EFFECT OF LIVE DRIED BAKER'S YEAST WITH OR WITHOUT ACIDIFICATION OF MILK AND OF YEAST CULTURE ON PERFORMNCE OF SUCKLING BUFFALO CALVES.

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SUMMARY

Sixteen newly born buffalo calves were left with their dams from birth till day14, then removed and divided into four similar groups(4calves,each) according to weight and sex. which assigned randomly to four treatments(T). Tested groups were suckling calves on 3 liters of buffalo milk / calf / day without additives (control. T_1), with added live dried baker's yeast (*Saccharomyces cerevisiae* ; 5g /calf /d) (LDY;T_2), with added yeast (*Saccharomyces cerevisiae*) culture Diamond V "XP" (40g / calf / d) (DVYC; T_3) or with acidification of the milk (just before feeding)by 1 ml of an 85 % solution of formic acid /letter + addition of 5g live dried baker's yeast / calf /d (T_4). All calves were offered a mash calf starter for ad libitum intake (as a group feeding), from the start of the trial till weaning at 86 kg body weight, with water available all time. Daily feed intake (for each group) and biweekly body weight (for each calf) were recorded. Jugular blood samples were taken from each calf at day 60 from the beginning of the experiment and at weaning to determine some plasma constituents. Results indicated that daily gain was improved by 6.01and 11.01% due to addition of LDY to natural or acidified suckling milk; while it was increased by 3.5 % due to DVYC inclusion, respectively, relative to the control. DM intake of both milk & starter was reduced by17.4 and 14.3% due to addition of LDY to natural or acidified rearing buffalo milk, while it was reduced by 25.7% due to DVYC supplementation, respectively as compared to the control. Feed conversion as (kg DM / kg gain) was improved by 25.53 and 28.79% due to adding LDY to natural or acidified rearing milk; while it was improved by 32.17% due to DVYC addition, respectively. Plasma total protein & globulin concentrations tended to increase, while plasma urea tended to decrease with each of the tested additives. LDY addition tended to increase plasma albumin and decrease plasma creatinine. Total cholesterol and calcium concentrations and GPT activity of plasma were not affected by treatments while GOT activity and phosphorus level tended to decrease with LDY addition.

Keywords: *yeast, acidified milk, suckling buffalo calves, performance, plasma.*

INTRODUCTION

Among the management strategies to reduce rearing costs of suckling calves is the early intake of high grain diets beside restricting the consumption of dam's milk as to accelerate the development of rumen function. On the other hand, it has been suggested(Seymour ***et al.***, 1995) that nutrients provided by yeast cells (e.g. vitamins and amino acids) may have possibly aided the growth of beneficial gut microorganisms and the establishment of normal gut fermentation, thereby reducing stress and digestive upset. Furthermore, development of rumen function prior to weaning may be aided by a supply of B vitamins and other microbial metabolites such as those found in baker's yeast.

ON the other hand, organic acids (citric, formic and propionic) are commonly used for acidification of milk of suckling calves as to provide for a more desirable pH in the gastrointestinal tract which may aid digestion (Thickett *et al.*,1980). Also, (Skrzhivanova *et al.*, 1990) reported that ease of absorption of nutrients and increased appetite for concentrates are advantages of acidification of rearing milk which may facilitate the development of the digestive system, especially the rumen, ensure more effective utilization of plant feed and increase growth.

So, the aim of this work was to study the effect of addition of *Saccharomyces cerevisiae* either as live dried baker's yeast in natural or acidified rearing buffalo milk or as yeast culture ((Diamond V $^{((}$XP$^{))}$) in natural rearing buffalo milk on the performance and some blood plasma constituents of suckling buffalo calves.

MATERIALS AND METHODS

Sixteen newly born buffalo heifer and bull calves belonging to the experimental herd of the milk replacer research center; Faculty of Agric.; Ain Shams Univ. were used. Calves were left with dams for 14 d , then divided randomly into 4 similar groups (G) , (4 each) according to weight and sex, and moved to group pens bedded with rice straw for the duration of the experiment.

From the start of the experiment (day 14), each calf was suckled on 3 liters of buffalo milk /calf/ day without additives (control , group 1), with added live dried baker's yeast(LDY , *Saccharomyces cerevisiae*) 5 g/calf/day (group 2), with added yeast (*Saccharomyces cerevisiae*) culture (Diamond V $^{((}$XP$^{))}$) 40 g/calf/day (DVYC; group 3) or with added live dried baker's yeast 5 g/calf/day with acidification of the daily amount of milk by adding 1 ml of an 85% solution of formic acid / liter of milk (group 4).

The live dried bakers yeast was secured from Sugar Integrated Industry Company (Hawamdia Chemicals Factory) which, according to the manufacturer, contained at least 20×10^9 live cells / g from *Saccharomyces cerevisiae* . On the other hand , Diamond V $^{((}$XP$^{))}$ yeast culture was a dried product , produced by Diamond V Mills ,USA ,which according to the manufacturer , composed of yeast (*Saccharomyces cerevisiae* , about 500×10^6 live cells / g) and the media on which it was grown (ground yellow corn , homing feed , corn gluten feed , wheat middling , rye middling , diastatic malt , corn syrup and cane molasses) and other vitamins , amino acids and minerals due to fermentation.

A mash calf starter (Table 1) was offered for all calves as a group feeding, once daily for *ad libitum* intake from the start of the experiment till weaning ; while feed refusals of each group were measured once daily. Water was available at all time.

Daily amount of milk of each calf was offered twice daily (2 liter at 7 a.m. and 1 liter at 1 p.m.). The daily amount of additives of each calf (groups 2,3 and 4) was added to only one liter from morning milk while acidification of milk fed to calves of (G4) was performed for all the daily amount of milk just before feeding . At weaning (86 kg body weight) the daily amount of milk was reduced to become 2 liters /day for 3 days and thereafter was reduced again to become 1 liter/day for another 3 days, then milk feeding was stopped .

Calf starter, LDY and DVYC were analyzed for dry matter, crude protein, crude fiber, ether extract, ash and nitrogen free extract, according to A.O.A.C. methods (1984); while rearing milk was analyzed for total solids % (Majenier method laboratory manual 1949),total protein and ash % (Ling 1963), fat % (Gerber method for milk according to British Standard Institution 1951) and lactose (by calculation). Chemical composition of calf starter, live dried baker's yeast, yeast culture (Diamond V $^{((}$XP$^{))}$) and rearing milk is found in (Tables 2&3). Calves were weighed as they began the study (day 14) and every 14d thereafter till weaning.

Jugular blood samples were taken from each calf at day 60 from the beginning of experiment and at weaning in glass tubes containing EDTA. Blood was centrifuged just after taken to obtain plasma which stored (-20^{0}C) until analyzed for total protein (Henry *et al.*, 1974) ,albumin (Doumas *et al.*,1971),globulin (by calculation), (A/G) ratio (by calculation),urea (Fawcett and Scott,1960), creatinine (Bartles *et al.*,1972) ,calcium (Gindler and King,1972), phosphorus (Yee,1968), cholesterol (Allain *et al.*, 1974),GOT& GPT (Reitman and Frnkel,1957) .

Data of initial body weight, weigh gain and age at weaning were analyzed as one way analysis of variance. Data of daily gain were analyzed within each period as one way analysis of variance, while data of plasma constituents were analyzed as repeated measurements, using general linear procedure of SAS (1995). Differences among means were evaluated using Duncan (1955).

Table 1. Ingredient composition of experimental calf starter.

Ingredient	%, as fed
Yellow corn	65.0
Wheat bran	10.0
Soybean meal	15.0
Salt	1.5
Limestone	3.0
Mineral mixture	0.5

Table 2. Nutrient chemical composition of experimental calf starter and additives.

Item	Nutrient % of DM						
	DM	OM	Ash	CP	CF	EE	NFE
Calf starter	92.36	92.57	7.44	17.06	4.52	3.47	67.52
LDY	92.14	95.62	4.38	48.70	4.51	0.92	41.49
DVYC	89.40	95.22	4.78	15.07	6.30	3.75	70.10

Table 3. Chemical composition of buffalo milk used in suckling experimental calves.

Component	%, as fed
Total solids	16.74
Protein	4.17
Ash	0.76
Fat	6.90
Lactose	4.91

RESULTS AND DISCUSSION

Results of performance of suckling buffalo calves are found in (Table 4). Daily weight gain of calves increased by 6.01 % relative to the control due to LDY supplementation of rearing milk. Moreover, when acidification of rearing milk associate such supplementation (T_4) additional increase in daily gain occurred as to be the difference from the control group 11.01 %. Addition of DVYC to suckling milk increased daily gain by 3.5 % relative to the control. Differences among treatments, however, were insignificant. Despite the higher weight gains (till weaning at 86 kg BW) of calves in groups 2,3 & 4, age at weaning was either similar (group 2) or even decreased (groups 3 & 4) as compared to the control. This is due to higher daily gains of calves in these groups relative to the control (Table 4). However, lack of significance among treatments, concerning growth data may be due to large within-treatment variation as indicated by high SE's. It has been suggested (Seymour *et al.,* 1995) that nutrients provided by yeast cells (e.g. vitamins and amino acids) may have possibly aided the growth of beneficial gut microorganisms and the establishment of normal gut fermentation, thereby reducing stress and digestive upset. Furthermore, development of rumen function prior to weaning may be aided by a supply of B vitamins and other microbial metabolites such as those found in baker's yeast. Butler and stone (1990) indicted that DVYC and live yeast cells contain considerable amount of active phytase ; which can increase the available phosphorus due to plant phytate hydrolysis and can reduce plant phytate' ability to chelate cation minerals like calcium, magnesium and zinc in the form of phytin ; which in turn can easily make a significant contribution to mineral availability. Also, Streeter and McClung (1979) reported that ,adding DVYC increased average daily gains over an 87 day period of suckling calves from 2.24 lbs for controls to 2.50 for treated calves. Moreover, (Ruppert *et al.,* 1994).

Table 4. Performance of suckling buffalo calves as affected by milk additives.

Item	Treatment			
	Control	Live yeast	Yeast culture	Live yeast & acidified milk
Initial weight, kg	43.38^a± 4.82	40.25^a±8.22	41.50^a±8.58	40.75^a±3.20
Final weight, kg	86.00	86.00	86.00	86.00
Weight gain, kg	42.50^a± 4.65	45.75^a±8.22	44.5^a±8.58	45.25^a±3.20
Age at weaning, d	125.75^a±18.19	126.00^a±7.44	124.50^a±13.18	119.50^a±13.18
Daily gain, g/d				
wk 1 to 8	261.28^a±66.44	295.13^a±52.2	319.80^a±97.52	334.20^a±81.81
wk 9 to weaning	518.28^a±32.62	532.50^a±143.22	491.83^a±90.30	533.80^a±85.93
wk 1 to weaning	386.80^a±69.67	410.05^a±81.95	400.3^a±90.30	429.38^a±85.93
DM intake, g/d				
milk	391.7	393.0	365.0	355.0
starter	1070.5	852.5	798.4	924.1
total	1462.2	1245.5	1163.4	1279.1
CP intake, g/d				
milk	97.6	98.0	90.9	88.4
starter	176.0	140.2	131.3	151.9
total	273.6	238.2	222.2	240.3
Feed conversion				
kg DM/kg gain	3.825	3.047	2.894	2.970
kg CP/kg gain	0.715	0.582	0.553	0.558

Means in the same row with same superscripts did not differ ($p<0.05$).

reported that, improved daily gain of Holstein calves was due to supplementing daily milk replacer with probiotics which is a combination of *Saccharomyces cerevisiae , S. faecium and L. acidophilus*. In addition, it has been found (Wawrzynzak 1988) that live weight gains can be increased and digestive disturbances can be reduced by giving milk acidified with acetic or hydrocholoric acids to calves up to the age of 120 days. Others (Vajda and Pastorek 1996) reported greater average daily body weight gain for calves fed on acidified milk compared with those fed on fresh milk. Also , Kaya ***et al.*** (2000) found that ADG till weaning for calves fed whole milk and acidified whole milk were 427.44 and 459.95 g/d, respectively.

Data of DM intake (Table 4) showed that, supplementing rearing milk of buffalo calves with yeast cells (LDY) did not affect DM intake of milk, however it decreased daily DM intake from starter by 25.5 % relative to the control. Seymour ***et al.,*** 1995 reported that calves fed yeast cells consumed less DM from dry and liquid feeds than did calves fed no yeast. Addition of LDY that associate acidification of the milk caused a decrease in milk consumption by 10.3 % relative to the control , with a tendency for increasing DM intake of starter as compared to the addition of LDY without the acidification of milk (8.4 %), however intake from starter was still lower than the control (by 15.8 %). Woodford ***et al.*** (1987) reported that lower replacer's pH due to acidification may reduce intake, which could be desirable when weaning to dry feed. Moreover, (Skrzhivanova ***et al.***, 1990) also reported that ease of absorption of nutrients and increased appetite for concentrates are advantages of using acidified milk products. However, in the present study, the associate effect of yeast cells and acidification of milk may be responsible for the lack of effect of acidification on consumption of starter. Supplementation of rearing milk with DVYC resulted in decreasing intake of both milk and starter by 7.3 and 34.1 % ; respectively relative to the control. This my be due to the action of yeast cells that present in the culture , as discussed above. The data also showed that , daily total DM intake (milk and starter) was decreased by 17.4 and 14.3 % due to addition of LDY in normal or acidified buffalo milk ; respectively, while it was decreased by 25.7 % due to DVYC supplementation, as compared to the control calves , respectively. A similar trend was also observed for CP intake of milk & starter.

Results of feed conversion (Table 4) indicated that addition of LDY or DVYC to rearing buffalo milk improved DM conversion (kg DM/kg gain) by 25.53 and 32.17 % respectively ; over the control . However, addition of LDY in acidified buffalo milk (T_4) resulted in another improvement in DM conversion as to sustain a total improvement of 28.79 and 2.59 % over the control or LDY alone without acidification. Feed conversion expressed as kg CP required to produce kg gain followed the same trend of DM conversion(Table 4). The improved feed conversion due to addition of yeast cells, yeast culture or acidification of milk may be explained by the reduction in feed intake with higher average daily weight gains. Seymour ***et al.*** (1995) found that feed to gain ratio was improved by yeast addition during the period from d 5 to 11, which marks the transition to dry feed and suggested that yeast may have aided adaptation to diet . Similarly , Nisbet and Martin (1991) hypothesized that large amounts of L- malic acid measured in yeast culture may stimulate growth of lactate utilizers such as *Selenomonas ruminantum* , thereby reducing ruminal lactate concentration. Moreover, Quigley ***et al.*** (1992) reported that increases in L (+)-

and D (-)-lactate at 4 h postfeeding were reduced by 42 and 25 %,respectively ,when young calves were fed yeast. Skrzhivanova *et al.* (1990) reported that using acidified milk may facilitate the development of the digestive system especially the rumen, and ensure a more effective utilization of plant feeds due to ease of absorption of nutrients and increased appetite for concentrates and hay. Similarly , Woodford *et al.* (1987) found that acidification of milk replacer decreased pH of abomasal contents and assumed an abomasal pH of 4 had potential biological importance because it affect activity of proteolytic enzymes which may aid digestion. Others(Vajda and Pastorek 1996) reported higher efficiency of feed conversion for calves fed on acidified milk compared with those fed on fresh milk. It should be stated that data of feed intake was measured on a group feeding basis with only one observation per treatment, so results are raw means only with no statistical analysis. Therefore, no statistical conclusions may be drawn regarding feed intake as DM or CP or feed conversion as DM or CP.

Plasma protein, urea and creatinine of experimental calves are shown in (Table 5). Addition of DVYC in rearing milk or LDY in acidified rearing milk of buffalo calves tented to increase plasma total protein level relative to the control calves. Skrivanonva *et al.* (1990) found that acidification of milk diet did not significantly affect plasma total protein of calves. Supplementing suckling milk of buffalo calves with DVYC caused an insignificantly increase in plasma albumin concentration compared to the control calves or those supplemented with LDY either in natural or acidified buffalo milk. Supplementation of buffalo milk of suckling calves (either natural or acidified) resulted an insignificant higher plasma globulin level of calves compared to supplementation with DVYC, while calves of control group recorded the least value. Chang and Mowat (1992) found that chromium supplied by yeast may have improved the immune response of calves due to increasing serum total immunoglobulins. A/G ratio tended to be decreased due to any of the tested additives relative to the control.

Inclusion of DVYC in natural milk or LDY in natural or acidified milk fed to buffalo calves tended to decrease insignificantly plasma urea concentration of reared buffalo calves. This may reflect a tendency for improved N utilization of feed. Skrivanonva *et al.* (1990) reported no significant effect of acidification of milk diet on plasma urea concentration of calves. Also, Quigley *et al.* (1992) found that plasma urea – N was unaffected due to inclusion of yeast culture in calf starter during preruminant stage. Plasma creatinine tended to decrease insignificantly with LDY addition to natural or acidified rearing buffalo milk, relative to the other groups.

Plasma cholesterol, transaminases, calcium and phosphorus of experimental calves are shown in (Table 6). Cholesterol, calcium and GPT of plasma were not affected by treatments. On the other hand , GOT activity decreased ($p<0.05$) due to LDY addition to acidified rearing buffalo milk as compared to the control calves. Phosphorus concentration of plasma of calves received LDY either in natural or acidified milk tended to be decreased relative to the other groups. Skrivanonva *et al.* (1990) reported no significant effect of acidification of milk diet on cholesterol and transaminase activities in plasma of suckling calves.

Table 5. Plasma proteins, urea and creatinine of suckling buffalo calves as affected by milk additives.

Period	Treatment			
	Control	Live yeast	Yeast culture	Live yeast & acidified milk
Total protein, g/dl				
day 60	5.33 ±0.44	5.40±0.36	5.23±0.09	5.56±0.23
at weaning	4.63 ±0.13	4.74±0.42	5.23±0.09	5.43±0.55
Overall mean	4.98[a]±0.25	5.07[a]±0.25	5.23[a]±0.06	5.49[a]±0.28
Albumin, g/dl				
day 60	2.99±0.02	2.42±0.27	2.97±0.01	3.05±0.15
at weaning	3.16±0.07	3.13±0.06	3.49±0.003	3.12±0.05
Overall mean	3.07[a]±0.05	2.77[b]±0.19	3.23[b]±0.10	3.08[b]±0.08
Globulin, g/dl				
day 60	2.34±0.46	2.98±0.17	2.27±0.11	2.54±0.28
at weaning	1.48±0.07	1.61±0.41	1.74±0.09	2.31±0.58
Overall mean	1.91[a]±0.27	2.30[a]±0.34	2.00[a]±0.12	2.42[a]±0.30
A/G ratio				
day 60	1.48±0.35	0.83±0.14	1.31±0.07	1.25±0.19
at weaning	2.15±0.08	2.33±0.52	2.03±0.10	1.66±0.41
Overall mean	1.81[a]±0.21	1.58[a]±0.38	1.67[a]±0.15	1.45[a]±0.22
Urea, mg/dl				
day 60	32.25±2.36	32.75±2.10	38.25±2.25	27.75±2.95
at weaning	49.75±4.11	36.75±7.49	34.00±3.89	31.75±2.36
Overall mean	41.00[ab]±3.97	34.75[ab]±3.68	36.13[a]±2.23	29.75[b]±1.91
Creatinine, mg/dl				
day 60	1.27±0.05	1.06±0.10	1.03±0.03	1.06±0.01
at weaning	1.17±0.06	1.10±0.09	1.58±0.07	1.15±0.11
Overall mean	1.22[a]±0.04	1.08[b]±0.04	1.30[bc]±0.11	1.10[ac]±0.05

Means in the same row with different superscripts differ ($p<0.05$).

Table 6. Plasma total cholesterol, GOT, GPT, calcium and phosphorus of suckling buffalo calves as affected by milk additives.

Period	Treatment			
	Control	Live yeast	Yeast culture	Live yeast & acidified milk
		Cholesterol, mg/dl		
day 60	46.00±2.04	43.75±1.65	51.25 ±4.92	43.75±1.65
at weaning	46.75±2.78	43.50±6.56	36.75±5.84	48.25±2.14
Overall mean	46.38[a]±1.60	43.63[a]±3.13	44.00[a]±4.47	46.00[a]±1.51
		GOT,U/ml		
day 60	137.95±3.44	148.73±11.92	155.75±7.96	109.50±4.27
at weaning	132.48±5.09	161.58±5.15	119.28±28.68	122.73±11.06
Overall mean	135.21[a]±3.02	155.15[ab]±6.48	137.51[ab]±6.48	116.11[b]±6.03
		GPT,U/ml		
day 60	41.00±3.45	42.75±12.90	36.10±1.80	47.00±5.21
at weaning	54.20±1.51	51.08±5.79	51.50 ±4.59	48.80±6.73
Overall mean	47.60[a]±3.04	46.91[a]±3.39	43.80[a]±3.70	47.90[a]±3.95
		Calcium, mg/dl		
day 60	7.15±0.11	7.10±0.06	7.20±0.01	7.1 ±0.06
at weaning	7.11±0.14	7.26±0.24	7.15±0.13	7.1 ±0.12
Overall mean	7.13[a]±0.08	7.18[a]±0.12	7.10[a]±0.06	7.13[a]±0.06
		Inorganic phosphorus, mg/dl		
day 60	7.18±0.23	6.93±0.13	8.01±0.68	7.11±0.06
at weaning	8.04±0.63	7.32±0.52	7.35±0.05	7.14±0.12
Overall mean	7.61[a]±0.35	7.13[a]±0.26	7.68[a]±0.34	7.13[a]±0.06

Means in the same row with different superscripts differ ($p<0.05$).

Results of economics of different milk additives on weight gain are presented in (Table 7). Total feed and additive cost per kg gain was 93.45 and 95.41 % of that of the control when LDY or DVYC was added to the natural rearing buffalo milk. However when LDY was associate acidification of rearing milk ; the cost was decreased to reach 82.57 % relative to the control.

Table 7. Economics of milk additives on weight gain of suckling buffalo calves.

	Treatment			
	Control	Live yeast	Yeast culture	Live yeast & acidified milk
Feed cost / kg gain ,LE				
Milk[1]	11.46	10.90	10.35	9.39
Starter[2]	1.62	1.20	1.14	1.23
Additive cost / kg gain, LE				
LDY[3]	-	0.11	-	0.11
DVYC[3]	-	-	0.99	-
Acidification[3]	-	-	-	0.07
Total cost	13.08	12.21	12.48	10.80
Relative cost of kg gain[4]	100.00	93.45	95.41	82.57

1 on the basis of a price of 1.90 LE / litter. 2 on the basis of a price of 0.525 LE / kg.
3 on the basis of a price of 9 LE / kg live dried yeast, 10 LE / kg yeast culture and 10 LE / litter formic acid.
4 Assuming that cost of kg gain of the control equals 100.

CONCLUSION

It is concluded that supplementing rearing buffalo milk of suckling buffalo calves with 5 g / calf / day of live dried baker's yeast or 40 g / calf / day of yeast culture (Diamond V "XP") can increase weight gain, decrease feed intake and improve feed conversion which is reflected in decreasing cost per kg gain by 6.55 and 4.59 % ; respectively relative to the control . Moreover, if acidification of rearing milk associate the addition of live dried baker's yeast , the cost per kg gain is decreased to become 17.43 % less than the control.

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تأثير إضافة خميرة الخباز الجافة بدون أو مع تحميض اللبن أو إضافة مزرعة الخميرة على أداء العجول الجاموس الرضيعة

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استخدم في هذه الدراسة عدد ١٦ عجل جاموسي حديث الولادة ، تركت مع أمهاتها حتى عمر ١٤ يوم ثم تم إبعادها عن الأمهات وتوزيعها عشوائيا تبعا للوزن والجنس علي أربعة معاملات غذائية هي : المعاملة(١) المقارنة ،حيث تم إرضاع العجول علي لبن جاموسي(٣ لتر/ رأس/ يوم) بدون أي إضافات . المعاملة (٢) مثل مجموعة المقارنة لكن مع إضافة ٥ جم / رأس / يوم من خميرة الخباز الجافة. المعاملة (٣) مثل مجموعة المقارنة لكن مع إضافة ٤٠ جم / رأس / يوم من مزرعة الخميرة المعروفة تجاريا باسم داياموند في اكس بي. المعاملة (٤) مثل المعاملة (٢) ولكن مع إضافة ١ ملل³ من محلول حمض الفورميك ٨٥ % / لتر من لبن الرضاعة لتحويل اللبن إلى لبن حمضي. وقدم أمام عجول كل معاملة علف بادئ مطحون وماء طازج كاستهلاك حر وذلك كتغذية جماعية وذلك من بداية التجربة (عمر ١٤ يوم) حتى الفطام علي وزن ٨٦ كجم. وتم تسجيل استهلاك الغذاء لكل مجموعة يوميا ، وتم وزن كل حيوان مرة كل أسبوعين. وخلال التجربة تم أخذ عينات دم في اليوم ٦٠ من بداية التجربة وكذلك عند الفطام لتقدير بعض القياسات علي بلازما الدم. وقد أظهرت النتائج أن إضافة أي من مزرعة الخميرة أو خميرة الخباز الجافة إلى لبن الرضاعة أدي لتحسين معدل الزيادة اليومية في وزن الجسم ولكن التحسن كان أعلي في حالة خميرة الخباز الجافة وخاصة مع تحميض لبن الرضاعة. وقد قل استهلاك المادة الجافة اليومي (من اللبن + البادئ) بمقدار ١٧,٤ ، ١٤,٣ % بينما تحسنت الكفاءة التحويلية للغذاء المأكول بنسب وصلت إلى ٢٥,٥٣، ٢٨,٧٩ % وذلك عند إضافة خميرة الخباز الجافة إلى لبن الرضاعة الطبيعي أو المحمض علي التوالي، وذلك مقارنة بمجموعة المقارنة . بينما أدي إضافة مزرعة الخميرة إلى لبن الرضاعة إلى تقليل استهلاك المادة الجافة اليومي بمقدار ٢٥,٧% و إلى تحسين كفاءة تحويل الغذاء بنسبة ٣٢,١٧ % وذلك مقارنة بمجموعة المقارنة . وقد أظهرت النتائج أيضا أن مستوي البروتين الكلي والجلوبيولين بالبلازما مال للارتفاع بينما مال مستوي اليوريا بالبلازما للانخفاض كنتيجة لاستخدام الإضافات المختبرة. وأن مستوي الالبيومين بالبلازما مال للارتفاع بينما مال مستوي الكرياتينين للانخفاض نتيجة لإضافة خميرة الخباز إلى لبن الرضاعة . وقد أظهرت النتائج أيضا عدم تأثر مستوي الكولسترول أو الكالسيوم أو نشاط أنزيم GPT بالبلازما بأي من الإضافات المختلفة. ولكن نشاط إنزيم GOT ومستوي الفوسفور بالبلازما مال للانخفاض مع استخدام خميرة الخباز. وقد أظهرت النتائج أن أفضل المعاملات من الناحية الإقتصادية هى المعاملة الرابعة (خميرة الخباز الجافة مع تحميض لبن الرضاعة) وذلك مقارنة بباقى المعاملات حيث انخفضت تكلفة إنتاج كجم من الوزن الحى بمقدار ١٧,٤٣ % نتيجة هذه المعاملة مقارنة بمجموعة المقارنة بينما كان الإنخفاض فى تكلفة إنتاج كجم من الوزن الحي هو ٦,٥٥ أو ٤,٥٩ % نتيجة إضافة خميرة الخباز أو مزرعة الخميرة إلى لبن الرضاعة الطبيعي مقارنة بمجموعة المقارنة.