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EFFECT OF BIO-TOP SUPPLEMENTATION ON THE PERFORMANCE AND RUMEN ACTIVITY OF LAMBS.

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ABSTRACT

Effects of Bio – Top supplementation (as commercial probiotics) on the performance ,nutrient digestibilities and some rumen liquor parameters of fattening Rahmany lambs were studied.Sixteen fattening Rahmany male lambs on an average 39 kg live body weight were used in this study .The lambs were divided into four equal groups.Lambs were fed diets of bean straw and concentrate feed mix (30 : 70 on DM basis) supplemented with Bio – Top at level 5 ,7.5 ,and 10 gm / head / day for groups 2 ,3 and 4 ,respectively 90 days.The group 1 (control group) received the same basis ration without the Bio – Top supplement.

The results of the animal performance showed that supplementation of Bio – Top improved growth rate and consequency average daily gain (ADG) of treatments groups compared with control group .Lambs feed 10 gm Bio – Top recorded the highest (169 gm) ADG ($P > 0.05$) than other groups ,while the lowest one recorded for control group (139 gm). Daily feed intakes expressed as DM was slightly higher for treated lambs.The results of feed efficiency show that lambs fed Bio-top supplemented ration had the highest values of body gain related to the unit of DMI,TDN and DCP.values

The results of nutrients digestibility pointed that supplementation rations with bio-top improved DM, OM,CP , EE and NFE digestibilities compared to control group (unsupplemented group). Crude protein digestibility increased as level of Bio –top increased (5 , 7.5 , and 10 gm / head / day). The same trend has been recorded with CF digestibility.

The main results indicated that TDN , DCP and N – Balance contents were increased linearly with increased of level of growth promoter supplemented.

Ammonia – N concentration of rumen liquor tended to increased gradually as a result of supplementing 5 , 7.5 and 10 gm of Bio - top / head / day.The highest value was recorded for group 4 followed by group 3 and 2 , while the lowest value for control group . The highest income over feed cost were obtained from lambs of group 4,while the lowest was with lambs of group 1 (control group).

In view of the obtained results, it Could be concluded that supplementation with Bio – top (as a commercial probiotic) to fattening lambs as a feed additive during this stage improved the animal performance, digestibility, feeding values and reduce the cost of the product (meat production) by increasing the feed efficiency of roughages.Furtheremore, supplementation with Bio – top at rate of 10 gm / head / day showed to be the best rate for fattening lambs .

Keywords: Probiotics, growth promoters , lambs performance, digestibility, rumen parameters, feeding cost, income over feed cost.

INTRODUCTION

Probiotic have been used as growth promoters to replace the widely used antibiotic and synthetic chemical feed supplements (Higgibotham and Bath ,1993) .It has been used as a supplement in animal feeds for more than

seven decades for improving animal performance that obtained by including small amounts in animal feeds (Dawson 1995). Nahashon et al .,(1992) pointed out that the composition of probiotic is a mono or mixed culture of living microorganisms applied to animal which beneficially affects the host by improving the properties of indigenous microflora.Also,they reported that many of the beneficial productive response associated with the use of probiotic supplements can be directly related to their effects on the the microbial population in the digestive tract.Traditional probiotics are lactic acid bacteria, such as Lactobacillus (L) casei,Lactobacillus acidophilus and streptococci. Probiotic regulate the microbial environment of the intestine ,decrease digestive disturbances ,inhibit pathogenic intestinal microorganisms and improve feed conversion efficiency (Windschitl,1992 and Dhingra,1993) .

The term probiotic was first introduced by Lilly and Stllwell (1965) to describe growth promoting factors produced by microorganisms .In addition to the prevention of diarrhea,bacterial probiotics have also been used to enhance the development and maintenance of a stable rumen fermentation.Lactobacilli has been shown to improve feed intake and liveweight gain in young cattle entering feedlots (Wren,1987 ; Lee and Botts,1988).Umberger *et al* .(1989) reported that Lactobacillus stimulated liveweight gain in lambs entering feedlot.As many strains of lactobacilli and streptococci produce large quantities of lactic acid under in vitro conditions (Holdeman *et al* .,1977), it has been suggested that they might reduce intestinal ph and thus reduce overgrowth E.coli (Fox,1988).Probiotic strains may possws bactericidal activity.

It is already known that the use of such probiotics eventually increases feed intake and digestion by stimulating appetite and increasing nitrogen and fat .calcium,phosphours ,copper and manganese retention (Nahashon *et al* .,1992 and Jin *et al.*, 1997).Besides ,probiotic has no residues in milk or meat. (Games,1987).

This experiment was designed to evaluate the effect of commercial probiotics (Bio – Top) as a new probiotic product on the performance , nutrient digestibilities and some rumen liquor parameters of fattening Rahmany lambs. Bio – Top is composed mainly of Bacillus Licheniformis and Bacillues Subtilis and zinc oxide acts through improving the balance of intestinal microflora with consequent improvement of animal health performance by inhibiting harmful bacteria and preventing diarrhea and increasing animal growth rate.

MATERIAL AND METHODS.

The present experiment was conducted at the experimental station which belongs to faculty of Agriculture, Al-Azhar University, Assiut Branch. Sixteen fattening Rahmany male lambs of an average live body weight (LBW) 38.37 kg were divided according to their body weight into four treatment groups (4 lambs in each) to study the effect of different levels of Bio – Top

on their growth performance ,digestibility ,some rumen liquor parameters and the income over feed cost.

Animals management:-

Each group was fed balanced ration (concentrate feed mix 'CFM' + bean straw) according to NRC (1985) requirements for 90 days.Lambs in group 1 served as control, while group 2,3 and 4 were experimental group supplemental in addition to the CFM, 5 grams,7.5 grams and 10 grams Bio – Top per head daily ,respectively.Each group were kept in separate shaded pen and adapted for the ration and treatments for 15 days .Lambs were weighed at the beginning of the experiment and thereafter at two weeks intervals till the end of the experiment to calculate for gain and feed intake . The shrunk live body weight were recorded.Salt blocks as a mineral mix and fresh water were available at all over day. CFM (concentrate feed mix) was offered at the ratio of 70 of total dry matter (DM) requirements.The CFM were offered to animals once daily at 8 .00 am,and after animals consumed it, bean straw was fed ad .lib.The residue of offered roughage was collected and weighed daily.The intakes of CFM were adjusted biweekly for each group according to increase in body weight to meet the required allowance.Lambs were vaccinated and treated against internal and external parasites before beginning the experiment.The experimental animals were kept under the roterinary supervision of the station during the experimental period.

2) Experimental diets :-

Samples of feedstuffs used were subjected in duplicate for determining the proximate analysis (DM,CP,CF.EE and ash) according to A.O.A.C. (1990) and NFE values were calculated by difference.The average chemical analysis of feedstuffs used and calculated composition of ration are given in table (1). The concentrate feed mixture (CFM) was formulated to supply requirements using Stochastic Non Linear Programming method (Abou,l Ella 2000) from available feedstuffs in the station.CFM was consisting 40 % commercial co-up concentrate ,40 % yellow corn and 20 % undecorticated cotton seed meal (UCSM).

Table (1) : Chemical composition (%) of feedstuffs and calculated composition of ration (On DM basis).

Item	DM	OM	CP	CF	EE	Ash	NFE
Co-up concentrate	90.4	84.3	13.4	14.2	3.9	15.7	52.8
Yellow corn	87.8	97.9	9.5	0.7	4.5	2.1	82.2
Undecorticated cotton seed meal	91.78	94.35	28.5	24.45	4.64	5.65	36.76
Bean straw	91.4	83.4	4.9	38.6	1.42	16.6	38.48
Calculated composition of ration .	89.64	91.75	14.8	10.85	4.29	8.25	61.81

3)**Metabolism trials :-**

At the end of the experimental period, four digestibility trails were carried out by the ordinary method to determine nutrients digestibility and nutritive values.Three lambs were chosen randomly from each group .Animals were left in metabolic cages for 21 days ,14 days for adaptation and 7 days for collection. Samples of rumen fluid were collected ,using stomach tube .Samples were withdrawn just before morning diet and at 3 and 6 hours

post feeding.Samples were strained through two layers of cheese cloth and were immediately used for determination of ruimnal pH and ammonia nitrogen (NH_3 – N) .pH values were measured by using a digital pH meter.Rumen liquor samples were stored in glass bottles with 3 drops of toluene and a thin layer of paraffin oil just to cover the surface to stop microbial activity and to prevent volatilization and frozened for VFA'S determination.

4)**Chemical analysis :-**

Dry matter (DM) ,crude fiber (CF), crude protein (CP),ether extract (EE) ,and ash of feces and urinary N were determined according to A.O.A.C. (1990) procedures.

TVFA,s were determined by steam distillation method according to Warner (1964).Ammonia nitrogen was determined in the filtered rumen liquor (as mg %) according to Abou-Akkada and Osman (1967).

The data were analyzed according to SAS User's Guide ,1988.Separation among means was carried out by using Duncan multiple range test ,(Duncan,1955).

RESULTS AND DISCUSSION

Animals performance

Effect of Bio–Top supplementation on growth rate,dry matter feed intake(DM),and feed efficiency of Rahmany lambs are shown in table (2).

Data of Table (2) show the different responses when Bio – Top was supplemented in fattening lambs ration .In the entire feeding period , supplementation of the Bio – Top to basal diet improves the growth rate and consequently average daily gain (ADG) of treatments group (group 2, 3, and 4) compared with control group (group 1 , unsupplemented group) . Lambs feed supplemented with 10 gm Bio – Top showed significantly higher average daily gain ($p>0.05$) than other groups .The highest average daily gain (o.169 kg) was obtained with group 4 followed by group 3 (0.161 kg), and group 2 (o.154 kg) ,while the lowest value (o.139 kg) was recorded for control group. The differences of ADG of lambs between group 1 and group 2 , group 1 vs.group 3 was not affected ($p>0.05$) by supplementation of Bio – Top to animal at the level used in this study (5 gm and 7.5 gm / head / day) ,while these differences was affected ($p>0.05$) by supplementation at level 10 gm / head /day .The improvement in daily gain may be due to the effect of Bio-top on microbial efficiency and organic matter digestibility. Similar trends were found by El-Basiony *et al.* (2001) who reported that ADG of growing buffallo calves were improved by pronifer supplementation to the ration. Bohn and Srour (1995) used crossbred calves of 200 kg .They recorded an increase in growth rate when animals were fed ration supplemented with pronifer.They attributed that to increased digestion, retention of nutrients or a result of the improvement in balance of the intestinal microflora. Moreover, reduction in incidences of digestive disorders in young calves were record by Kopency *et al* .(1989).

The efficiency of utilization expressed as feed efficiency , calculated as the amount of live body gain per either TDN or DCP consumed are

presented in table (2). The results of feed conversion show that lambs fed Bio-top supplemented ration had the highest values of body gain related to the unit of DMI,TDN and DCP.Values of daily feed intakes expressed as DM was slightly higher for treated lambs . This was mainly due to the increase in roughage intake where the amount of CFM offered was restricted (70 % of total dry matter (DM) requirements).Even though,lambs of group 4 ate more roughage than other groups.

Supplementation of Bio –Top may enhance roughage fermentation and / or prompt in emptying the rumen ,which may lead to increasing roughage intake. These results were similar to those obtained by El-Basiony et al (2001) in male buffalo calves , Shoeib *et al.*,(1996) in poultry and Sorour *et al.* ,(2000) in Fallahi male camels. Also, it should be noted that feed conversion kg DMI , kg TDN and gm DCP / kg gain were improved by 19.1,8.9, 3.8 % and 11, 6.4 , 2.2 % 15.44, 5.98, 0.30 for group 4(10 gm) than group 1 , 2 and group 3,respectiveley.The relative improvement in daily gain of supplemented groups might be due to the increase in rumen microflora activity , which led to improved feed efficiency ,resulting in an increase in DM intake (particularly ,roughage intake) and daily gain. These results ,however are in line with those reported by Sissons (1988) and Makled (1991) who reported that the improvement in body gain and feed intake due to growth promoter supplementation may be attributed to the mode of action of probiotics which may operate by producing antibiotic substances and inhibiting harmful bacteria ,altering microbial metabolism and decrease intestinal pH .

It could be concluded that gain: feed and DM intake increased linearly with increasing level of Bio – top / head / day in the ration of lambs.

Table (2): Effect of Bio-top supplementation on live body weight gain,feed consumption and efficiency of fattening lambs.

Item	Experimental treatments			
	T1	T2	T3	T4
NO.of animal	4	4	4	4
Av.Initial body weight (kg)	37.338	39.25	38.38	38.50
Av.Final body weight (kg)	49.87	53.13	52.88	53.75
Total gain (kg) / head	12.50	13.88	14.5	15.25
Av.Daily gain (gram)	0.139[b]	0.154[b]	0.161[b]	0.169[a]
DM intake,kg.				
CFM (kg)	286.85	288.64	286.85	288.64
CFM gm /day / head	797	802	797	802
Bean straw (kg)	87.75	91.40	92.30	95.06
Bean straw gm /day/head	244	254	256	264
Total DM intake,kg.	374.6	380.04	379.15	383.70
Feed conversion				
Kg.DM./ kg gain	7.49	6.85	6.53	6.29
Kg.TDN./ kg gain	5.00	4.79	4.60	4.5
g.DCP./ kg gain	0.83	0.762	0.721	0.719

a,b,c Means at the same row with different superscripts are significantly different at ($p<0.05$).

Digestibility coefficients:

The results of nutrients digestibility of experimental rations are shown in Table (3) .Supplementation rations with bio-top increased DM, OM,CP , EE and NFE digestibilities compared to control group(unsupplemented group),that may be due to the better response of rumen fermentation to the used additive. These results were similar to those obtained by Williams, 1989 who reported the improvement of protein digestibility may be due to the stimulation of rumen proteolytic bacteria . On the other hand , improving CF digestibility may be attributed to increase the number of rumen cellulolytic bacteria due to growth promoter supplementation (Williams,1989 and Gomez – Alarcon *et al.* 1990).The increase in digestibility , especially for CF , may have been due to an increase in the population and / or activity of rumen cellulolytic bacteria.Protolytc bacteria counts were also stimulated by yeast culture (Yoon and Stern , 1996 and Newbold *et al.*,(1996) .El Ashery *et al.*(2001) reported that supplementing rations with dried baker,s yeast for growing buffalo calves (as a growth promoter) increased CP digestibility and tend to increase CF digestibility relative to unsupplemented ration.NFE and OM digestibility had the same trend. Slightly improve has been shown with EE digestibility with increasing supplemented level of Bio – top compared with control group.The differences between groups not significantly.

Table (3) :Effect of Bio-top supplementation on nutrients digestibilities of experimental rations.

Groups	DM	OM	CP	CF	EE	NFE
Group 1	68.65 ± 0.2363	69.20 ± 0.5074	74.85 ± 0.3326	57.25 ± 1.1658	72.35 ± 1.0000	73.40 ± 1.1536
Group 2	68.70 ± 0.3000	69.50 ± 1.0642	75.10 ± 0.9609	57.75 ± 0.5840	72.35 ± 0.4619	73.75 ± 0.6062
Group 3	69.30 ± 0.8401	69.92 ± 0.9305	75.95 ± 0.5132	58.45 ± 0.4822	73.35 ± 0.4252	73.95 ± 0.1914
Group 4	70.10 ± 04444	71.00 ± 0.3329	77.2 ± 0.3279	59.35 ± 0.3993	74.10 ± 0.5500	75.22 ± 0.2987

Feeding value:

Regarding the nutritive values of the experimental rations , the results in Table (4) indicated that TDN, DCP and N – balance contents were increased linearly with increased of level of growth promoter supplemented .It was observed that TDN , DCP % for group 3 and 4 were significantly ($p < 0.05$) higher than group 2 and control group. This could be associated with the lowest nutrients digestibility values of group 2 and control group as shown in Table (3).Therefore ,the increased in digestibility lead to an increase in the feeding value . Results in Table (4) show also the best value of TDN and DCP were for group 4, and the lowest for control group.

Despite the varying N intake from different diets varying in group's rations as the results of Bio – top supplementation , all animals remained in positive apparent N-balance.It could be observed significant differences($p < 0.05$) in nitrogen balance between groups. Group 4 (10 gm Bio - top / head /

day) has highest N-balance than other groups followed with group 3 and 2 then control group . This findings are in agreement with El Ashery *et al.* (2001) who found that feeding values of buffalo calves ration (TDN and DCP) supplemented with live dried baker;s yeast and yeast culture showed higher ($p < 0.05$) than control groups (unsupplemented rations) .

Table (4):Effect of Bio-top supplementation on feeding values of rations

Group	TDN %	DCP %	NB g/h/day
T1	66.72[b]	11.08[b]	5.33[b]
T2	69.95[b]	11.11[b]	5.56[b]
T3	70.36[a]	11.24[a]	6.22[a]
T4	71.51[a]	11.43[a]	6.45[a]

a,b,c Means at the same column with different superscripts are significantly different at ($p<0.05$).

Rumen parameters:

Ruminal microbial activity was evaluated as ph and concentrations of ammonia – N and total volatile fatty acids (TVFA). The data of rumen pH values are shown in Table (5) . The results showed that there a significant differences between experimental group .The results revealed that the rumen pH values at 3 hours post feeding were slightly lower ($p>0.05$) in treated groups than control .All average values were above ph 6.0 which indicated a better digestion of cellulolytic materials (Mertens,1978).Results of rumen pH indicated that the highest for the control group (6.19) and the lowest value (5.64) was for group 4 (10 gm Bio – top / head / day) at 3 hours post feeding .It appears from the data in table (6) that increasing Bio – top level in the ration caused a decreased in pH value. Concerning the effect of time of sampling it was found that the ruminal ph were higher for pre-feeding samples while the lowest ph values was obtained after 3 hours post feeding , then it began to reincrease.This trend was similar to findings of Abou'l – Ella et.al.,(2002) and Lashein *et al.*, 1995 who found that ruminal pH value of sheep was the highest shortly before the morning meal then declined to the minimum at 3 – hours after feeding then begin rise again .Parashad *et al.*, (1972) reported that rumen ph is one of the most important factors affecting the fermentation in the rumen and influence its function and it varies in a regular manner depending on the nature of the diet and on the time that it is measured after feeding and reflects changes of organic acids quantities in the ingestia .

Concentration of VFA's of rumen liquior as affected by the level of Bio – top supplementation are shown in Table (5).It has been observed that the minimum value before feeding and increase after 3 hours, to the maximum values , again decreased after 6 hours.At 3 h after feeding group 4 showed the highest level VFA concentration followed by group 3 and group 2,while the lowest value was for control group. The differences were not significantly .Ruminal VFA's values obtained in this study were within the normal levels (3.07 – 19.9 m.eq /dl of rumen liquor) reported by Kandil *et al.*,1996 as

shown in table (6) .The increase in VFA concentration at 3 h post feeding lead to the decreases observed in ph values. Ahmed and Salah (2000) concluded similar effect of yeast culture (YC) at two levels (4 and 8 gm / head / day). Similar trends was reported by Taie *et al.* (1998).This may have been due to the increase in the bacterial counts and activity (Erasmus *et al.* ,1992 and Putnam et al .,1997). Furthermore,Mehrez 1992 ,reported that ,in generally the pattern of VFA's followed revealed that there was a close reverse relationship with the pH values at all times and reflects pattern of fermentation in the rumen.

Ammonia – N concentration tended to increased with supplemented groups with Bio –top as shown in Table (5).It was increased gradually as a result of supplementing 5 , 7.5 and 10 gm of Bio - top / head / day.The highest value was recorded for group 4 followed by group 3 and 2 , while the lowest value for control group . The obtained results of CP digestibility is supporting this idea. However, it should pointed out that supplemental groups had higher DCP % ,which was mainly a reflection the better digestibility CP. Moreover , values of NH3 – N were insignificant increased with increasing Bio – top level supplementation. The prefeeding NH3-N values were low .However ,at 3 h after feeding the mean values for groups increased, then decreased after 6 h.These results are in favor with those reported by Lashein *et al.*, (2001) and Mehrez *et al.* (2001),who reported that NH_3-N values increased and reached the peak value at 2 hours after feeding .The NH3 – N concentration recorded (23.99 mg / 100 ml RL) as an average of all groups .This value would satisfy microbial needs for N and hence maximize rate of fermentation and synthesis of microbial protein in the rumen . Moreover , studies by Kumar *et al.*(1994) on buffalo calves showed that addition of yeast culture as a promoter growth ,to the diets resulted in increasing rumen pH ,total bacteria ,number of protozoa ,TVFA's ,total N and microbial protein with decreasing ammonia – N and improving digestion of cellulose and DM disappearance.

Table(5) :Effect of Bio-top supplementation on rumen liquor parameters.

Groups	PH Time hour				VFA's (meq / 100 ml) Time hour				NH3-N (mg / 100ml Time hour			
	0	3	6	Average	0	3	6	Average	0	3	6	Average
G1	6.78	6.19	6.13	6.37[b]	6.55	8.12	7.45	7.83	18.63	29.68	21.22	22.81
G2	6.72	6.14	6.53	6.46[a]	6.59	8.45	7.62	7.48	18.55	30.46	22.15	22.22
G3	6.85	5.86	6.46	6.39[a]	6.35	8.86	7.55	7.59	18.85	33.13	22.82	24.93
G4	6.71	5.64	6.25	6.14[a]	6.61	9.13	7.23	7.35	19.05	35.35	23.6	26.00

a,b,c Means at the same column with different superscripts are significantly different at ($p<0.05$).

Economical efficiency:

Economical efficiency were expressed as feed cost per unit gain (LE/ kg gain) and income over feed cost per unit gain as shown in Table (6).It could be noticed that lowest feed cost per unit gain (LE/ kg gain) for lambs of control group (unsupplemented group) ,while the highest income over feed cost per unit gain was for lambs of group 4. Income over feed cost per

unit gain was lower for lambs of group 1 ,2 and 3 by 6.65 , 2.3 and 2.3 % compared with those in group 4 ,respectively.

Table (6) : Effect of Bio-top supplementation on economic efficiency of fattening lambs.

Economic efficiency	T1	T2	T3	T4
Total feed cost (LE)*	225.6	260.28	275.44	293.68
Feed cost / head /day (LE /day)	0.627	0.723	0.765	0.816
Feed cost per unit gain(LE/kg)	4.51	4.70	4.70	4.81
Income over feed cost (LE) **	68.60	73.73	76.14	79.08
Income over feed cost head/ day (LE / day)	0.191	0.204	0.216	0.220

*** Feed cost /unit gain(LE/kg gain) =Total feed cost (LE) ÷ body weight gain (kg)**

**** Income over feed cost (LE) =(body weight gain (kg) x price (LE) per kg body weight) – Total feed cost (LE) (Abou'l Ela 2000).Where,price of 1 ton CFM =630 LE,and bean straw = 250 LE .Price of 1 kg live body weight = 10 LE as the dominant market price of finishing ram lambs at Assiut market in this period. Additional feeding cost (exceeded the material cost of Bio – top) for supplemental groups 2 , 3 and 4 were 8.1 ,12.5 and 16.2 LE.,respectively.**

In view of the obtained results,it could be concluded that supplementation with Bio – top (as a commercial probiotic) to fattening lambs as a feed additive during this stage to reduce the cost of the product (meat production) by increasing the feed efficiency of roughages.Furtheremore, supplementation with Bio – top at rate of 10 gm / head / day showed to be the best rate for digestibility ,feeding values ,economic efficiency and performance of fattening Rhamany lambs .

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تأثير إضافة منشط النمـــــو (بيو – توب) على أداء و نشـــاط الكـــرش فـــى الحملان .

عـــلى عبد الله أبو العلا

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تم دراسة تأثير إضافة البيو – توب كمنشط للنمو بمستويات مختلفة على أداء و معـــاملات الهضـــم و بعـــض مقاييس سائل الكرش للحملان الرحمانى .استخدم فى هذه الدراسة ١٦حمل بمتوسط وزن ٣٩ كجم قسمت الى أربع مجا ميع متساوية .غذيت الحملان على عليقة تحتوى على مخلوط العلف المركز (٧٠ %) طبقا لمقـــررات NRC (١٩٨٥) للأغنام وكملت بقية الاحتياجات الجافة من تبن الفول حتى الشبع .المجموعة الأولى استخدمت كعليقة مقارنـــه بدون اضافه لمنشط النمو و المجاميع الثانية و الثالثه و الرابعة أضيف الى علائقها ٥ و ٧,٥ و ١٠ جرام مســحوق بيو – توب كمنشط للنمو / راس / يوم و استمرت التجربه ٩٠ يوم. تم عمل أربع تجارب هضم بالطريقة المعتادة و تم أخذ عينات من سائل الكرش على فترات مختلفة (قبل الإفطار و بعد ثلاثة ساعات و ست ساعات من التغذية.

و أوضحت النتائج ارتفاع المأكول من المادة الجافة فى العلائق المضاف إليها منشط النمو كما زادت معـــدلات النمو اليومى للمجموعات المعاملة بالمقارنة بمجموعة المقارنه و كان أعلا معـــدل نمـــو يومـــى ($p < 0.05$) للمجموعة الرابعة (١٠ جرام بيو – توب /رأس / يوم) وكان أقلها نموا مجموعة المقارنه. لوحظ تحســن الكفـــاءة الغذائية فى المجاميع المعاملة بالمقارنة بمجموعة المقارنه و كان هذا التحسن يتزايد بزيادة مستوى منشط النمو بالعليقة . زادت قيم معاملات هضم المادة الجافة و العضوية و البروتين الخام و الألياف الخام و المستخلص الخالي من النتروجين و مستخلص الإثير للمجاميع المعاملة بالمقارنة بمجموعة المقارنه. كما أخذت نفس الاتجاه القيمة الغذائية على صـــورة مجموع المركبات الكليه المهضومة و البروتين الخام المهضوم .كما أدى إضافة منشط النمـــو الـــى تحســن الاتـــزان النتروجينى و تخمرات الكرش خاصة تركيز الأحماض الدهنية الطيارة التى تدل على ارتفاع نشـــاط الكائنـــات الدقيقـــة بالكرش. من ناحية الكفاءة الاقتصادية أدت إضافة البيو – توب الى العلائق الى زيادة صافى العائد اليومى وبذلك بينت الدراسة بأن اضافة البيو – توب لحملان التسمين و خاصة عند مستوى ١٠ جرام / رأس / يوم يـــؤدى الـــى زيـــادة معدلات الأداء و معاملات الهضم مع زيادة الاستفادة من مواد العلف الخشنة و تحسين الكفاءة الغذائية كمادة جافه مأكولة لكل كيلوجرام نمو و العائد بعد خصم تكاليف التغذية.