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INCLUSION MILK THISTLE (*SILYBUM MARIANUM*) SEED EXTRACT IN DOES RABBITS FEED AS ANTIOXIDANTS

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ABSTRACT

Oral administration of 1% dried milk thistle seeds extract (MTSE) to gestating and lactation rabbits was evaluated on suckled milk, kids performance, circulating hormonal concentrations and oxidative status during three parity's (PT).
Fifty does fed with conventional diets during gestation and lactation were assigned as controls (control; n = 25) or treated orally (MTSE; n = 25) rabbits. Treatment consisted of providing 1% dried milk thistle seeds extract (MTSE) daily from mating until weaning kids. Daily suckled milk, kids performance were recorded, blood samples for hormonal assays and evaluation of oxidative stress biomarkers were obtained at mid gestation and lactation in 3 parities.
In the group of rabbit does treated with MTSE, it was observed a highest milk yield (439 g/PT3), Litter weight weaning (592.5 g/PT2, LWW), as well as total antioxidant capacity (2.11 mmol/l/PT, TAC) and progesterone (10.5ng/ml/P, P4). However, TBARS was lower than control at mid gestation (0.84µmol/ml PT3). At mid lactation, MTSE does group had the highest TAC (2.31 mmol/l/ PT2 and 1.05 ng/ml/PT3) but TBARS value was lower than control (0.59 µmol/ml/PT3).
It can be concluded that MTSE favorably affects milk production, litter weaning weight and enhances progesterone and prolactin hormone as well as improved anti oxidative stress as TAC and TBARS.

Keywords: *Milk thistle seeds, reproductive performance, antioxidant, doe rabbits.*

INTRODUCTION

Pregnancy and lactation pose substantial stress to doe rabbits *per se* and its offspring. When the endogenous antioxidant system is not efficient or the supply of antioxidant micronutrients is limited, exaggerated oxidative stress within both *pre-partum* and *post-partum* occurs, resulting in negative effects on performance (Mistry and Williams 2011).

Milk thistle (MT, *Silybum marianum*) namely in Egypt "wild Artichoke" is a wild plant growing as weed in the poor land behind the canals or drains and as weeds in some crops in Egypt. Recently, silymarin has been reported to have a galactogogic effect in women (Carotenuto and Di Pierro 2005 and Zuppa *et al*., 2010) and some studies have confirmed that the milk thistle increases lactation in cows (Tedesco *et al*., 2004). Hadolin *et al*. (2001) found that seed of MT contains betaine, tri-methyl glycine and a large quantity of oil that work an important role in anti-inflammatory and anti-hepatitis effects of the extract. Potkanski *et al*. (2001) reported that substituted 20% of concentrate cows diet with endosperm from milk thistle {*Sylibum marianum L.*) caused increase fat content in milk compared control. Wu *et al*. (2009) reported that MT has a good property as anti-oxidants. Hamed *et al*. (2016) found that MT seed contains about 392.1 mg/100g total polyphenols and 174.7 mg/100g antioxidant activity (equivalent to ascorbic acid).

This study was done to evaluate in the rabbit the effect of inclusion of 1% dried milk thistle in the diet on suckled milk and oxidative stress during gestation and lactation periods.

MATERIAL AND METHODS

Fifty, 7-8 months does New Zealand White rabbits, weighing 3.25-3.50 kg were equally divided into 2 experimental treatments to study the response of doe rabbits and their litters to dietary supplementation with milk thistle in the following order:
All experimental rabbit does (n=50) were individually caged and fed on pelleted diets to meet at least the NRC (1977) requirements of doe-rabbits during pregnancy and lactation (17% CP, 12% CF, 2550 DE/kg diet). The control group was administrated orally distilled water at 1ml/Kg doe (n=25), while MTSE group (n=25) was administrated orally dried milk thistle seeds extract (MTSE) at 1ml/Kg doe. Destilled water and MTSE was administered daily for three parities from 1st day of mating till weaning day. Each doe was transferred to the buck's cage and served twice. Palpation was made at the 14th day *post-partum* to detect pregnancy. Re-mating interval was 10 days after parturition. Blood serum samples were withdrawn from ear vein at two phases;1) at 14 day of gestation and 2) at 14 day of lactation. The following reproductive and productive traits were recorded and tabulated as an average for the studied three parities (PT); Total milk yield (g/h/PT) , litter weight at birth (LWB), litter weight at weaning (LWW), Also, the following blood serum antioxidant and hormones were Thiobarbituric acid-reactive substances (TBARS), Total antioxidant capacity (TAC) determined according to Diamond Biodiagnostic, Egypt. The measurement of the rabbits' progesterone (Pr4 ng/ml) and prolactin (ng/ml) level in blood serum samples were done by applying ELISA method. Data from all response variables were subjected to one way analysis using SAS (2001). Variables having significant differences were compared using Duncan's Multiple Range Test (Steel and Torrie, 1960).

RESULTS AND DISCUSSION

Does and their litter performance

Reproductive and productive performance of doe rabbits and their litters as affected by MTSE administration are set in Table 1. Through three parity of this study, addition MTSE in doe rabbit diets had no detectable effect on LSB and LWB per parity. Total milk yield and litter weight at weaning (LWW) were due to the MTSE administration.

The positive milk yield response to the supplementation of MTSE was observed upward from parity 1-3 and therefore in LWW. These results are in accordance with those reported by Mohammad *et al.* (2019). They proved that addition 200 mg\kg\day milk thistle seed extract improved milk yield, litter body weight and serum prolactin hormone *vs* control.

Blood antioxidant and hormones constituents

Levels of blood serum antioxidants and hormones studied during gestation periods (at mid pregnancy) and lactation period (at mid lactation) are presented in Table 1. Results setting that prolactin levels differed at mid gestation in 3paritys, as well as P4 at mid lactation when compared with control group. TAC values at mid gestation and at mid lactation were greater in MTSE group; an opposite effect was noted to TBARS.

Hamed et al. (2016) proved that addition 5 and 10g MTSE improved seminal plasma TAC vs control buck rabbits. P4 was high in parity 1 and 2 of does from MTSE group at mid gestation. As well as, prolactin was higher than control from 1-3 parity at mid lactation. Capasso (2014) proved that administrated orally with MTSE in female rats caused a significant increase in serum prolactin vs control.

CONCLUSION

It can be concluded that MTSE favorably affects milk production, litter weaning weight and enhances progesterone and prolactin hormone as well as improved anti oxidative stress as TAC and TBARS.

Table 1: Milk yield litter performance and blood constituents of doe rabbits with dried milk thistle seeds.

	Total Milk Yield g/h/Parity			LSB[@]/ Parity			LWB[#]/ Parity			LWW[$]/ Parity		
Treatments	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Control	313.1[b]	358.3[b]	341.1[b]	6.88	7.34	7.11	42.1	46.2	42	475.5[b]	471.9[b]	474.0[b]
MTSE	399.3[a]	429.3[a]	439.3[a]	7.20	8.1	7.39	40.9	45.9	46	532.5[a]	592.5[a]	562.5[a]
SEM	4.05	4.28	2.80	0.68	0.39	0.37	1.69	1.88	1.48	15.14	15.07	13.25
***P*-value**	**0.017**	**0.047**	**0.001**	**0.347**	**0.075**	**0.284**	**0.231**	**0.540**	**0.112**	**0.003**	**0.017**	**0.008**
	Blood antioxidant and hormones constituents at mid gestation											
	TBARS[^] (µmol/ml)			**TAC[&] (mmol/l)**			**Prolactin (ng/ml)**			**Pr4[*](ng/ml)**		
	1	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Control	1.78[a]	1.98[a]	1.67[a]	1.38[b]	1.39[b]	1.09[b]	49.5	44.3	70.1	7.39[b]	7.82[b]	8.71
MTSE	0.89[b]	0.91[b]	0.84[b]	2.05[a]	2.11[a]	1.98[a]	55.6	47.2	66.5	10.1[a]	10.5[a]	9.36
SEM	0.09	0.11	0.11	0.91	0.92	1.01	2.09	2.21	2.09	0.14	0.11	0.14
***P*-value**	0.014	0.003	0.023	0.036	0.005	0.014	0.114	0.213	0.519	0.012	0.05	0.13
	Blood antioxidant and hormones constituents at mid lactation											
	TBARS (µmol/ml)			**TAC (mmol/l)**			**Prolactin (ng/ml)**			**Pr4 (ng/ml)**		
	1	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Control	1.94[a]	1.99[a]	1.79[a]	1.25[b]	1.11[b]	1.20[b]	0.70[b]	0.73[b]	0.80[b]	1.01	1.11	1.05
MTSE	0.65[b]	0.77[b]	0.59[b]	2.16[a]	2.31[a]	2.25[a]	0.90[a]	1.01[a]	1.05[a]	1.20	1.12	0.97
SEM	0.19	0.10	0.11	0.94	0.9	1.12	2.51	2.09	2.23	0.10	0.09	0.1
***P*-value**	0.001	0.012	0.002	0.04	0.04	0.038	0.001	0.001	0.034	0.415	0.24	0.342

a, b : different superscripts within a column indicate significant differences.
LSB[@]=Litter size at birth; LWB[#]= Litter weight at birth; LWW[$]= Litter weight at weaning; TBARS[^]= Thiobarbituric acid-reactive substances; TAC[&] = Total antioxidant capacity; Pr4[*]= progesterone.

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