 3.96 to 4.12. They recorded the feed conversion efficiency (kg feed/ hg milk) values as 1.91, 1.94 and 1.95 for their three 0, 25 and 50% replacement level studied.

It should not be forgotten that in the study reported herein the solid corrected milk (kg/h/d) was positively and significantly (P<0.01) increased T3 (Table 4). This means that animals utilize this ration more efficiently through digestion, absorption, assimilation , milk synthesis and secreting processes. Our results were in accordance with (Mohamed and Hala 2008).They concluded that the fungal treatment was beneficial for feeding lactating buffaloes.

Feeding lactating buffaloes on T2 or T3 significantly (P<0.01) decreased the total dry matter intake (DMI, kg/d) and as percent of body weight (DMI/ B.W) %. This result could be explained as SBP is a hydrophilic substance that absorb water and increased in volume. Moreover, it’s specific gravity is (1.152) lower thancorn grains 1.237, therefore the rumen wall stretch and sensors of volume and tension signaling and let animals feel satiety (Bhatti and firkins, 1995 and karla, 2014). In addition, the increase in feed bulk volume reduced the rate of passage leading to increased retention time and negatively affect feed intake (Voelker and Allen, 2003 and Iraira et al., 2013). But, on the contrary increasing the feed bulk retention time gives greater chance for both microbial and enzymatic digestion and absorbance of digested nutrients.

Blood hematological parameters (Hb, PCV, WBC’s and RBC’s) results support the better productive merit when buffaloes fed T3. The significant (P<0.01) increase in hemoglobin concentration (Hb, g/dl) that accompanied by significant (P<0.01) increase in RBC’s count gave proofs for enhancement is cellular biological oxidation and metabolism in general. The values obtained in this study were in the normal range as reported by Abd-Ellah *et al*. (2013) for RBC’s and WBC’s count. Neama (2015) reported that blood metabolic profile is used in assessing nutritional status and animal health. Significant variations in the blood metabolic profile depend on many genetic and non-genetic factors.One of the important factors is the physiological status, which has an effect on concentrations of indicators in blood that are involved in the development of blood metabolic profile.

It is of interest to find that the total protein concentrations (g/dl) even they are in the normal range (6.0-8.0 g/dl), the highest concentration was 7.87 g/dl for T3. This result is attributed to higher concentration of CP in this ration followed by higher digestible CP and concomitant increase in blood and milk protein concentrations.

Blood glucose, cholesterol and triglycerides concentrations were in the references interval 22.33 to 97.49mg/dl for glucose 26.62 - 76.33 mg/dl for cholesterol and 10.36 - 59.36 mg/dl for triglycerides mentioned by Abd- Ellah *et al.* (2013),Ebeid(2012) andAbd El-Fattah (2013).

But it is remarkable that the productivitymerit of buffaloes fed T2 or T3 were greater than feeding the control ration (T1), the opposite direction was noted in blood concentrations of cholesterol and triglyceride. It is hard to explain these results otherwise they were utilized and secreted in milk as milk yield was increased and fat yield as well when T2 and T3 were fed while DMI and EE content of T2 and T3 were less than T1 (Tables 2 and 5).

Blood urea concentrations (mg/dl) were in the references range (20-40 mg/dl) outlined by Neama (2015). It is well known that blood urea is in general an expression of protein metabolism status, protein intake, dietary protein digestion, absorption and assimilation (McDonald *et al*., 2010). Therefore, the significant (P<0.01) increase in urea concentrations when T2 or T3 were fed could be elucidated in the shadow of CP concentration in the rations, CP digestibility coefficients, digestible CP and crude protein intake. Accordingly it is expected to increase in blood and in milk which were increased when T_2 or T_3 were fed concomitantly blood urea is expected to increase.

Plasma concentrations of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) do not significantly differed among buffaloes fed the tested rations (Table 8) . The values were in the reference range (22.0 - 93.4 for AST and 7.17 - 48.48 for ALT) mentioned by Abd-Ellah *et al*. (2013), El-Fattah (2013) and Neama (2015). These results may express that SBP containing rations either supplemented with 2% urea (T2) or treated with fungus (SBP*T. H*., T3) were safe, digested, metabolized normally and no adverse effect was observed. This result is in agreement with Safa *et al*. (2011) findings. She recorded that *Trichoderma viride* treatment of rice straw or corn stalks improve their feeding values without adverse effect on animal performance. On the same trend, Ali (2012) stated that fungal treated banana leaves can replace clover hay in growing lamb's rations to decrease the feeding cost without negative effect on digestion or growth performance. Mohamed and Hala (2008) support these results and concluded that biological treatment should be explored.

Blood plasma concentrations of Triiodothyronine (T_3) and Thyroxin (T_4) were in the normal range reported by Neama (2015) in buffaloes during different physiological status. It is also comparable to these of Ibrahim (2007) on lactating buffaloes and Abo-zeida *et al.* (2017) in his study in feeding growing buffalo calves on SBP containing rations. But the decreased concentration of both T_3 and T_4 when lactating buffaloes fed SBP containing rations than the control ration is questionable. These hormones are related to general body metabolism, energy metabolism, activity and productivity of the animals. Buffaloes fed SBP rations were more productive than the control ration. In a way to find acceptable answer, Harper *et al*. (2005) reported that increase of thyroid hormones was associated with an increase in cholesterol level in blood. In the present study the cholesterol concentrations in blood were significantly (P<0.01) low when buffaloes fed T2 or T3 than the control ration T1 (Table 7). Baiomy (1999) found that the increase in feed intake of dairy buffaloes and cows was associated with increase in their serum T_3 and T_4 concentrations. In the present study DMI was reduced when buffaloes fed T2 or T3 rations. It should be remind that mineral and vitamin mixture was added to the total mixed ration as 3 kg/ton of feed. This mixture contains 0.3g iodine / 3kg (Table, 1). Accordingly, the iodine consumed is linearly related to DMI. The last word in this respect Baruah *et al*. (1993) reported that thyroid hormones are influenced by many factors including nutrition.

The economical feature of this study gives the bright information that could be extracted and concluded. Treatment of SBP by *Trichoderma H.* fungi and its inclusion as 40% of the concentrate feed mixture increased the daily feed return by 424.93%
Results of this work clearly showed significant improvement in the nutritional analysis, digestibility coefficients and the feeding value of SBP. Accordingly, the productivity of lactating buffaloes was enhanced. These means greater amount of milk is available for human consumption.

As the feeding value was increased, the indigestible component of the feed is reduced, and the excreta pollution problem and cost will be diminished. Moreover, as the feeding value was enhanced, this means greater number of animals could be fed on the same amount of feed. Again, greater amount of animal products would be available for human consumption.

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أثر تغذية لب بنجرالسكر المضاف الية يوريا أو المعامل بفطر الترايكودرما هاريزيانم علي أداء الجاموسات الحلابة

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أجريت هذه الدراسة علي ٩ من الجاموسات الحلابة متوسط وزنة ٦٠٤±٣٥ كجم بعد أسبوعين من الولادة. تم توزيع الحيوانات الي ثلاث مجموعات متماثلة بكل منها ثلاث جاموسات. وغذيت الحيوانات علي ثلاث علائق متكاملة. العليقة الاولي (العليقة المقارنة) مخلوط علف مركز مختلط معة ١٥% تبن قمح كمكون واحد بينما العليقة الثانية فكانت (٦٠% منمخلوط العلف المركز مختلط معة ١٥% تبن قمح كمكون واحد،٤٠%لب بنجر السكر مضاف الية ٢% يوريا) وكانت العليقة الثالثة (٦٠% منمخلوط العلف المركز مختلط معة ١٥% تبن قمح كمكون واحد، ٤٠% لب بنجر السكر معامل بالفطر تريكودرما هاريزيانم. أوضحت النتائج ان معامل هضم المادة الجافة والمادة العضوية زادت معنويا علي بإحتمال (٠.٠١ %) بمعدلات ٨.٣٦ ، ٤.٥٧ % للمادة الجافة و ٨.٤٨ ، ٤.٢٣ % للمادة العضوية عند تغذية الجاموس مع العليقة الثالثة مقارنة بالتغذية علي العليقة الاقلي والثانية علي التوالي. كما زادت مجموع المركبات الغذائية المهضومة (TDN%) معنويا بإحتمال (٠.٠١ %) حيث بلغت ٦٧.٩٢% عند التغذية علي العليقة الثالثة مقارنة بالتغذية علي العليقة الاولي او الثانية (٦٠.٥٤ ، ٦٦.١٢ علي الترتيب).
زادت نسبة الدهن وبروتين اللبن معنويا (٠.٠١ %) عند التغذية علي العليقة الثالثة مقارنة بالتغذية مع العليقة الاولي او الثانية وكانت نسبة الدهن ٧.٥٢ ، ٧.٢٥ ، ٨.٤١ % بينما كانت نسبة البروتين ٤.١٥ ، ٤.٣١ ، ٤.٩٧% عند التغذية علي العليقة الاولي والثانية والثالثة علي التوالي. تحسن معدل التحويل (٧% لبن معدل الدهن) / كجم مادة جافة ماكول معنويا بإحتمال (٠.٠١ %) بالتغذية علي العليقة الثانية و الثالثة مقارنة مع العليقة الاولي.

إنخفضت تركيزات الكوليسترول والجلسريدات الثلاثية معنويا بإحتمال (٠.٠١ %) في الدم بالتغذية علي العليقة الثانية و الثالثة مقارنة مع العليقة الاولي. كما أوضحت النتائج ان تكلفة ١ كجم اللبن المعدل انخفض بالتغذية علي العليقة الثانية و الثالثة (٢.١٤، ١.٨٦ علي التوالي) مقارنة مع العليقة الاولي (٣.١).

يستنتج من هذه الدراسة ان التغذية علي علائق بها ٤٠% لب بنجر السكر معامل باليوريا او بالفطر كانت الافضل مقارنة بالعليقة الكونترول ومما سبق يتضح ان المعاملة الثالثة (معاملة لب بنجر السكر بالفطر) كانت افضل المعاملات من حيث القيمة الغذائية وانتاج اللبن والقيمة الإقتصادية.