EFFECTS OF USING YUCCA SCHIDIGERA POWDER AS FEED ADDITIVE ON PRODUCTIVE AND REPRODUCTIVE EFFICIENCY OF ZARAIBI DAIRY GOATS

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ABSTRACT

This study was performed to evaluate the influence of *Yucca schidigera* powder (YSP) as feed additive on productive and reproductive performance and some blood constituents of Zaraibi dairy goats. Twenty- four Zaraibi dairy goats aged >3 years and weighed averagely 34.49±2.15 kg were used. Does were randomly selected and divided into three similar groups (8 does each). This experiment was conducted 21 days before breeding season and continued till early lactation stage. The three experimental groups were; G1 as control group fed the basal rations without any addition, G2 received the basal rations plus 250 mg YSP/h/d while, G3 nourished the basal rations plus 500 mg YSP/h/d. The basal rations consisted of 60% concentrate feed mixture (CFM) + 40% roughage "berseem hay (BH) + rice straws (RS)". The obtained results elucidated that G2 and G3 had (P<0.05) heavier live body weight (LBW) during trimester time, at 140 days of gestation, post- kidding, post-weaning and at 6 weeks of lactation than does in G1. In addition, LBW of does in G2 and G3 had similar (P>0.05) improvement through other weights compared to G1. The data demonstrated that all measured reproductive parameters had changed (P<0.05) among groups and affected by YSP intake. The conception rate was 87.5, 100 and 100 % and fertility rate showed 62.50, 75.00 and 87.50% for G1, G2 and G3, respectively. The present results showed better (P<0.05) milk harvest during suckling period and the early 6 weeks of lactation with G2 and G3 than G1. Regarding oestrus resumption (days) and oestrus duration (hours), does in G2 and G3 had shorter (P<0.05) oestrus resumption and longer (P<0.05) oestrus duration either post-kidding or post- weaning than those in G1. The blood concentrations of cholesterol, triglyceride and urea were lower (P<0.05) in G2 and G3 than in G1. However, the lowest (P<0.05) glucose and calcium levels were occurred in G1 compared to the both treated groups G2 and G3. These results suggest that addition of YSP to diets of nanny goats at levels 250 or 500 mg /h/d had positive and beneficial effects on reproductive performance and some blood parameters. Consequently, results supported the hypothesis that feed additives such as YSP can be successfully used to modify milk harvest during suckling and early lactation stages as well as live body weight for dairy Zaraibi goats.

Keywords: *Dairy goats, production and reproduction performance, Yucca schidigera powder.*

INTRODUCTION

It is dictated that use of chemicals as feed additives should be phased out and that only natural products should be used in animal production. In this context, diets fortified with natural feed additives as *Yucca schidigera* powder (YSP) have been safely used for long time for both human and livestock. Yucca plant originates from the *Lily* family of plants and grows wild in the deserts. It is used as food additive or medicine and contains steroides, saponins and glycocomponents (Kaya *et al.*, 2003). The glycofraction has ammonia binding capabilities, saponins fraction has antiprotozoal and antibacterial effect. Thus, yucca is currently used as dietary supplement for livestock and also to improve performance (Santoso *et al.*, 2004[a]). Moreover, Gudev *et al.* (2005) revealed that blood biochemical parameters were improved when lambs received YSP at level of 2g / day/ head and also, contributed to better protein utilization and inhibitory of pathogenic bacteria. Indeed, YSP has got increasing effect on rumen microbe populations and inhibition of Gram-positive bacteria (Katsunuma *et al.*, 2000) and inhibition of urease activity in the rumen that reflect on growth (Santoso *et al.*, 2004[b]). According to Aregheore (2005), YSP

has improved dry matter intake, body weight change, daily protein, metabolizable energy and ruminal total volatile fatty acids concentrations in goats. In a study by Mellado *et al.* (2009) it was also concluded that 50% dry matter of alfalfa hay in the diet can be safely replaced with of yucca without adverse effects on goats' growth performance. On the other hand, Holtshausen *et al.* (2009) revealed that YSP stimulate the immune system, increased resistance to disease and reduce mortality when fed at late pregnancy and have several beneficial properties on production of dairy cows. Also, Rajendar *et al.* (2012) reported that yucca is an antioxidants and free-radical scavenge, which may aid in suppressing reactive oxygen species (ROS) that stimulate inflammatory responses in tissue. At all events, Oztasan (2013) strapped that yucca regulates metabolic disturbances (impaired lipid metabolism), achieves moderate glucose and re-institutes the homeostatic balance.

Therefore, the present study was structured as a preparatory work in order to identify the effects of YSP addition to diets on live body weight from flushing to early milking weeks, reproductive performance, milk yield and some blood components of Zaraibi dairy goats.

MATERIALS AND METHODS

The study took place at El-Serw Experimental Research Station which belongs to Animal Production Research Institute (APRI), Agriculture Research Center, Ministry of Agriculture, Egypt. The study was conducted during the breeding season 2013.

Yucca schidigera powder

This product is a 100% natural powder made entirely from the stem of *Yucca schidigera* plant species exclusively. Yucca powder had not neither preservatives nor carriers and is mechanically produced without any chemical extraction. The YSP contains 5.88% moisture, 5.46% crude protein, 0.69% crude fat, 24.10% crude fiber, 7.59% ash and 56.38% (min. 30%) carbohydrates (Kowalczyk *et al.*, 2011).

Experimental animals and feeding

Twenty-four mature and healthy Zaraibi dairy goats of 34.49±2.15 kg BW and > 3 years old were used in this experiment. The does were allocated to three equal groups (8 does/treatment); G1 untreated control group; G2 and G3 served as treated groups. G1 received daily basal experimental rations (BER) consisted of 60% concentrate feed mixture (CFM) + 40% berseem hay (BH) + rice straw (RS) plus orally rice paper sack / head without dose. G2 and G3 daily nourished YSP orally using rice paper sack as carrier, at rates 250 and 500 mg per head plus BER diet. G1, G2 and G3 received the experimental rations and YSP for 21 days (as flushing) pre-mating season up to end of lactation months at levels meet requirements of NRC (2007). The basal rations were offered twice daily at 8:00 and 16:00 hours, while YSP doses given at 8:00 h. Fresh water and salt blocks were available all experimental time. All goats used for the experiment were housed in semi-shaded well ventilated pens. The contents of samples from CFM, BH and RS were analyzed according to AOAC (2007) as shown in Table 1.

Changes in live body weight of does

All nanny goats were weighed at begin of flushing, pre-mating season, post-mating season, at last trimester of gestation (at 90 days of pregnancy), at 140 days of gestation, post-kidding, post-weaning and at 6 weeks of lactation season (early milking stage).

Reproductive performance

After does served by a fertile buck the reproductive traits of does were recorded as conception rate (number of does conceived / does served), fertility (number of does kidded / does served), fecundity (number of all kids born / does served), prolificacy (number of a live kids born / does kidded).

Parity patterns were recorded; single birth rate (number of does kidded singles/ number of alive does kidded; twins birth rate (number of does kidded twins/ number of alive does kidded; triplet birth rate (number of does kidded triplet/number of does kidded).

Table 1: Chemical analysis of basal experimental diet (on DM basis).

Chemical composition (%)	Basal experimental diets		
	CFM	BH	RS
Organic matter	91.14	85.17	84.55
Crude protein	14.40	12.88	3.36
Ether extract	3.04	1.68	1.24
Crude fiber	14.30	33.91	37.50
Nitrogen free extract	59.40	36.70	42.45
Ash	8.86	14.83	15.45

Reproductive potential (number of weaned kids/does kidded, kilograms of kids birth/ does served, kilograms of kids birth/ does kidded, kilograms of kids weaned/ does served, kilogram of kids weaned / does kidded.

Milk yield during both suckling and early weeks of lactation

Milk amount was assayed during suckling period at 7, 15, 30, 60 and 90 days using oxytocin methods depicted by Khalifa *et al.* (2013) Also, milk harvest was recorded at the first six weeks of lactation.

Oestrus resumption

Detection of does in heating was observed post-kidding and post-weaning using teaser billy buck. The oestrous cycle was observed twice daily at 12 hours interval and one hour as monitor. The nanny goats experiencing oestrus behavior is walking the fence or increased vocalizations for the teaser, will stand and allowed teaser to mount.

Analysis of blood samples

Blood samples were taken on the last day of the 6 weeks of lactation using 4 does /group. The blood samples were collected from the jugular vein into dry and heparinized tubes; the operation took place in the morning (7:00 am) before offering food. Blood samples were obtained by centrifugation at 3000 rpm for 15 min, plasma was harvested frozen at -20ºC for later analysis. The concentrations of glucose, cholesterol, triglyceride, blood urea nitrogen (BUN) and calcium were measured using commercial kits (Bia Mrives-France).

Statistical Analysis

Collected data were statistically analyzed using Statistical Package for Social Sciences (SPSS) for Windows Version 20.0 (2011). Data of treated and control groups were analyzed using F-test. The treatment means ± SEM showing significant differences at a probability value of ($P < 0.05$) was compared using Duncan multiple comparison test of the same software.

RESULTS AND DISCUSSION

Live body weight (LBW)

The means of LBW at start of flushing, pre-mating, post-mating, at 90 days of pregnancy, at 140 days of gestation, post-kidding, post-weaning and after 6 weeks of lactation are presented in Fig. 1. In the present study, LBW obviously differed among treatment groups at 140 days of gestation, post kidding and post-weaning and at 6 weeks of milking. However, LBW at start of flushing, pre-mating and post-mating could be ameliorated ($P>0.05$) in G2 and G3 compared to LBW in G1. Addition of YSP in G2 and G3 might improve feed intake more than G1. This result confirms with those of Aregheore (2005) who explicated that goat had better body weight when fed YSP based diets than goat in the control diet. Moreover, the inclusion of YSP with basal diets had ameliorated voluntary feed intake and LBW. This is supported by the results obtained by Santoso *et al.* (2006) who indicated positive improvement in feed intake and live body weight in sheep received YSP than control group. Furthermore data reported by Selcuk and Tuncer (2010) demonstrated that YSP has a potential to improve feed intake, live weight and body weight gain. Also, Liu and Li (2012) concluded that YSE accomplished significant increase in rate of daily body weight gain, improved the apparent digestibility of nutrient, feed intake and feed conversion efficiency. Moreover, Földešiová *et al.* (2013) refers to that yucca extract contains a number of steroidal saponins that caused biological activity, have attracted attention of the livestock industry, improved body weight performance and health of the livestock.

Reproductive performance

The responses of reproductive traits of dairy nanny goats to different levels of YSP in either G1 or G2 or G3 are shown in Table 2. The data showed that all reproductive parameters differed (P<0.05) among the three tested groups due to YSP intake. In addition, it could be observed that G2 and G3 had the highest value of reproductive performance as conception rate, parity type and reproductive ability. It is worth noting that, YSP has mended reproductive rate (P<0.05) in G2 and G3 than G1, which could be related to available energy (by reducing methane) when YSP was given (Xu, *et al.,* 2010). The energy requirement of pregnancy represents a considerable proportion of total needs of reproducing ruminants and preservative fetal development in uterus. These results are in agreement with those of Tovar-Luna *et al.* (2007) who concluded that the average efficiency of metabolic energy (ME) used for pregnancy of goats was near 25%, which is attributable to fetal or conceptus tissues. Similarly, Salam (2009) illustrated that enough amount of energy can increase the growth and development of fetus and its weight at birth. Also, high energy excesses pregnancy rate (Hafez *et al.,* 2011) and the birth weight of fetus increase (El-Nour *et al.,* 2012). From another view, as YSP contains carbohydrates at level of 30-56% mainly as glucose that plays as main energetic substrate for foetal development and colostrum/milk production and therefore glucose requiring tissues that rely on gluconeogenesis. Positive relationship has been reported between energy intake and plasma glucose that is significantly elevated in the end of pregnancy. Nevertheless, even though gluconeogenesis is increased in liver, the use of glucose in body tissue (except for mammary) is reduced, glucose level in plasma usually drops postpartum (Husted *et al.,* 2008). Also, Kacar *et al.* (2010) observed that glucose is the main energy source at the fetal stage because fetal development is dependent on glucose concentration that passes to fetus from the maternal blood. Also, these authors reported that glucose is also used by the fetus to form fructose, glycogen and fat. Furthermore, Mota-Rojas *et al.* (2011) noticed that before birth, fetal glucose levels are maintained by the transplacental transfer of glucose from the dam to the newborn depends on its own hepatic glycogen stores to maintain blood glucose. According to Zhang *et al.* (2012) glucose had essential metabolic function to all mammalian cells, pre-ovulatory follicles, protect granulosa cells and the oocyte from the free radicals induced by ovulation.

The YSP has also a beneficial effect on increasing protein utilization in the lower digestive tract. Protein plays fundamental part in boosting of reproductive performance. This observation is consistent with Liu and Li (2012) who reported that adding yucca to the diet improved the reproduction performance, reduced blood urea nitrogen and increased true protein. The YSP contains anti-oxidants and free-radical scavengers which may aid in suppressing reactive oxygen species (ROS) thus reproduction responses are improved. Chuffa *et al.* (2011) reported that ROS appear to be directly involved in the reproductive physiological functions such as oocyte development and fertility. Improvement of reproductive characteristics in G2 and G3 could be attributed to that YSP contains steroids that enhance metabolism, immune functions, salt and water balance and development of sexual performances (Challinor *et al.,* 2012). Examining of the relationship between genital tract mucus and rabbits spermatozoa (Baláži *et al.,* 2013) revealed that yucca intake by female rabbits could increase spermatozoa progressive motility in genitalia that attained the best conception rate.

Milk yield during suckling and six weeks of lactation

Milk yields during suckling and the early six weeks of lactation are presented in Fig. 2 and 3. It could be observed that milk harvest during suckling and the first 6 weeks of milking varied widely among the three groups. However, milk yield during suckling was nearly similar between G2 and G3 and was not affected by levels of YSP intake. While, during lactation weeks, G3 showed the best milk production followed by G2 and G1. At all events, YSP treatment succeeded to modulate

Table 2: Effect of YSP intake on reproductive performance of dairy goats.

Items	Experimental groups		
	G1	G2	G3
No. of does served	8	8	8
No. of does conceived	7	8	8
Conception rate,%	87.50	100.00	100.00
No. of does kidded	5	6	7
Fertility rate,%	62.50	75.00	87.50
No. of does born alive kids	5	6	6
Total number of kids born	8	15	18
No. of alive kids at birth day	8	15	15
Fecundity rate, %	100.00	187.50	225.00
Prolificacy rate, %	160.00	250.00	214.29
No. of alive kids after 1 day of birth	8	12	15
Parity patterns:-			
No. of does kidding single	2	-	-
Single rate, %	40.00	-	-
No. of does kidding twins	3	3	3
Twinning rate, %	60.00	50.00	42.86
No. of does kidding triplet	-	3	4
Triplet rate, %	-	50.00	57.14
Reproductive potential:-			
No. of alive kids at weaning	8	11	12
No. of dead kids during suckling up to weaning	-	1	3
No. of kids weaned / does kidding,%	160.00	183.33	171.43
Total weights of kids at birth, kg	13.50	25.00	26.00
kilograms of kids birth / does served	1.69	3.13	3.25
kilograms of kids birth / does kidding	2.70	4.17	3.71
Total weights of kids at weaning, kg	81.00	97.00	115.00
kilograms of kids weaned / does served	10.13	12.13	14.37
kilograms of kids weaned / does kidding	16.20	16.17	16.43

Fig. 1: Effect of YSP intake on LBW (kg) from start flushing to six weeks of lactation

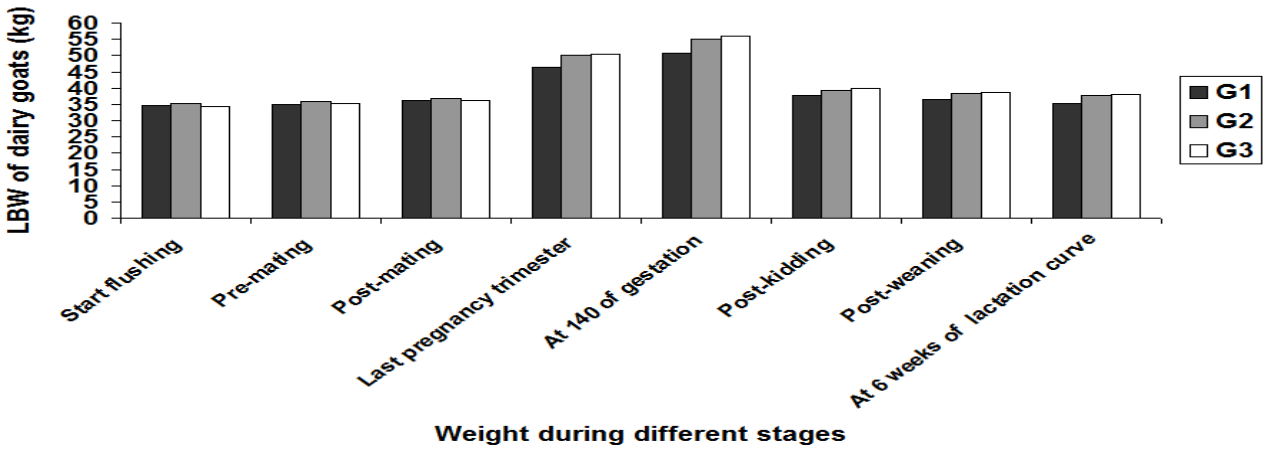


Fig.2 :Effect of YSP intake on suckling milk yield

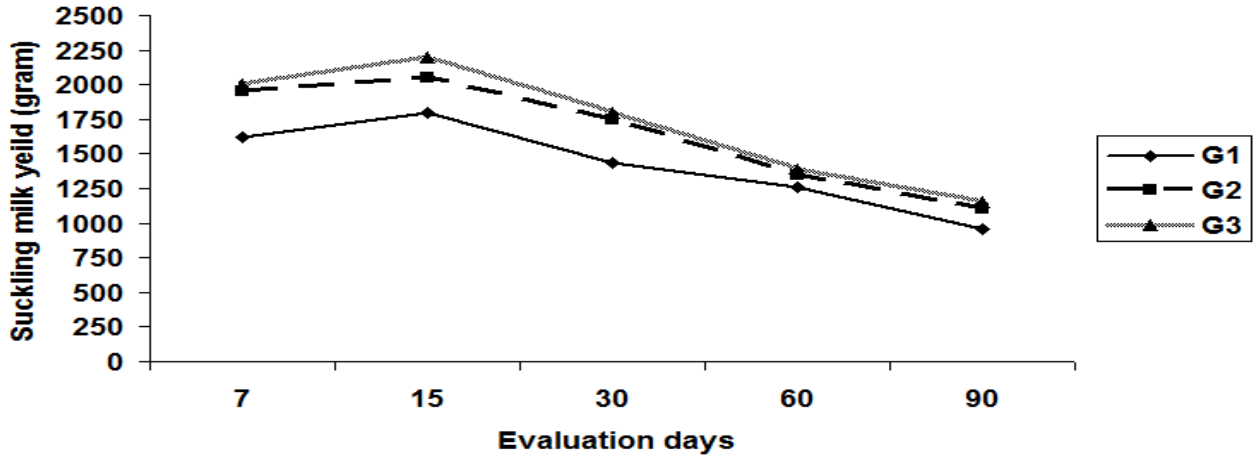
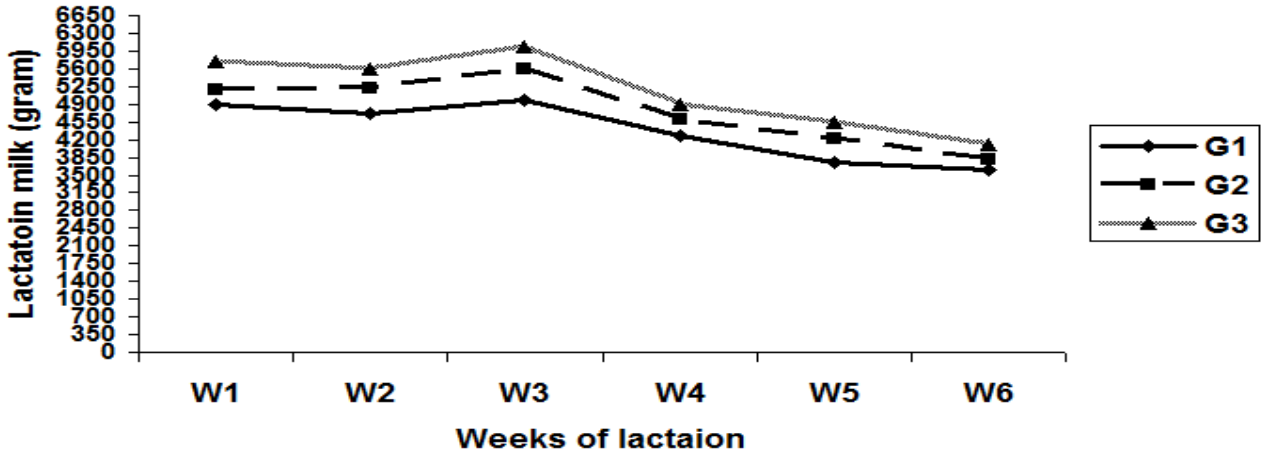


Fig.3: Effect of YSP intake on first six weeks of lactation



rumen fermentation and improve nutrient utilization in ruminants (Liu and Li, 2012). Feeding YSP is recognized as safe food additives and has been proposed as a safe alternative to antibiotics (Narvaez *et al.*, 2013). The YSP intake contributed in glucose synthesis that refluxed in milk quantity. These results are in agreement with Lin *et al.* (2010) who claimed that glucose had positive effects on milk production, milk protein, milk fat and milk lactose, then glucose was a limiting factor for milk formation. Also, YSP reduces hydrogen gas (H_2) concentration thus reduces methanogenesis in the rumen which might be reflected on a more favorable total volatile fatty acids (TVFA) and increased fermentation efficiency by microbes (Bozic *et al.*, 2009). The TVFA in the rumen seems to be playing a large role in milk amounts because TVFA stimulates rumen micro flora activity and enhance digestibility. These results are in accordance with those noted by Patra and Saxena (2010) who reported an increase in milk yield due to rise of rumen TVFA and reduction of methane production. Effects of YSP on nitrogen metabolism include reduction in urea and ammonia that have some practical implications especially in dairy animals. Milk production by dairy animals can be adversely affected by elevation of ruminal ammonia production that manifested by high blood urea levels. This result is symmetrical with Lovett *et al.* (2006) who noticed that feeding yucca to lactating Holstein Friesian cows had participated on milk production, milk goodness, digestibility and better rumen fermentation characteristics.

Addition of yucca might reduce udder mastitis caused by ROS. This is positively reflected on quality and quantity of milk (Cheeke *et al.*, 2006). Consequently, YSP increases energy by reducing methane in the rumen since methane produced during ruminal fermentation represents loss of 2–15% of gross energy intake (Singer *et al.*, 2008). Therefore, providing energy plays a significant role in the formation of daily milk harvest (Brun-Lafleur *et al.*, 2010). Moreover, YSP intake may positively influence the production of microbial protein and alter the activities of protein digestion and metabolism that appeared to have positive effect on milk production (Chunlong and Zhongqiu, 2012).

Oestrus resumption

Observations of oestrus signal in G1, G2 and G3 post-kidding or post-weaning are appeared in Table 3. It is indicated that does in G2 and G3 had significantly (P< 0.05) shorter oestrous cycle length and longer estrus duration than G1. In the majority of goats, Ensminger (2002) found that oestrous cycle length ranged from 12 to 24 days (average 20 days) and duration of estrus ranged from 1 to 4 days (39-48 hrs). Also, the period from kidding to resumption of next cyclicity is known as postpartum anoestrous and may be affected by nutritional levels and suckling. This information is coordinated with Shahnaz *et al.* (2001) who measured the postpartum interval as 15 to 65 days (average 56 days) to the first oestrous cycle. Furthermore, these authors defined that 1st estrus resumption after kidding was at 34-61 days in Barbari goats, 60 days in Black Bengal goats, 51-110 days (average 84 days) in West African Dwarf goats and 68-172 days in Saanen and Toggenbury goats. Regarding YSP intake, in the present study, steroidal substance played a major role to build phytoestrogens which are able to exert many biological effects on bioavailability of sex hormones. Gruber *et al.* (2002) reported that phytoestrogens promote estrogenic actions in mammals and structure of estrogen and 17β-estradiol which may be of great benefit in increasing oestrous cycle behaviors. Furthermore, Rajendar *et al.* (2012) indicated that YSP have been screened for simulating effect of estrogen, oxytocin and other reproductive hormones. On the other hand, yucca intake could provide ingredients that stimulate ovary sexual activity and oestrous cycle such as glucose (Salem et al., 2011), energy (EL-Nour et al., 2012) and minerals such as calcium which is necessary for ovarian hormone synthesis and releasethat associated with phase of oestrous cycle (Yaqub *et al.*, 2013). Moreover, Hussain *et al.* (2013) suggested that minerals as calcium could reduce urea or ammonia levels in blood that can influence the pattern of ovarian follicular growth and stimulate oestrous cycle. On the other hand, YSP consumption reduces urea level which might improve oestrous cycle hormones. Similarly, Alves *et al.* (2011) noticed that progesterone (P4) is intrinsic oestrous cycle hormone. Thus, these authors revealed that P4 concentration was 0.2 ng/ml and 8.55 ng/ml when urea in diets was 1.36% and 0.95% after 11 days of estrus, respectively. Furthermore, Yaqub *et al.* (2011) authenticated that fluctuations in serum urea may be due to variation in ovarian steroids during the oestrous cycle therefore it is recommended that plasma urea should be taken into consideration during the oestrous cycle phase. Concerning oestrous cycle resumption post-weaning, Teleb *et al.* (2003) concluded that plasma progesterone levels during postpartum were significantly and negatively correlated with prolactin hormone levels and demonstrated that lactation and suckling lengths have no effect on the estrus resumption and sexual activity. Likewise, Kandiel *et al.* (2010) stated that bromocriptine treatment (prolactin antagonist) increased the LH response to LH-RH stimulation consequently ovarian hormonal waves and ovulation in goats. Also, Mohamed *et al.* (2011) expounded that decreased prolactin and increase of LH levels might induce the ovulatory event of estrus resumption in goats.

Generally, the oestrus resumption period plays a pivotal role in reproduction performance and early resumption of ovarian activity that required for achieving ovary and uterus to the first service and conception (Kara *et al.*, 2013).

Table 3: Oestrus resumption post-kidding or post weaning in dairy goat intake YSP.

Items	Experimental groups		
	G1	G2	G3
Estrus resumption post-kidding			
No. of kidding does	5	6	6
No. of does display estrous	3	4	4
***Heating rate %**	60.00	66.67	66.67
1st oestrus (days)	46.33±0.88 [a]	39.80±1.93[b]	39.60±0.87 [b]
Oestrus duration (hours)	31.33±1.20[b]	37.40±0.51[a]	38.60±0.50[a]
Estrus resumption post- weaning			
No. of kidding does	5	6	6
No. of does display estrus	4	5	5
***Heating rate %**	80.00	83.33	83.33
1st oestrus (days)	60.50±1.53[a]	47.17±0.25[b]	46.33±0.37[b]
Oestrus duration (hours)	30.25±0.33[b]	39.83±0.58 [a]	40.17±0.40 [a]

a, b. Means within rows with different superscripts are significantly different ($P < 0.05$).
***** Heating rate %= No. of does display estrus / total No. of kidding does x100.

Analysis of blood samples

Results in Table 4 summarizes the results of some blood parameters at the last 6 weeks of lactation. There were significant ($P<0.05$) differences among G1, G2 and G3 in all studied blood parameters. The blood parameters of G2 and G3 were significantly ($P<0.05$) lower than G1 except glucose and calcium. At all events, Aiello (2000) recorded normal variation in blood metabolites such as glucose, cholesterol, triglyceride, urea and calcium, being 2.7- 4.18 mmol/L, 1.7 - 3.5 mmol/L, 0.07- 0.36 mmol/L, 3.5-10.7 mmol/L and 2.25 – 2.90 mmol/L in goat, respectively. In this study, they found glucose within the normal range that indicated healthy and infer that depress in glucose was not due to tannic acid intoxication but to that energy was sufficiently utilized for production and reproduction. Accordingly, glucose levels increased in YPS groups (G2 and G3) compared to the control group (G1). Similar results were reported by Duffy et al. (2001) who summarized that 200 ppm of yucca supplemented to the diets of rats increased blood glucose level. In parallel the previous study of Oztasan (2013) showed normal glucose level that revealed that YSP had normal histopathological examination of pancreatic tissue structure. Furthermore, this author cleared that YSP may increase blood glucose level by different mechanisms such as stimulating glucagon hormone release in pancreas and innervated transferring hepatic glucose production. These data seem to contradict with those earlier reported by Bhor *et al.*, (2004) who indicated that saponins found in yucca decreased blood glucose levels by increasing glucose consumption in tissues and impairing glucose absorption from gastrointestinal tract. Regarding cholesterol, it decreased in goats fed YSP compared to those fed the control diet. Similarly, Aazami *et al.* (2013) noticed that saponins found in yucca act either directly or by inhibiting absorption of cholesterol from the small intestine or indirectly by inhibiting re-absorption of bile acids and desquamation of mucosal cells. Also, these authors administrated that saponins in the diets with levels 0, 100 and 200 mg/ kg DMI reduced blood cholesterol concentration from 81.2 to 76.3 and 70.3 mg /dI in Baluchi sheep, respectively. The lowest cholesterol concentration in does receiving YSP may give a clear indication that does in G2 and G3 were normal and not susceptive to heart diseases. With the exception of the study of Mardalena *et al.* (2011) who indicated that YSP could function as an antioxidant, which relates to the ability to capture free radicals and radical peroxy salts so that it will be effective in inhibiting lipid oxidation, especially with lower cholesterol. In the current study, concentration of triglycerides was lower in goats given YSP than those fed rations without YSP. These

Table 4: Some biochemical blood parameters in dairy goats.

Items	Experimental groups		
	G1	G2	G3
Glucose, mmoI/L	2.78±0.04[b]	3.98±0.05[a]	4.00±0.05[a]
Cholesterol, mmoI/L	3.40±0.41[a]	2.43±0.10[b]	2.33±0.28[b]
Triglyceride, mmoI/L	0.36±0.01[a]	0.19±0.01[b]	0.16±0.02[b]
Urea, mmoI/L	8.10±0.64[b]	5.73±0.30[b]	5.63±0.26[b]
Calcium, mmoI/L	2.38±0.06[b]	2.78±0.05[a]	2.80±0.10[a]

Means within rows with different values are (P<0.05).

results are supported by Kaya *et al.* (2003) who stated that yucca powder supplementation decreased triglyceride levels. In this study, decreasing urea levels may be attributed to decelerate urea degradation due to inhibition of urease activity in the rumen by YSP. These results are in accord with those of Selcuk and Tunce (2010) who mentioned that blood urea nitrogen levels of lambs given yucca were lower than those of control because yucca inhibits urease activity in rumen and reduces urea degradation. Furthermore, the low urea levels in the present study were within the normal range limits indicating that kidney and liver were functioning well. The blood calcium levels recorded in this study were within the reference of normal calcium values (2.25 – 2.90 mmol/L) for goats. Then, the maintenance of calcium within the normal range for goats in this study suggests that feeding of YSP may not have any deleterious effect on hyperparathyroidism, hypervitaminosis D, and neoplastic disease in high calcium levels or rickets and renal failure in low calcium levels. Hence, blood is the fastest means of ascertaining toxicity of ingested feed animals, because blood serves as an indicator of health status of animal (Kalio *et al.*, 2014).

CONCLUSION

Based on the experimental work presented above it could be concluded that YSP could provide a positive adjustments on body weight of dairy goats, favor high reproductive performance and contributing in regulating metabolic disturbances, not only through reinstitutes the homeostatic balance but also affects the productive characteristics.

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الملخص العربى

تأثير إستخدام اليوكا كإضافات غذائية على الكفاءة الإنتاجية والتناسلية للماعز الزرايبى الحلاب

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أجريت هذه الدراسة لتقييم تأثير إضافة مسحوق اليوكا على الأداء الإنتاجى والتناسلى وبعض صفات الدم للماعز الحلاب .إستخدمت 24عنزة حلابة عمرها أكبر من 3 سنوات ومتوسط وزنها34.49 كجم .قسمت العنزات الى ثلاثة مجاميع 8 بكل مجموعة واجريت التجربة قبل 21 يوم من موسم التلقيح وحتى نهاية موسم الحليب وتحددت تغذية المجاميع الثلاثة كالتالى :

1- **مجموعة المقارنة** غذيت على العليقة الأساسية بدون اى اضافات (مج1)

2- **مجموعة الثانية** غذيت على العليقة الأساسية مضاف إليها 25 ملليجرام من اليوكا /يوم/رأس(مج2)

3- **مجموعة الثالثة** غذيت على العليقة الأساسية مضاف إليها 500 ملليجرام من اليوكا /يوم/رأس (مج3)

وكانت العليقة الأساسية تتكون من 60 % العلف المركز +40% دريس البرسيم +قش الأرز

وأوضحت النتائج المتحصل عليها :

أن مج2 ومج3 حققتا زيادة معنوية فى الوزن اثناء مرحلة الثلث الأخير من الحمل، واليوم 140 من الحمل، وبعد الولادة ،وبعد الفطام وحتى 6 اسابيع الأولى من الحليب مقارنة بمج1 كما أظهرت الدراسة تفوق غير معنوى فى الأوزان خلال الدفع الغذائى ، واثناء موسم التلقيح وبعد موسم التلقيح لكل من مج2 ،مج3 مقارنة مع مج 1 كما اوضحت النتائج ان المقاييس التناسلية تغيرت بزيادة معنويا لصالح مج2،مج3 مقارنة ب مج1 .وكان معدل الحمل 87.5 ،100، 100% ومعدل الخصوبة62.5، 75 87.5% لكل من مج1، مج2، مج3 على التوالى .كما ان مج 2، مج3 حققت افضل زيادة معنوية لمحصول اللبن خلال الرضاعة والستة أسابيع الأولى من الحليب مقارنة ب مج1 والدراسة اوضحت اختلافات معنوية منخفضة لعودة الشياع ومرتفعة لوقت الشياع بعد الولادة والفطام لكلا من مج2,مج3 مقارنة مع مج1 .مكونات الدم اظهرت اختلافات معنوية وحدوث إنخفاض للكوليستيرول ، الدهون الثلاثية، اليوريا لمج2، مج3 فيما عدا الجلوكوز والكالسيوم حيث ارتفعا مقارنة ب مج1 .وبناء عليه تؤكد الدراسة أن اضافة مسحوق اليوكا بمستويات 250 و500ملى جرام /رأس /يوم يمكن ان تستخدم بنجاح لتعديل كلا من الأداء الإنتاجى والتناسلى للماعز الزرايبى الحلاب .