

## Reproductive performance and blood constituents of Damascus goats as affected by yeast culture supplementation

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### ABSTRACT

The effect of dietary yeast culture (YC) supplementation during pre-mating and gestation periods on reproductive performance and some blood constituents were studied on 39 Damascus does aged 3-4 years and weighed  $45.87 \pm 1.00$  kg. The animals were divided into 3 comparable groups (13 does each). The 1<sup>st</sup> group fed a basal ration composed of 60% concentrate feed mixture (CFM) plus 40% clover and rice straw. The 2<sup>nd</sup> and 3<sup>rd</sup> groups fed respectively the same basal ration plus daily supplement of 2.5 or 5.0 g YC which added to a part of the ground CFM. Results showed that YC supplementation significantly ( $P < 0.05$ ) improved reproductive ability, conception rate, fertility, fecundity, prolificacy, kids born/does joined, kids weaned/does kidded, kg of kids born or weaned/does joined or /does kidded. It also resulted in higher ( $P < 0.05$ ) serum total protein, albumin, total lipids, creatinine, zinc concentrations and AST activity but it decreased cholesterol and urea concentration than control does.

Serum total protein, albumin concentrations and A/G ratio were increased ( $P < 0.05$ ) and globulin concentration was decreased ( $P < 0.05$ ) during the last weeks before kidding. AST activity significantly decreased ( $P < 0.05$ ) from mating up to wk 8, thereafter increase was mild and gradual till kidding. Meanwhile ALT concentration recorded its minimum value at the 10<sup>th</sup> wk of pregnancy while it increased gradually till kidding. Serum total lipids concentration was significantly decreased ( $P < 0.05$ ) from mating till kidding. Total cholesterol concentration was significantly increased ( $P < 0.05$ ) from mating up to the 8<sup>th</sup> wk of pregnancy, thereafter it was gradually decreased till kidding. Concentration of blood urea recorded its minimum value at the 10<sup>th</sup> week of pregnancy (mid pregnancy). Thereafter it gradually increased till 18<sup>th</sup> week

and decreased till kidding. Meanwhile, serum creatinine concentration increased gradually from conception till kidding. The concentration of serum Zn recorded its maximum value at the 8<sup>th</sup> week of pregnancy, thereafter it gradually decreased till kidding. However, the concentration of serum Fe recorded its minimum value at the 14<sup>th</sup> week of pregnancy, thereafter it gradually increased up to the 18<sup>th</sup> week and decreased till kidding.

It can be concluded that yeast culture supplementation could be added to does ration at the level of 2.5 or 5.0 g/head/day during pre-mating and gestation periods in order to improve reproductive traits and blood components.

**Key words:** Yeast culture, goats, reproductive traits, blood parameters, growth performance.

### INTRODUCTION

Yeast and yeast cultures have been widely used in ruminant to manipulate rumen fermentation to improve animal performance. However, resulted performance of ruminants, fed yeast culture, had been varied. These differences may depend on many factors such as diet composition; forage to concentrate ratio, type of forage fed, yeast dose, feeding strategy and stage of lactation. Several studies have showed that live yeast and yeast culture supplementation may increase feed intake and milk production of dairy cows (**Robinson and Garrett, 1999 and Dann et al., 2000**). Some researchers have suggested that feeding yeast products may be most beneficial to dairy cows during gestation and early lactation because of their effects on rumen fermentation and nutrient digestion (**Robinson and Garrett, 1999; Dann et al., 2000 and Erasmus et al., 2005**).

Moreover, supplementation of yeast culture (YC) to ruminant diets improved animals performance and also found to increase blood total protein (**El-Shaer, 2003**), glucose

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concentration (Sharma *et al.*, 1998) and decrease cholesterol (Fayed *et al.*, 2005). An improvement in reproductive performance was also obtained by Abdel-Khalek (2003) in Friesian cows and Ebrahim (2004) in Egyptian buffaloes. The relationship between nutrition and reproduction in ruminants is complex and often quite variable. However, nutrient supply, as a component of the management system, need to be carefully evaluated. Milk yield and fertility are principal factors affecting profitability of dairy herds, since solving fertility problems in dairy herd increased milk production (Boland, 2002). Recently, clinical trials in non-pregnant animals have shown that the consumption of probiotics can improve and maintain animals' physiological function and prevent oxidative stress that might eventually have beneficial effects on postpartum reproductive function (Zebeli *et al.*, 2010).

The objectives of the present study were to illustrate the effect of yeast culture supplementation during pre-mating and gestation period on reproductive performance and some blood components of Damascus goats.

### MATERIALS AND METHODS

The present study was conducted at El-Gemmiza Experimental Station, Animal Production Research Institute, Ministry of Agriculture, Egypt. In this respect, 39 Damascus goats of 3-4 years old and  $45.87 \pm 1.00$  kg body weight were divided into 3

comparable groups. The first group was fed according to NRC (1981) on a basal ration composed of 60% concentrate feed mixture (CFM) plus 40 % clover, and rice straw and served as control. The other two groups were fed the same basal ration supplemented daily with either 2.5 or 5.0 g /h/d YC (BGY-35: Table 2), respectively.

The YC was added to a part of the ground CFM. Chemical composition of the basal rations and YC are shown in Tables 1 and 2.

All animals were free of diseases and parasites and housed in semi-shaded well ventilated pens. After two weeks of starting YC supplementation, all does were subjected to heat detection 3-times daily. Does exhibited receptive and stood for mounting were subjected to natural mating by a fertile buck. Reproductive traits of does were recorded including; conception rate (CR) as percentage of does conceived/does joined; fertility as percentage of does kidded/does joined; fecundity as percentage of kids born/does joined; prolificacy as percentage of kids born/does kidded (kidding rate); reproductive ability as percentage of kids weaned of does joined; percentage of kids weaned/does kidded; kilograms of kids born/does joined; kilograms of kids born/does kidded; kilograms of kids weaned/does joined; kilograms of kids weaned /does kidded; mortality rate and finally percentage of dead kids from birth to weaning.

**Table (1): Chemical composition of feedstuffs on DM basis**

Ingredients	Items %						
	DM	OM	CP	EE	CF	NFE	ASH
Yeast culture	91.66	97.72	37.83	4.51	8.44	46.94	2.28
CFM*	88.7	91.20	14.70	3.02	13.90	59.58	8.80
Berseem 2 <sup>nd</sup> cut	15.3	86.3	16.40	1.90	20.40	47.60	13.70
Berseem 3 <sup>rd</sup> cut	19.3	88.8	14.70	3.10	22.60	48.40	11.20
Rice straw	91.21	84.38	3.63	0.99	37.54	42.22	15.62

\*CFM: The ingredients of concentrate feed mixture were 30% wheat bran, 15 % undecorticated cotton seed meal, 35 % yellow corn, 15 % sunflower meal, 3 % molasses, 1.5 % limestone and 0.5 % salt.

**Table (2): Contents of YC (BGY-35, Manufactured by F. L. Emert., Co. USA), as fed.**

Vitamins, TDN & NEM		Amino acids		Minerals	
E	36.80 IU/kg	Arginine	1.83%	Calcium	0.22 %
Biotin	2.44 mg/kg	Cystine	0.58%	Phosphorus	0.60 %
Choline	3401.00 mg/kg	Histidine	0.85 %	Sodium	0.15%
Folic acid	7.80 mg/kg	Isoleucine	1.45 %	Potassium	0.20%
Niacin	245.50 mg/kg	Leucine	3.46 %	Magnesium	0.22%
Pantothenic acid	59.20 mg/kg	Lysine	1.63 %	Manganese	21.30 ppm
Riboflavin	18.25 mg/kg	Methionine	0.62 %	Iron	184.05 ppm
Thiamine	46.20 mg/kg	Phenylalanine	2.03 %	Copper	5.00 ppm
Pyridoxine	22.00 mg/kg	Threonine	1.37 %	Zinc	75.00 ppm
TDN	70.00 %	Tryptophan	0.38 %	Selenium	1.00 ppm
NEM	1.72 mcal/kg	Valine	2.05%	-	-

After parturition, kids were kept with their dams all time during the first 6 weeks then between 7 and 16.00h up to 8 weeks of age. Weighing kids was carried out weekly until weaning. Birth weight of each kid was recorded.

Blood samples were collected regularly at 2 wk intervals from 5 does /group by jugular vein puncture, just before morning feeding and drinking, starting at mating day. Harvested serum after centrifugation at 4000 rpm for 15 minutes was stored at – 20°C until chemical analysis for AST & ALT enzyme activities according to **Reitman and Frankel (1957)**; cholesterol & urea (**Henry, 1965**); creatinine (**Bartels, 1971**); total protein and albumin (**Doumas and Biggs, 1972 a & b**) using commercial colorimetric kits. Globulin was calculated by subtraction concentration of albumin from that of total protein then albumin/globulin ratio (A/G ratio) was also estimated. Commercial kits were used for calorimetric determination of serum total lipid. Concentration of Iron, Zinc, calcium and phosphorus in serum were determined by the absorption spectrophotometer.

The obtained data were subjected to statistical analysis using general linear model procedure adapted by **SPSS (1999)**. Significant differences among means were separated by **Duncan (1955)** multiple range test.

## RESULTS AND DISCUSSION

### *Reproductive performance*

Data in Table (3) clearly indicate that dietary supplementation of YC significantly ( $P \leq 0.05$ ) improved conception rate, fertility, fecundity, prolificacy, reproductive ability, kids born per does joined and kids born or weaned per does kidded. While YC insignificantly affected does kidded /does conceived, does aborted / does conceived and twinning frequency as compared to control does. Mortality rate of kids from birth to weaning was the lowest with 5.0g YC-supplemented group (15.38%) than the 2.5g YC- supplemented and control groups (38.46%). These findings may partially due to trace elements contents of YC, especially iron, zinc, manganese, copper and selenium (Table 2) and /or improvement of digestibility of CP, CF, EE and NFE (**Komonna, 2007 and Mousa et al, 2012**). The present results agree with those of **Komonna (2007), Abdel-Rahman et al. (2012) and Mousa et al, (2012)**, in sheep, who reported considerable improvement in reproductive performance in response to YC supplementation yielding a positive effect on the general health of treated animals. **Saleh (2004)** also stated that probiotics (bacteria or yeast) had a positive effect on activities of lactic acid bacteria in sheep intestine, which in turn improved their inhibition potency to the unfriendly bacteria such as E. coli.

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**Table (3): Reproductive performance of Damascus goats as affected by yeast culture supplementation (BGY-35).**

Items	Treatments		
	T1 (Control)	T 2 (2.5 g / YC)	T3 (5 g / YC)
Number of does joined with buck	13	13	13
Conception rate, ( %)	(53.85%) <sup>c</sup>	(100.0%) <sup>a</sup>	(92.31%) <sup>b</sup>
Fertility, does kidded / does joined, ( %)	(53.850%) <sup>b</sup>	(92.31%) <sup>a</sup>	(84.62%) <sup>ab</sup>
Does kidded/ does conceived, ( %)	-100.00%	-92.31%	-91.67%
Does aborted / does conceived, ( %)	0.00%	-7.96%	-8.33%
Fecundity, kids born/does joined, (%)	(92.31%) <sup>b</sup>	(169.23%) <sup>a</sup>	(153.86%) <sup>a</sup>
Kids born per doe joined, (%)	0.92 <sup>b</sup> ± 0.33	1.69 <sup>a</sup> ± 0.21	1.54 <sup>a</sup> ± 0.27
Prolificacy, kids born/does kidded, (%)	12 (171.45) <sup>b</sup>	22 (183.33%) <sup>a</sup>	(181.82%) <sup>a</sup>
Kids born per doe kidded	1.71 <sup>b</sup> ± 0.34	1.83 <sup>a</sup> ± 0.17	1.82 <sup>a</sup> ± 0.23
Twining frequency, ( %)	-42.86%	-66.67%	-81.82%
Number of viable kids at weaning	7	17	18
Reproductive ability (kids weaned/does joined), %	53.85 <sup>b</sup> ± 0.14	130.77 <sup>a</sup> ± 0.13	138.46 <sup>a</sup> ± 0.14
Kids weaned/does kidded , %	100.00 <sup>b</sup> ± 0.17	141.67 <sup>a</sup> ± 0.13	163.64 <sup>a</sup> ± 0.14
Kg. of kids born per doe joined	1.62 <sup>b</sup> ± 0.37	4.23 <sup>a</sup> ± 0.34	3.65 <sup>a</sup> ± 0.41
Kg. of kids born per doe kidded	3.00 <sup>b</sup> ± 0.47	4.58 <sup>a</sup> ± 0.36	4.31 <sup>a</sup> ± 0.37
Kg. of kids weaned per doe joined	7.00 <sup>b</sup> ± 1.99	17.85 <sup>a</sup> ± 1.29	16.92 <sup>a</sup> ± 2.22
Kg. of kids weaned per doe kidded	13.00 <sup>b</sup> ± 2.16	20.00 <sup>a</sup> ± 1.72	19.33 <sup>a</sup> ± 1.65
Mortality rate of kids from birth to weaning %	38.46	38.46	15.38

<sup>a</sup> and <sup>b</sup> values in the same row not sharing the same superscripts significantly differed (P<0.05).

Otherwise, **Callaway and Martine, (1997)** demonstrated that YC provides soluble growth factors (i.e., organic acids, vitamin B and amino acids), which would stimulate growth of rumen bacteria that utilize lactate and digest cellulose.

In addition, it could be observed that kilograms of kids born or weaned per does joined or does kidded were the highest (P≤0.05) in group supplemented with 2.5g YC followed by 5.0g YC supplemented group then the control group. These results are in agreement with the obtained results by **Helal and Abdel-Rahman (2010), Abdel-Rahman et al, (2012) and Mousa et al, (2012)** who reported that supplementation of yeast to ewes diets increased litter weight at birth and weight gain of their offspring. *Saccharomyces cerevisiae*

was reported to balance the energy and the acid-base metabolism in dairy cattle resulted in a significantly higher milk production (**Brydt et al., 1995**). **Masek et al.,(2008) and Helal and Abdel-Rahman ,(2010)** came to the same conclusion in sheep since increasing milk yield of ewes is an important factor for the production of robust lambs at weaning. **Ismaiel et al. (2010)** reported that yeast culture increased average daily gain of lambs. It was also reported that, yeast or yeast culture are rich source in vitamins, enzymes and other important nutrients and co-factors which make them attractive as digestive enhancers (**Dawson, 1994**).

**Blood components:**

**Protein fractions:**

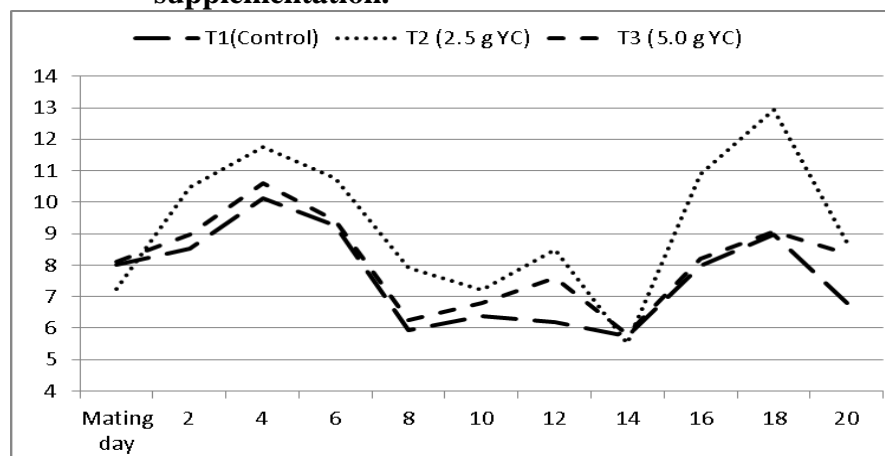
Yeast culture supplementation significantly ( $P < 0.05$ ) increased blood total protein and albumin concentrations (Fig 1). Meanwhile it was not significantly affected blood globulin and A/G ratio. In general, T2 (2.5g YC) recorded the highest ( $P < 0.05$ ) value of serum total protein followed by T3 (5.0g YC) than control (Fig 1-a). Concentration of total protein was higher ( $P < 0.05$ ) by about 21.52 and 6.43% in T2 (2.5g YC) and T3 (5.0g YC) than control, respectively. The present results are in agreement with the results of **El-Shaer, (2003)** and **Fayed et al., (2005)** in sheep and **Kholif, (2001)** in goats. They found that the YC supplementation led to increase blood total protein. Moreover, **Abdel-Khalek et al. (2000)** and **Ragheb et al., (2003)** found that concentration of total protein was higher in yeast culture (Lacto-Sacc) treated calves than control. The present results could be related to the beneficial effect of YC supplementation on increasing protein digestibility through the enzymatic effect of protease and alteration amino acid profile of digesta due to increasing microbial protein synthesis (**Williams, 1989** and **Abdel-Khalek et al., 2000**).

Yeast culture supplementation improved digestibility of CP, CF, EE and NFE (**Komonna, 2007** and **Mousa et al, 2012**), which indicated better utilization of dietary

protein through digestive tract. The results agree with the conclusion of **Kumar et al. (1980)** who reported that there was a positive correlation between dietary protein and serum protein. **Yousef and Zaki (2001)** noticed that the increase in digestibility of CP may be a reason for the increase of serum total protein. Also, serum proteins are considered reliable index reflecting health and performance characteristics of the animals (**Talha et al., 2009**). Additionally, **El-Masry and Marai (1991)** related the variations in serum proteins to alteration in thyroid hormone level and in albumin or globulin concentrations.

Albumin concentration in blood serum was significantly ( $P < 0.05$ ) lower in control and T3 than T2 (Fig 1-b). It can be noticed that T2 (2.5g YC) recorded significantly ( $P < 0.05$ ) higher values of serum albumin by about 25.89 and 23.85% than control and T3 (5.0g YC), respectively. The significant increase in blood albumin suggested normal status of liver function, since liver is the main organ of albumin synthesis. The obtained results are in accordance with those reported by **El-Shaer (2003)** and **Mahrous and Abou-Ammou (2005)** for sheep and **Kholif (2001)** for goats. The increase of albumin in response to YC supplementation may be associated with improved nitrogen absorption (**Talha et al., 2009**).

**Fig 1: Blood protein fractions of Damascus pregnant does as affected by yeast culture supplementation.**



**Fig 1-a: Total Protein, g/dl**

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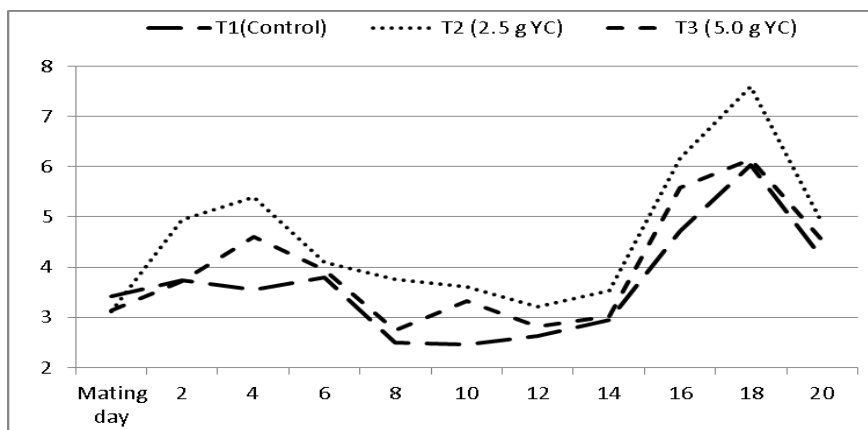


Fig 1-b: Albumin, g/dl

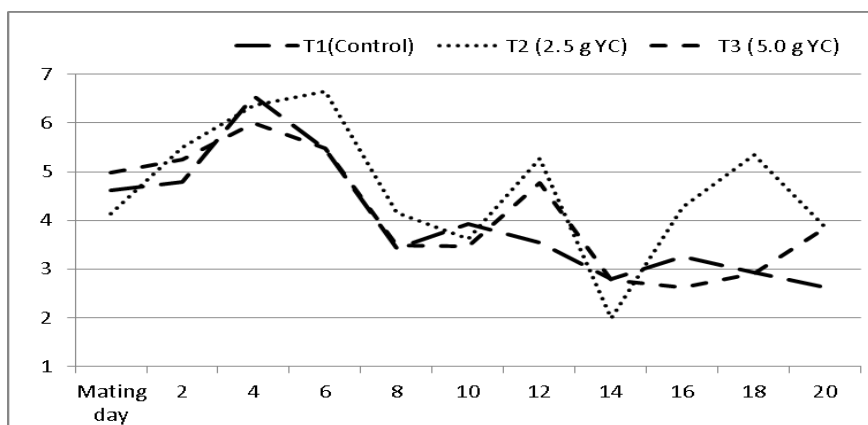


Fig 1-c: Globulin, g/dl

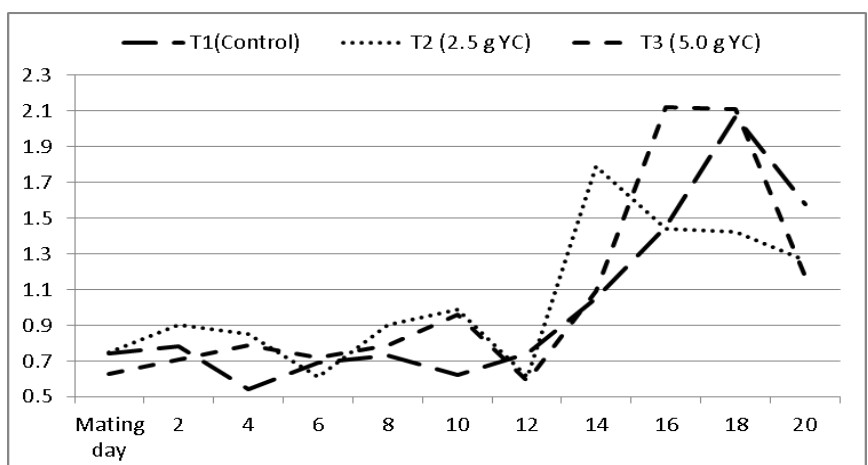


Fig 1-d: A/G ratio

Serum albumin have been shown to be a good indicator of nitrogen status, especially in small ruminants (Ingraham and Kapple, 1988; Gaskins *et al.*, 1991 and Laborde *et al.*, 1995). On the other hand, El-Ashry *et al.* (2004) reported that the increase in serum albumin of heifer calves supplemented with YC (Lacto-Sacc) may be due to its role as growth promoter

on decreasing the deamination of amino acids. Also, albumin acts as a significant mobile protein store for amino acids (White *et al.*, 1959).

There were no significant differences in globulin between treatments. However, the globulin content in blood serum was the highest with T2 (2.5g YC), followed by T3 (5.0g YC),

while control had the lowest value (Fig 1-c). Concentration of globulin was higher by about 16.54 and 4.01% in T2 and T3 does, respectively. These results agree with those obtained by **El Ashry et al. (2004)** who used lacto-Sacc with growing buffalo, yeast culture (**Abdel-Rahman et al.,2012**) with sheep and live dried yeast with sheep (**Mousa et al, 2012**). These three studies revealed that such supplements caused increase of serum globulin level compared to the control. As reported by **Hussien (1986)** this increase was mainly due to the increase in globulin and development of the immune system. The increase in globulin level may be induced by an improvement in immune response in does supplemented with YC. These results agree with those obtained by **Talha et al., (2009)** who used Mannan Oligosaccharides (MOS) and probiotic with calves. **Chang and Mowat (1992)** found that chromium supplement to yeast may improve the immune response of calves due to increasing serum total immunoglobulin. The high level of globulin of T2 and T3 may indicate good develop of immunity status (**Kitchernham et al., 1975**). It was reported by **Maxine (1984)** that albumin tends to predominate over globulin in sheep and goats. The globulin concentrations in T2 and T3 were within the normal values indicating good immunity status of animals.

The A/G ratio ranged from 1.00 to 1.06 showing lowest values for control, meanwhile the T3 recorded the highest values. YC supplementation did not affect blood A/G ratio (Fig 1-d). These results are in accordance with those reported by **El-Shaer (2003)** and **Mahrous and Abou-Ammou (2005)** on sheep and **Kholif (2001)** on goats. They also reported that sheep or goats fed diets supplemented with YC or treated with fungi or yeast did not show differences in A/G ratios. It is important to note that all values of A/G ratio were higher than 1.0, which indicate that animals did not suffer from any health problems that might affect the performance of experimental animals as reported by **EL- Sayed et al. (2002)**.

Regarding the effect of gestation period on protein fractions in the blood serum, it clearly appears that concentrations of total protein and albumin increased ( $P<0.05$ ) till 4

wk then decreased gradually till 14 wk and increased again till kidding. Meanwhile, globulin concentration increased ( $P<0.05$ ) till 4 wk then gradually decreased till kidding. While, the A/G ratio increased ( $P<0.05$ ) from 12 to 18 weeks before kidding as shown in (Fig 1-d). However, serum total protein and albumin concentrations and A/G ratio were increased ( $P<0.05$ ) while globulin concentration was decreased ( $P<0.05$ ) during the last weeks before kidding. These findings are in agreement with those reported by **Abdel-Hafez (2002)** and **Abdel-Rahman et al. (2012)** on Suffolk x Ossimi ewes and **Mousa et al (2012)** on Rahmani ewes. **Abdel-Hafez (2002)** reported that the pre-partum decrease in blood protein fractions might be attributed to the increase in fetus weight and increase of protein breakdown required for gluconeogenesis. While **Putnam and Schwab (1994)** reported that YC stimulates rumen microbes that altered microbial protein synthesis and increase protein passage as well as protein yield. The obtained results regarding effect of gestation period is in agreement with those reported by **Abdel-Ghani et al. (2003)** that blood globulin concentration was decreased during late pregnancy in buffaloes. However, **El-Malky (2007)** found that YC supplementation had no significant effect on A/G ratio during pregnancy.

#### **Liver function:**

Activity of AST was significantly ( $P<0.05$ ) higher in T2 (2.5g YC; 108.40) than control (70.67) and T3 (5.0g YC; 76.59). However, ALT was not significantly affected by YC supplementation. Activities of AST or ALT increased by about 53.39 & 41.53% or 6.04 & 11.13%, in serum of does supplemented with 2.5g YC (T2) than control and T3, respectively. **Abdel-Rahman et al. (2012)** found similar results with pregnant ewes fed diets supplemented with YC. The present results are also in agreement with those reported by **Komonna, (2007)** and **Mousa et al, (2012)**, while disagrees with the results obtained by **Abdel-Khalek et al (2000)** and **Kholif and Khorshed (2006)** who reported that value of serum AST was not significantly affected by using yeast or selenized yeast treatments. In the

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present study the values of serum AST are comparatively higher while those of ALT are lower than the normal range obtained in the previous studies on does. These results may be due to several factors such as feeding practices, genetics control, response to stress, age, liver function and body weight (Talha, *et al*, 2009).

Supplementation of YC increased ( $P<0.05$ ) concentration of total lipids by about 14.36 and 18.85 % and decreased cholesterol concentration by about 2.27 and 1.17% in T2 (2.5g YC) as compared to the control and T3 (5.0 g YC), respectively,. Mean value of serum total lipids for animals treated (T2) was significantly ( $P<0.05$ ) higher than that of control animals (T1). Meanwhile, cholesterol was not significantly affected by YC supplementation. El-Ashry *et al*. (2004) and

Talha *et al*. (2009) working on buffalo calves and Abdel-Rahman *et al*. (2012) and Mousa *et al* (2012) working on sheep, found that feeding diets treated with yeast culture resulted in a decrease of cholesterol concentration. The current study indicated that increasing total lipids was associated with decreasing cholesterol levels as affected by YC supplementation, which may be attributed to stimulation of bacterial lipids synthesis (Williams, 1989) and / or due to anti-cholesterolemic effect of YC treatments (Fuller, 1989).

Regarding the effect of gestation period, Fig (2-a) illustrates that the activity of AST significantly decreased ( $P<0.05$ ) from mating up to wk 8, thereafter increase was mild and gradual till kidding.

**Fig 2: Some blood metabolites and liver function of Damascus pregnant does as affected by yeast culture supplementation.**

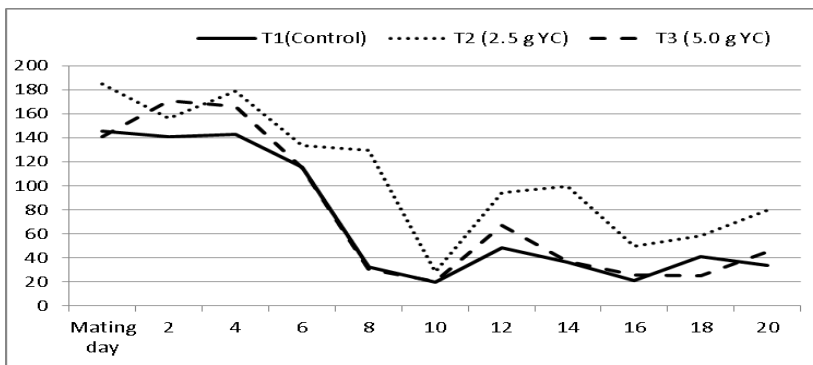


Fig 2-a: AST, U/L

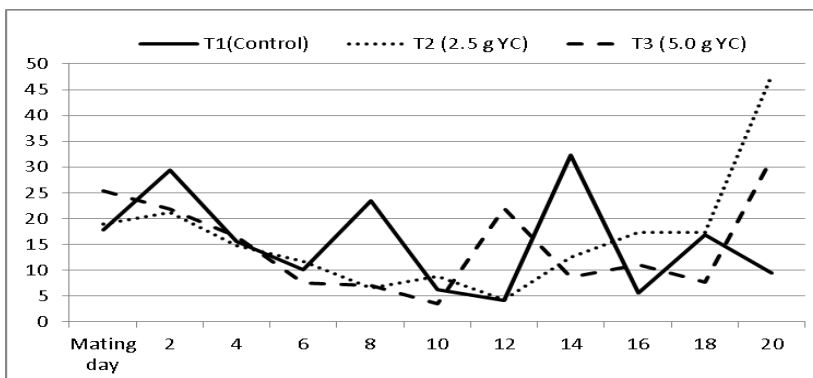


Fig 2-b: ALT, U/L



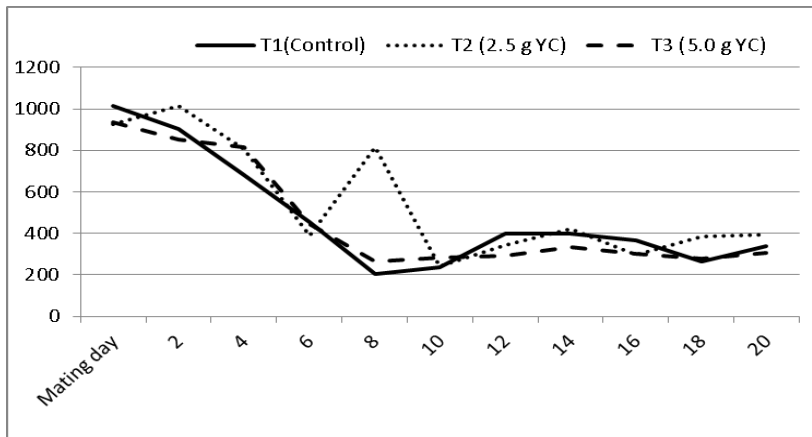


Fig 2-c: Total lipids, g/dl

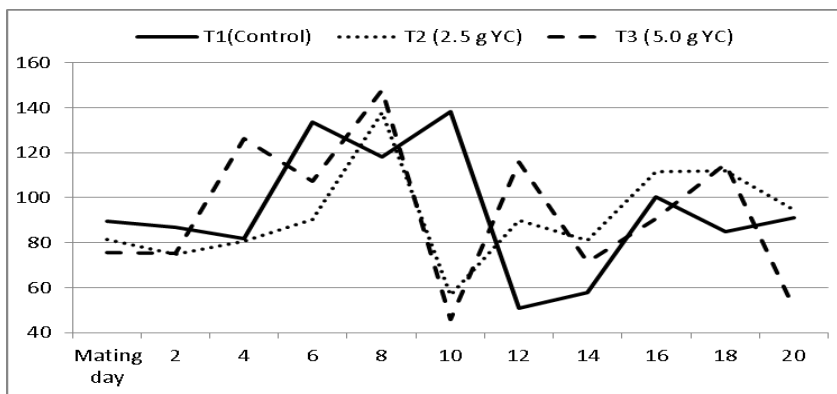


Fig 2-d: Cholesterol, g/dl

Meanwhile ALT concentration recorded its minimum value at the 10<sup>th</sup> wk of pregnancy. It was also reported that serum AST and ALT increased from mating up to 90 days after mating, while they declined at the beginning of the last week of pregnancy (Abdel-Hafez, 2002). Moreover, Juma *et al.* (2009) found that pregnancy period had an influence on concentration of AST and ALT enzymes which mostly in the second period of gestation and during the first week of parturition (Sarma and Ray, 1985). The increased activity of AST and ALT enzymes may be due to more requirements of amino acids during milk production (Vihan and Rai, 1987). Blood total lipids concentration was significantly decreased ( $P < 0.05$ ) from mating till kidding (Fig 2-c). Meanwhile, Piccione *et al.* (2009) found that total lipids was increased in the middle and end of pregnancy compared to early pregnancy, probably due to the reduced insulin that mediated inhibition of lipolysis observed in late pregnancy (Schlumbohm *et al.*, 1997). Lipogenesis stimulate by insulin is also

responsible of the increased values of total lipids observed in ewes during early lactation. Total cholesterol concentration significantly increased ( $P < 0.01$ ) from mating up to wk 8, thereafter it was gradually decreased till kidding. Additionally, Juma *et al.* (2009) found that total cholesterol concentration in blood serum was increased significantly during pregnancy period. This may be due to enhanced progesterone synthesis in the placenta (Lin *et al.*, 1977), and its decline after parturition due to estrogen decrease in plasma LDL (Ganog, 1995).

#### **Kidney function:**

Supplementation with YC did not show stable trend on urea N (Fig 3-a). On the other hand, Petr Dolezal *et al.*, (2011) found lower concentration in serum urea-N of cows in response to YC supplementation which suggested as an indicator of better nitrogen metabolism and utilization of protein. These results are in agreement with those reported by El-Ashry *et al.* (2003) and Shakweer (2003)

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that sheep fed diets treated with yeast or fungi exhibited lower urea concentration than control. However, the results obtained by **Abdel-Rahman *et al.* (2012)** and **Mousa *et al.* (2012)** on sheep, found that feeding diets treated with yeast culture resulted in an increase of urea concentration. These controversial results may be due to the differences in levels and duration of YC treatments (**Khattab *et al.*, 2003** and **Mahrous and Abu-Ammou, 2005**) with sheep and **Kholif (2001)** with goats.

Serum creatinine started to increase than control in response to YC supplementation after

10 weeks of gestation till end of experimentation (Fig 3-b). Supplementation of YC increased ( $P<0.05$ ) serum creatinine concentration by about 6.37 and 2.55% as compared to the control (Table 6). Mean value of serum creatinine for the treated animal (T2) was significantly ( $P<0.05$ ) higher than that control animals. The present results are in agreement with those of **Abdel-Rahman *et al.* (2012)** and **Mousa *et al.* (2012)** on sheep, who found that feeding diets treated with yeast culture resulted in an increase of creatinine concentration.

**Fig (3): Some blood metabolites, kidney function and minerals of Damascus pregnant does as affected by yeast culture supplementation.**

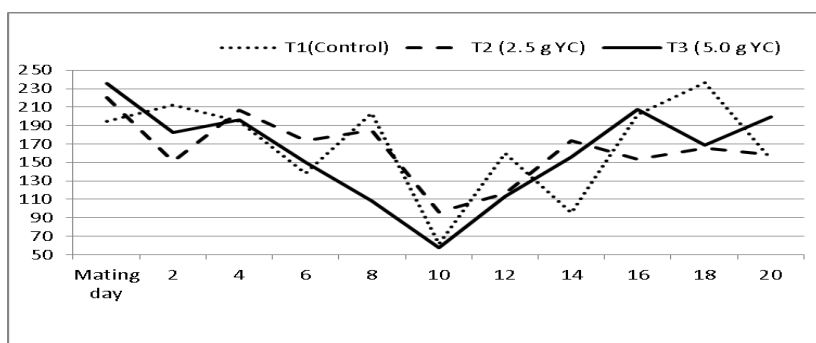


Fig 3-a: Urea. mg/dl

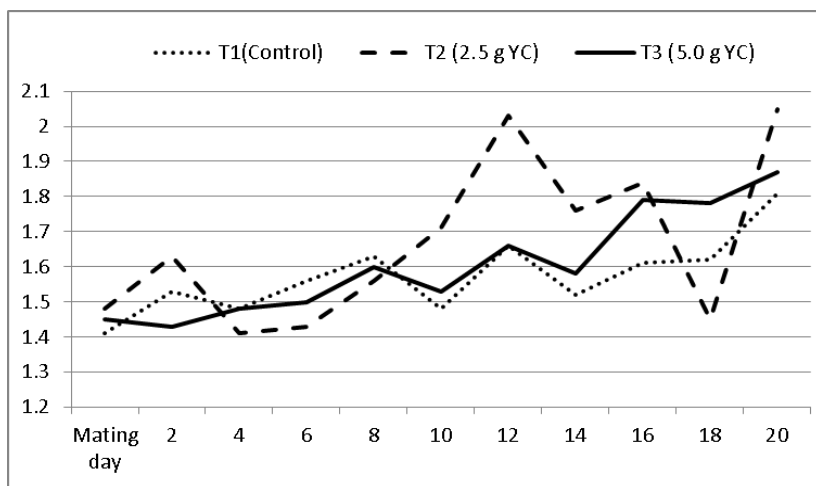


Fig 3-b: Creatinine, mg/dl

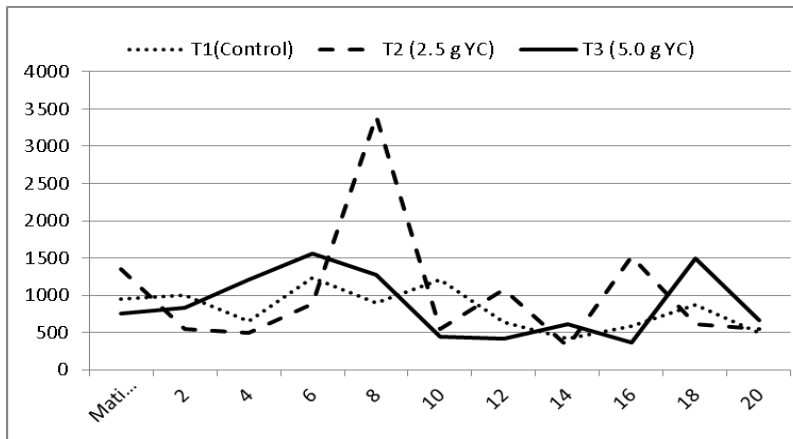


Fig 3-c: Zinc, µg/dl

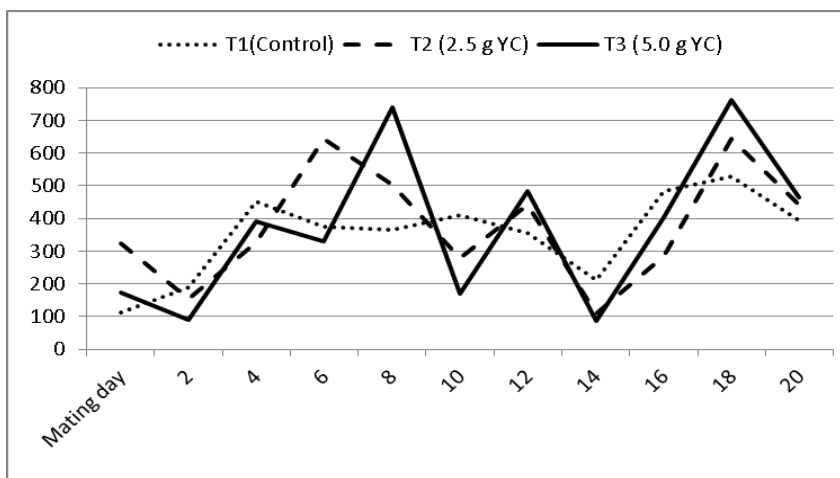


Fig 3-d: Fe, µg/dl

However, some authors reported no significant effect or a decrease of creatinine concentration with the addition of yeast culture (Khattab *et al.*, 2003 in sheep; Salem *et al.*, 2002 in lactating buffaloes; Ragheb *et al.*, 2003 in Friesian calves and El-Kholi *et al.*, 2005 in buffalo calves). Generally, serum creatinine level is a useful indicator of glomerular filtration in the kidney.

Regarding the effect of gestation period, Fig (3-a) illustrates that the concentration of blood urea recorded its minimum value at the 10<sup>th</sup> week of pregnancy (mid pregnancy), thereafter it gradually increased till 18<sup>th</sup> week and decreased till kidding. Meanwhile, serum creatinine concentration (Fig 3-b) increased gradually from conception till kidding. The increase in creatinine during this period may be attributed to foetus development (Korshom *et al.*, 1993). The present results are in agreement with those obtained by Abdel-Hafez (2002) in

sheep, who reported that creatinine was increased from 21 days after mating till last week of pregnancy. While, Abdel-Rahman *et al.* (2012) in sheep, found that creatinine concentration recorded its maximal value at the 9<sup>th</sup> wk of pregnancy then it decreased gradually till lambing. El-Sherif and Assad (2001) and Durak and Altinek (2006) in sheep, found that plasma urea level started rising during 10<sup>th</sup> week of pregnancy and reached a peak at parturition. Meanwhile, the present study showed a significant decrease on day 75 of gestation period with progressive increase before and after this day (Fig 3-a). The reason behind those highest values might be the increase of cortisol level that affecting the catabolism of protein in the body (Silanikove, 2000).

Zn levels (Fig 3-c) and Fe levels (Fig 3-d) show that YC supplementation for pregnant does did not maintain a clear trend during

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pregnancy. However, concentrations of both Zinc and Fe measured for some weeks over gestation showed increase than control. Such increases in serum Zn and Fe levels may be due to the apparent effect of YC on minerals in body, which might protect animals against stresses resulting in losses of several trace elements such as Zn, Fe, Cu and Mn. Such pattern is in agreement with that reported by **Chang and Mowat (1992)**. On the other hand, it is well known that immunoglobulin production is regulated by specific enzymes that have trace elements at their core, the most common being Zn, Fe and Cu (**Fielden and Rotilio, 1984**). Possibly, YC may participate in certain enzymes that increase immunoglobulin synthesis and indirectly affects immunoglobulin levels.

With regards to the effect of gestation period, Fig (3-c & d) illustrates that the concentration of serum Zn recorded its maximum value at the 8<sup>th</sup> week of pregnancy. Thereafter it gradually decreased till kidding. Meanwhile, the concentration of serum Fe recorded its minimum value at the 14<sup>th</sup> week of pregnancy, thereafter its gradually increased till 18<sup>th</sup> week and decreased till kidding. **Abdel-Hafez (2002)** reported that the serum Zn level increased during oestrus, at 21 and 90 days after mating and decreased during late pregnancy. **Gurdogan et al, (2006)** found that the serum Zn concentration tended to decrease at 100 and 150 days of pregnancy. The low Zn level obtained in late pregnant animals may be due to increasing foetus requirement (**Mehta and Gangwar, 1983**). **Gurdogan et al, (2006)** reported that serum Fe concentration decreased at 60, 100 and 150 days of pregnancy in sheep. While, **Pinar et al (2009)** found that Fe level decreased at late stage of pregnancy in goats. Decreased level of serum Fe may result from increased demand to Fe storage during normal pregnancy (**Barratt et al, 1994**). On the other hand, the recorded decline in serum Fe during late pregnancy could be related to the great demand to this element by foetus (**Swenson and Reece, 1993**), because the Fe concentration in the foetus liver increases continuously with the advance of pregnancy and reaches high levels in the fifth month in sheep (**Rallis and Papasteriadis, 1987**). An increase in the number of foetuses stimulates

this accumulation (**Hafez and Dyer, 1969**). In general, data in Fig 1, 2 & 3 suggest that the two levels of YC (*Saccharomyces cerevisiae*) supplements had improved some blood components without any undesirable effects on kidney or liver functions.

### CONCLUSION

It could be recommended that YC supplementation could be added to does ration at the levels of 2.5 or 5.0 g / head / day during pre-mating and gestation periods in order to improve reproductive traits blood components without any observed undesirable effects on kidney or liver functions.

### REFERENCES

- Abdel-Ghani, L.; Singh, C. and Singha, S. P. S. (2003)**. Effect of advanced pregnancy and early lactation on the changes in protein profile of plasma in Murrah Buffaloes. *Indian. J. Anim. Sci.*, 73: 1031 – 1032.
- Abdel-Hafez, M. A. M. (2002)**. Studies on reproductive performance in sheep. Ph. D. Thesis, Fac. Agric. Zagazig Univ. Egypt.
- Abdel-Khalek, A. E. (2003)**. Productive and reproductive performance of primiparous and multiparous Friesian cows fed rations supplemented with yeast culture (Yea-Sacc1026). *Egyptian J. Nutr. and Feeds*, 6 (Special issue) : 1095 –1105.
- Abdel-Khalek, A.E.; A.F. Mehrez and E.A. Omar (2000)**. Effect of yeast culture (Lacto-Sacc) on rumen activity, blood constituents and growth of suckling Friesian calves. *Proc. Conf. Anim. Prod. In the 21<sup>st</sup> Century, Sakha*, 18-20 April 2000: 201-210.
- Abdel-Rahman, H; G.A. Baraghit; A.A. Abu El-Ella; S.S. Omar; Faten F. Abo Ammo and O.F. Komonna (2012)**. Physiological responses of sheep to diet supplementation with yeast culture. *Egypt J. of Sheep & Goats Sciences*, Vol 7 (1): 27-38.
- Bartels, H. (1971)**. Colorimetric determination of creatinine. *Chem. Acta*, 32: 81.
- Barrett, J.F.R; P.G. Whittaker; J.G. Williams and T. Land (1994)**. Absorption of non-haem iron from food during normal pregnancy. *BMJ.*, 309: 79-82.

- Boland, M.P.** (2002). A new frontier in trace mineral supplementation. Navigating from Niche Markets to Mainstream. Proceeding of Alltechs, European, Middle Eastern and African Lecture Tour.
- Brydt, E.; Bata, A.; Lasztity, P.; Vajdovich, K. and Nagy, G.** (1995). Effect of viable *Saccharomyces cerevisiae* on the ruminal fermentation, acid-base metabolism and milk production of dairy cows. Magyar Allatorvosok Lapja, 50 : 543
- Callaway, E. S. and Martin, S. A.** (1997). Effects of a *Saccharomyces cerevisiae* culture on ruminal bacteria that utilize lactate and digest cellulose. J. Dairy Sci., 80 (9): 2035 – 2044.
- Chang, X. and D.N. Mowat** (1992). Supplemental chromium for stressed and growing feeder calves. J. Anim. Sci.. 70:559.
- Dann, H.M.; J.K. Drackley; G.C. McCoy; M.F. Hutjens and J.E. Gareett** (2000). Effects of yeast culture (*Saccharomyces cerevisiae*) on prepartum intake and postpartum intake and milk production of Jersey cows. J. Dairy Sci. 83: 123-127.
- Dawson, K. A.** (1994). Current and future role of yeast culture in animal production. A review of research over the last six years. Proc. Alltech's 8th Ann. Symp. (Suppl.)Alltech. Tech. Publ., Kentucky, USA.
- Doumas, B.T. and Biggs, H.G.** (1972a). The colorimetric determination of total protein in serum or plasma. Standard Methods of Clinical Chemistry. Vol 7. Academic Press. New York.
- Doumas, B.T. and Biggs, H.G.** (1972b). The colorimetric determination of albumin in serum or plasma. Standard Methods of Clinical Chemistry. Vol 7. Academic Press. New York.
- Duncan, D. B.** (1955). Multiple range and multiple F-test. Biometrics, 11: 1.
- Durak, M.H. and A. Altinek** (2006). Effect of energy deficiency during late pregnancy in Chios ewes on free fatty acids,  $\beta$ -hydroxybutyrate and urea metabolites. Turkish Journal of Veterinary and Animal Sciences 30, 497-502.
- Ebrahim, S. E. A.** (2004). Physio-nutritional studies on Egyptian buffaloes. Ph. D. Thesis, Fac. Agric. Mansoura Univ.
- El-Ashry, M. A.; Fayed, A. M.; Youssef, K. M.; Salem, F. A. and Aziz, H. A.** (2003). Effect of feeding flavomycin or yeast as feed supplement on lamb performance in Sinai. Egyptian J. Nutr. and Feeds, 6 (Special issue) : 1009 – 1022.
- El-Ashry, M. A.; El-Sayed, H. M.; El-Koussy, H. M.; Khorshed, M. M.; Saleh, H. M. and Ammar, A. K.** (2004). Effect of Lacto-Sacc on feed efficiency, some blood constituents and reproductive performance of growing Egyptian buffalo heifers. Egyptian J. Nutr. Feeds, 7 (1) : 97 – 108.
- El-Kholi, N. M.; El-Ashry, M. A.; Shahin, k. A. and Mazen, H. A.** (2005). Comparison between the effects of leasure yeast and local bakery yeast on nutrients digestibility, growth performance and blood parameters of buffalo calves. J. Agric. Sci. Mansoura Univ., 30 (1) : 173 – 183.
- El-Malky, O. M. A.** (2007). Factors affecting retained placenta in Egyptian buffaloes. Ph. D. Thesis, Fac. Agric., Minufiya Univ., Egypt.
- El-Masry, K.A. and I.F. Marai** (1991). Comparison between Friesian and water buffaloes in growth rate, milk production and blood constituents during winter and summer conditions of Egypt. Anim. Prod. 53:39.
- El-Shaer, E. K. H. I.** (2003). Nutritional studies in ruminants. "Effect of yeast culture supplementation and concentrate: roughage ratio on performance of growing lambs." Ph. D. Thesis, Fac. Agric., Mansoura Univ.
- EL-Sherif M.M.A. and F. Assad** (2001). Changes in some blood constituents of Barki ewes during pregnancy and lactation under semi arid conditions. Small Ruminant Research 40, 269-277.
- El-Sayed, H. M.; El-Ashry, M. A.; Metwelly; H.M., Fadel, M. and M.M. Khorshed** (2002). Effect of chemical and biological

## Reproductive performance and blood constituents of Damascus goats as affected by yeast culture supplementation

- treatments of some crop-residues on their nutritive value:3- Digestion coefficient, rumen and blood serum parameters of goats. *J. Nutrition and Feeds*, 5(1): 55-69.
- Erasmus, L.J.; P.H. Robinson; A. Ahmadi; R. Hinders and J.E. Garrett (2005).** Influence of prepartum and postpartum supplementation of a yeast culture and monensin or both on ruminal fermentation and performance of multiparous dairy cows. *Anim. Feed Sci. Technol.* 122: 219-239.
- Fayed, A. M.; El-Ashry, M. A.; Youssef, K. M.; Salem, F. A. and Aziz, H. A. (2005).** Effect of feeding favomycin or yeast as feed supplement on ruminal fermentation and some blood constituents of sheep in Sinai. *Egyptian J. Nutr. And Feeds*, 8 (1) Special Issue : 619 – 634.
- Fielden, E.M. and G. Rotilio (1984).** The structure and mechanism of Cu / Zn super oxide dismutase. In: R. Lontie (Ed.). *Copper Proteins and Copper Enzymes Vol. II.* P 27. CRC Press, Boca Raton, FL.
- Fuller, R. (1989).** Probiotics in man and animals. A Review. *J. Appl. Bacteriol.*, 66: 365.
- Ganog, W.F. (1995).** Review of Medical Physiology. 17<sup>th</sup> ed. Lang Medical Publication, Los Altos California. p 12.
- Gaskins, H.R.; W.J. Croom, Jr; J.M. Fernandez; J.E. Van Eys; W.M. Hagler, Jr, and W.L. Johnson (1991).** Metabolic responses to protein supplementation and slaframine in goats and sheep fed roughage. *Small Ruminant Res.*, 6: 73-84.
- Gurdogan, F; A. Yildiz and E. Balikci (2006).** Investigation of serum Cu, Zn, Fe and Se concentrations during pregnancy (60, 100 and 150 days) and after parturition (45 days) in single and twin pregnant sheep. *Turk. J. Vet. Anim. Sci.* 30:61-64.
- Hafez, E.S.E.and Dyer, A.I. (1969).** *Animal Growth and Nutrition.* Lea &Febiger. Philadelphia. Pp 56-57.
- Helal, F.I.S. and K.A. Abdel- Rahman (2010).** Productive performance of lactating ewes fed diets supplementing with dry yeast and/or bentonite as feed additives. *World J.Agric. Sci.* 6(5):489-498.
- Henry,R.J. (1965).** *Clinical chemistry. Principles and Technics,* P: 293.
- Hussien, H.M. (1986).** Effect of different feeding system on some blood parameters in male buffalo. Ph.D. Thesis, Fac. of Agric. Ain Shams Univ. Egypt.
- Ingraham, R.H. and L.C. Kappel (1988).** Metabolic profile testing. *Vet. Clin. North Am. Food Pract.*,4: 391-411.
- Ismail A.M.; El-Far, A. H. and Abou-Ganema,I.I.(2010).** Effect of Tonilistat and Roemin W2 supplementations on the performance of lambs.*Int. J. Bio. and Life Sci.*,6(4):222-229.
- Juma, F.T; N.N. Maroff and K. T. Mahmood (2009).** Effect of some hormones on reproductive performance and some serum biochemical changes in synchronized black goats. *Iraqi J. of Veterinary Sci.* 23 (2) : 57-61.
- Khattab, H. M.; Salem, F. A.; Mohamed, S. M. and Nagh, H. M. (2003).** Effect of Yea-Sacc, Lacto-Sacc supplementations and energy levels on performance, rumen activity, some blood constituents and carcass traits in growing sheep. *Egyptian J. Nutr. and Feeds*, 6 (Special issue) : 991 – 1007.
- Kholif, S. M. M. (2001).** Effect of biological treatments of low quality roughage on milk yield and composition.Ph.D. Thesis, Fac. Agric., Ain-Shams Univ. , Egypt.
- Kholif, S.M. and M.M. Khorshed (2006).** Efect of yeast or selenized yeast supplementation to rations on the productive performance of lactating buffaloes, *Egypt J. Nutr. and Feeds* 9 (2): 193-205.
- Kitchennham, B.A.; G.J. Rowlands; R. Manston and S.A. Dew (1975).** The blood composition of dairy calves reared under conventional and rapid growth system. *Brit. Vet.J.*,31.
- Komonna,O.F.A. (2007).** Phsiological and nutritional responses of sheep to some feed additives. Ph.D. Thesis,Fac. Agric., Minufiya University.

- Korshom, M; S.A. Hattab and A.A. Mandour (1993).** Some biochemical studies in the blood of Egyptian buffalo-cows during last week of pregnancy and four weeks post-partum. *Bni-Suf Veterinary of Medical Research* 3 (1): 43-50.
- Kumar, N.U.B; B. Singh and D.N. Verma (1980).** Effect of different level of dietary protein and energy on growth of male buffalo calves. *Ind. J. Anim .Sci.*, 51: 513.
- Laborde, C.J.; A.M. Chapa; D.W. Burleigh, D.J. Salgado and J.M. Fernandez (1995).** Effects of processing and storage on the measurement of nitrogenous compounds in ovine blood. *Small Ruminant Res.*, 17: 159-166.
- Lin, D.S; R.M. Pitkin and W.E. Connor (1977).** Placental transfer of cholesterol in to the human fetus. *Am. J. Obs. Gyn.* : 128-735.
- Mahrous, A. A. and Abou Ammou, F. F. (2005).** Effect of biological treatments for rice straw on the productive performance of sheep. *Egyptian J. Nutr. Feeds*, 8 (1) Special Issue : 529 – 540.
- Masek, T.; Ž. Mikulec; H Valpotic.; N. Antunac; N. MikuIec; Z. Stojevic.; N Ilipovic and Pahovic (2008).** Influence of live yeast culture (*Saccharomyces cerevisiae*) on milk production and composition, and blood biochemistry of grazing dairy ewes during the milking period. *Acta Vet. Brno*, 77: 547-554.
- Maxine, M.B. (1984).** Outline of Veterinary Clinical Pathology. (Fourth Ed). The Iowa State Univ. Press Iowa USA.
- Mehta S.N and P.C. Gangwar,(1983).** Carbonic anhydrase and acid-base balance in relation to thermal stress in buffaloes, *Bubalus bubalis*.*Int. J. Biometeorol.*, 1983; 27: 41-46.
- Mousa, Kh. M.; O. M. El-Malky; O.F.Komonna, and S. E. Rashwan (2012).** Effect of some yeast and minerals on the productive and reproductive performance in ruminants. *J. of American Sci.* 8 (2): 291-303
- N.R.C.(1981).** Nutrient Requirements of goats. National Academy of Science. National Research Council, Washington, DC, U.S.A.
- Petr Dolezal; Jan Dvorack; Jan Dolezal; Jana Cermakova; Ladislav Zeman and Katarzyna Szwedziak (2011).** Effect of feeding yeast culture on ruminal fermentation and blood indicator of Holstein dairy cow. *Actavel Brno*, 80: 139-145.
- Piccione, G; Caola, G; Giannetto, C; Grasso, F; Runzo, S. C; Zumbo, A and Pennisi, P (2009).** Selected biochemical serum parameters in ewes during pregnancy, post-parturition, lactation and dry period. *Anim. Sci. Papers and reports.* 27 (4): 321-330.
- Pinar, T; Semiha,D and Ebubekir, C (2009).** Changes in same macro minerals and biochemical parameters in female healthy Siirt Hair goats befor and after parturition. *J. of Animal and Veterinary Advances* 8 (3) :530-533.
- Putnam, D. E. and Schwab, C. G. (1994).** Mode of action of yeast culture. *J. Anim. Sci.* 72: 2 – 5.
- Ragheb, E. E.; Mehrez, A. F. and Abdel-Khalek, A. E. (2003).** Digestibility coefficients, blood parameters, feed efficiency and growth performance of weaned Friesian calves fed diet supplemented with lacto-Sacc. *Egyptian J. Nutr. Feeds*, 6 (Special Issue): 693 – 702.
- Rallis, T and Papasteriadis, A.A.(1987).** study on iron and copper concentrations of foetal liver in sheep. *Zentralbl. Veterinarmed. A.*, 34: 582-584.
- Reitman, S. and Frankel, S. (1957).** Colormetric GOT and GPT transminases determination. *Amer. J. Clin. Path.*, 28: 57.
- Robinson, P.H. and J.yE. Garrett (1999).** Effect of yeast culture (*Saccharomyces cerevisiae*) on adaptation of cows to postpartum diets and on lactational performance. *J. Anim. Sci.* 77: 75-89.
- Saleh, H. M. (2004).** Effect of supplementing fenugreek seeds as galactagogue on performance of lactating ewes. *Egyptian J. Nutr. Feeds*, 7 (2) : 155 – 165.

## Reproductive performance and blood constituents of Damascus goats as affected by yeast culture supplementation

- Salem, F. A.; Hassanin, S. H. and El-Shewy, A. A. (2002).** Effect of *Saccharomyces cerevisiae* supplementation on milk yield and composition, digestibility and some blood constituents in lactating buffaloes. Proc., 1<sup>st</sup> Ann. Sci. Conf. Anim & Fish Prod. Mansoura 24 & 25 Sep., 131 – 142.
- Sarma, P.V. and T.K. Ray (1985).** Effect of physiological stats on some blood enzyme level and it relation to milk production. Ind. J. Dairy sci. XXXIII: 237-238.
- Sharma, R.; Nagia, O. P.; Gupta, M. and Sharma, R. (1998).** Effect of yeast culture (*Saccharomyces cerevisiae*) plus growth medium supplementation on rumen fermentation in buffalo calves fed high roughage diet. Inter. J. Anim. Sci., 13(2): 121 – 126.
- Schlumbohm, C; H. P. Sporleder; H. Gurtler and J. Harmeyer (1997).** The influence of insulin on metabolism of glucose, free fatty acids and glycerol in nomo-and hypocalcaemic ewes during different reproductive stages. Deutsche Tierarztliche Wochenschrift 104, 359-365.
- Shakweer, I. M. E. (2003).** Effect of biological treatments of rice straw and sugar cane bagasse on their digestibility, nutritive value, ruminal activity and some blood parameters in rams. Egyptian J. Nutr. and Feeds, 6 (Special issue) : 925 – 940.
- Silanikove, N.( 2000).** Effects of heat stress on the welfare of extensively managed domestic ruminants. Livestock Production Science 67, 1-18.
- SPSS (1999).** Statistical package for the social sciences, Release 10, SPSS Inc., Chicago, USA.
- Swenson M.J; Reece, W.O.(1993).** Duke's Physiology of Domestic Animals. 11<sup>th</sup>. Ed. Cornell University Press, Ithaca, NY. Pp.518-527.
- Talha, M.H.; R.I. Moawd; A. A. Abu El-Ella and G.H. Zaza (2009).** Effect of some feed additive on rearing calves from birth to weaning:1- Productive performance and some blood parameters. J. Agric. Sci. Mansoura Univ., 34: 2611-2631.
- Vihan, V.S and T.K. Rai (1987).** Certain hematological and biochemical attributes during pregnancy, parturition and post-parturition in sheep and goats. Ind. J. Anim. Sci. 57: 1200-1204.
- White, A.; H.P. Emil and S. Dewitt (1959).** Principales of Biochemistry. 2<sup>nd</sup> ed. McGraw-Hill Book Company, INC. London, UK.
- Williams, P. E. V. (1989).** The mode of action of yeast culture in ruminal diets. A review of the effect on rumen fermentation patterns. Pp. 65 in Biotechnology in the Feed Industry. Alltech Tech. Publ., Nicholasville, Kentucky, USA.
- Yousef, H.M and A.A. Zaki (2001).** Effect of barley radical feeding on body weight gain and some physiological parameters of growing Friesian crossbred calves. Egypt J. Nutri and Feeds 4 (Special Issue ) : 565-472.
- Zebeli, Q., S. Iqbal, S. M. Dunn and B. N. Ametaj. (2010)** Infusion of commensal bacteria intravaginally improved overall health status of transition dairy cows. J. Anim. Sci. Vol. 88, E-Suppl. J. Dairy Sci. 93: E-Suppl. Abstract # W2.



التي وضعت. كذلك أدت اضافة الخميرة الى ارتفاع معنوى فى تركيزات كل من البروتين الكلى ، الألبومين ، الليبيدات الكليه ، والكرياتينين ، والزنك وانخفاض غير معنوى لتركيز الكولستيرول فى الدم مقارنة بمجموعة الكنترول. لوحظ أيضا زيادة معنوية فى تركيز البروتين الكلى والالبومين ونسبة الألبومين الى الجلوبيولين وانخفاض تركيز الجلوبيولين خلال فترة الحمل حتى الأسبوع الأخير قبل الولادة. بينما ظهر تذبذب واضح فى تركيز كل من البيبيدات الكليه ، الكولستيرول ، اليوريا ، الكرياتينين ، الزنك ، والحديد ونشاط انزيم (الانزيمات الناقلة لمجموعة الأمين) AST و ALT خلال فترات الحمل.

ونستخلص من نتائج هذه الدراسة أن استخدام الخميرة (-PGY 35) خاصة عند مستوى 2.5 جم أو 5.00 جم / رأس / يوميا للعنزات خلال فترتى التلقيح والحمل للحصول على التحسن المرغوب فى الأداء التناسلى و قياسات الدم.

أستخدم فى هذه الدراسة 39 عنزة دمشقى عمر 3-4 سنوات ومتوسط وزن  $45.87 \pm 1.00$  كجم وذلك لدراسة تأثير اضافة الخميرة على بعض الصفات التناسلية والانتاجيه ومكونات الدم خلال فترتى التلقيح والحمل. وقد قسمت هذه العنزات الى ثلاث مجموعات متماثلة (13 بكل مجموعة) حيث غذيت على عليقة أساسية (60% علف مركز : 40 % مادة خشنة (برسيم + قش أرز) مع اضافة الخميرة الجافة يوميا الى جزء ناعم من العلف المركز بمعدل 2.5 جم / رأس للمجموعة الثانية ، 5.0 جم / رأس للمجموعة الثالثة بينما تركت المجموعة الأولى دون اضافة الخميرة كمجموعة مقارنة. وقد أوضحت نتائج هذه الدراسة أن اضافة الخميرة أدى الى تحسين معنوى فى كل من القدرة الاخصابيه ، معدل الخصوبه ، معدل الحمل ، معدل المواليد ، معدل الولادات ، نسبة الجديان المولوده : الأمهات المعدة للتلقيح ، نسبة الجديان المفطومة : للأمهات التى وضعت وعدد كيلو جرامات الجديان المولودة والمفطومه لكل من الأمهات المعدة للتلقيح والأمهات

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