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EFFECT OF FEEDING THE MEDICINAL HERB, CHAMOMILE FLOWER, ON PRODUCTIVE PERFORMANCE OF FRAFRA EWES AND THEIR BORN LAMBS.

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SUMMARY

This study conducted to evaluate effects of supplementing two levels of chamomile flowers to the ration of Farafra ewes on milk production, blood profile and lambs' growth. A total of 21 ewes with average live body weight 46.0 ± 1.23 kg were used in this study. Ewes divided into three groups (7 each) and fed diets according to NRC allowances (1985). Treatments contained 0, 5 and 10g chamomile/10 kg BW/day. The animals were in late pregnancy when started use in the experiment and continued for three months of lactation until weaning.

The results show that daily DM intake improved with increasing the level of chamomile (5 or 10 g/100 kg BW/day) in the rations G2, G3, respectively, and the differences were significant. The same trend observed also with TDN intake (916.05, 931.2 and 937.28 g/d of G1, G2 and G3, respectively.

Concerning blood parameters, the results indicate that some blood constituents tested not significantly affected by the tested experimental rations. Serum glucose, protein and globulin increased while cholesterol and enzymes (GOT, GPT and ALP) reduced, as result of adding chamomile, especially at the high level (G3). In addition, chamomile had positive effect on hematological parameters (Hb and Hct).

Daily milk yield increased by 6.41 and 15.10% for G2 (465g) and G3 (503g) relative to the control (437g). Moreover, percentages of both fat and total solids (TS) significantly increased with increasing the level of chamomile. It is interesting to found a negative relationship between SCC and milk yields.

Live body weight at birth and weaning positively affected by supplement of chamomile during pregnancy, thus total body gain and daily body gain of born lambs improved.

Accordingly, it could conclude that supplementing chamomile for lactating ewes' rations had positive effects not only on milk production, but also on metabolic parameters and lambs' growth.

INTRODUCTION

Medicinal plants commonly used for human and recently for animals as chamomile, thyme and fennel (Shehata et al. 2004, Abdel Hamid et al. 2004 and 2011 and Zeid and Ahmed 2004 and Ahmed and El-Kholany 2012). Addition of medicinal herbs to animals' rations help to prevent the hazard side effects of using chemicals. Either row material of these herbs, their extracts or drugs proved to be safe (Zeid, 1998, Tawfik et al. 2005 and Abdelhamid et al. 2011). Moreover, using medicinal herbs, such as chamomile, in dairy goat's rations had a positive effect on daily milk yield and milk fat and protein yield as well (Shehata et al. 2004). The same study reported that using chamomile in dairy goat's rations at level 5g/100kg BW/day reduced somatic cell counts from 459,000 cells /ml to 251,000 cells/ml. In another study, serum total lipids and cholesterol reduced while total protein and triglyceride increased as a result of adding both chamomile or thyme to goat's rations (Zeid and Ahmed, 2004). They found also that daily milk yield was the highest with chamomile treatment

(1.586 kg) followed by thyme treatment (1.540 kg) and lastly the control, which recorded the lowest value (1.407 kg), without any adverse effect on milk composition.

Recently, El-Kholany et al. (2015 and 2017) studied the effect of using chamomile flowers in ruminant's ration and concluded that adding chamomile flowers has positive effects on feeding values, metabolic parameters, milk production and feed utilization efficiency, consequently, improve performance of animals in general. These positive effects might attributed to active ingredients as reported by El-Hosseiny et al. (200), Abdel Hamid et al. (2004 and 2011) and Shehata et al. (2004 and 2007).

Therefore, the present study conducted to evaluate effect of using chamomile flowers in ration of Farafra ewes on milk production and blood constituents as well as lambs growth.

MATERIALS AND METHODS

Experimental animals and management

Twenty-one Farafra ewes (average had three seasons of lactation) aging 3 - 6 years and weighing 46.0 ± 1.23 kg were divided randomly into 3 equal groups, 7 ewes each. The animals were in the late pregnancy stage (start of the 4th month of pregnancy) and continued for the three month of lactation (suckling period) until weaning. Animals weighed at the beginning and thereafter at two-week intervals. The animals fed the experimental rations two weeks before the experiment to guarantee adaptation on the rations. Diets offered in groups. Each group housed in a semi-roofed barn (3×4×4 meters). The rations offered twice daily at 9 am and 3 pm. Water were available all the day for animals.

Experimental rations and nutritional requirements

The experimental rations were:

Group 1: concentrate feed mixture (CFM) + Berseem hay (BH) + Bean straw (BS) (Control, G1)

Group 2: CFM + BH + BS + 5 g chamomile / 100 kg BW, daily (G2)

Group 3: CFM + BH + BS + 10 g chamomile / 100 kg BW, daily (G3)

Allowances adjusted according to body weight and milk production every two weeks, according to NRC (1985). The CFM consisted of 20% un-decorticated cottonseed meal, 41% yellow corn, 5% soybean meal, 21% wheat bran, 5% rice bran, 4% molasses, 2.5% limestone, 1.0% common salt and 0.5 minerals mixture. The chemical analysis of CFM, BH and BS shown in table (1):

Table (1): Chemical analysis of feed ingredients (% on DM basis).

Items	DM	OM	CP	CF	EE	NFE	Ash
Concentrate feed mixture (CFM)	92.19	91.63	15.02	16.54	3.38	57.10	7.93
Berseem hay (BH)	90.13	85.94	12.76	26.85	2.52	43.58	14.32
Bean straw (BS)	89.5	86.0	5.5	37.9	1.2	41.4	14.0

Blood parameters

Two blood samples collected from the jugular vein of three ewes of each group, at end of the experiment. One sample immediately used for hematological estimation. The other blood sample centrifuged at 4000 rpm for 20 minutes. An aliquot of serum used for enzyme determination while the other part was frozen at -20 c until the other biochemical analysis.

Commercial kits were used for all blood measures.

Milk samples

Daily milk yield was recorded for each ewe. Representative milk samples (about 1% of total milk produced) were taken once biweekly from each ewe at both milking. Samples were composited and analyzed for chemical composition according to Ling procedures (1963).

Body weight changes:

Changes in live body weight were recorded individually for the ewe and their born lambs every two weeks.

Chemical analysis of feed ingredients:

Samples were taken from the tested ingredients for running the proximate analysis for dry matter (DM), crude protein (CP), ether extracts (EE), crude fiber (CF) and ash contents according to A.O.A.C. (1995) procedures.

Statistical analysis:

Data statistically analyzed by the least squares methods described by likelihood program of SAS (2003). Differences among means determined by Duncan's New Multiple Range Test (Duncan, 1955).

RESULT AND DISCUSSION

The effect of tested treatments on feed intake presented in table 2. The daily DM intake as g/h was significantly higher with G2 and G3 (1275.63g and 1283.94g, respectively) compared with the control (1254.91g), but difference was not significant between the two levels. CP intake showed minor differences. Similarly, TDN intake significantly increased (916.08, 931.20 and 937.20 g/h) with treatments of chamomile (0, 5 and 10 g, respectively), while also difference was not significant between the two levels.

Table (2): Effect of chamomile levels on feed intake (g/head/day)

Items	Treatments			
	G1	G2	G3	±SE
DM	1254.91^{b}	1275.63^{a}	1283.94^{a}	3.63
CP	163.14	165.83	166.91	1.09
TDN	916.08^{b}	931.2^{a}	937.28^{a}	2.37
DM, g/KgW$^{0.75}$	67.65	67.83	68.07	0.85
CP, g/KgW$^{0.75}$	9.78	9.97	9.60	0.12
TDN, g/KgW$^{0.75}$	57.82^{a}	54.00^{ab}	51.71^{b}	0.69

G1: control -- G2: 5g chamomile level -- G3: 10g chamomile level

When DM and CP intake related to metabolic body size, differences among treatments were not significant. The same trend observed by Shehata et al. (2004) and El-Kholany et al. (2015) with Zaraibi goats and Baladi cows, respectively. In this respect, Abdelhamid et al. (2004) studied the effect of using chamomile (at levels 0, 1 and 2 g/head/day) in lambs' rations and found that daily DM intake tended to increase (1483, 1497 and 1503 g/h) with increasing level of chamomile in the diets.

The same trend observed also with TDN intake (916.08, 931.20 and 937.28 g/h for G1, G2 and G3, respectively. But, the values of daily DM, TDN and CP intake showed some fluctuations among groups as observed by present study.

Blood Profile:

Data of hemato biochemical parameters presented in table 3. The results show that Hb,

total protein and glucose levels significantly increased with adding chamomile to ewe rations but differences were not significant between the two levels of chamomile. Hematocrit (Hct) only showed significant decrease with high level of chamomile.

The same trend were observed by Shehata et al. (2004) with some hematological parameters (such as Hb, Hct, RBC's and MCHC for Zaraibi goats fed on rations containing the same the levels of chamomile (0, 5 and 10 g/100 kg BW). Similar results observed by Abdel Hamid et al. (2004) with growing Rahmani sheep. El-Kholany et al. (2017) found that serum total protein, globulin, albumin and glucose tended to increase with increasing level of chamomile in caws rations and the differences were significant in serum total protein and globulin alone.

The activity of enzymes (GOT and GPT) significantly decreased by adding chamomile and by increasing its level, unless decrease of GOT which was significant only with G3. Serum cholesterol significantly decreases with adding chamomile, but no significant difference between the two levels of addition. Creatinine and urea-N concentrations showed insignificant fluctuations among groups as shown in Table3.

Table (3): effect of experimental treatments on blood parameters:

Items	G1	G2	G3	±SE
Hemoglobin (HB), g/dl	9.95^{b}	10.32^{ab}	11.06^{a}	0.21
Hematocrit (HCT), %	33.14^{a}	34.15^{a}	32.09^{b}	0.51
Red blood cells (RBC's) $\times 10^{6}$ul	10.13	10.56	10.87	0.18
Glucose, mg/100ml	42.26^{b}	48.65^{a}	46.18^{ab}	0.93
Total Protein, g/100ml	6.63^{b}	7.21^{a}	7.18^{a}	0.09
Albumin, g/100ml	3.76	4.01	3.92	0.03
Globulin, g/100ml	2.87^{b}	3.20^{a}	3.26^{a}	0.04
Creatinine, mg/100ml	1.26	1.34	1.29	0.02
Urea-N, mg/100ml	37.40	39.11	38.91	0.76
GOT / AST, u/l	119^{a}	112^{a}	98.00^{b}	2.10
GPT / ALT, u/l	25.35^{c}	23.70^{b}	19.79^{a}	1.58
Triglyceridemg/100ml	79.40^{b}	83.17^{b}	91.30^{a}	2.91
Cholesterol mg/100ml	96.65^{b}	86.20^{a}	84.07^{a}	2.86
Alkaline phosphatase, u/l	109.55^{a}	96.95^{b}	91.43^{b}	3.11

The same results observed by Abdelhamid et al. (2011) with using some medicinal herbs in goat's rations. Similarly, Shehata et al. (2004) studied the effect of chamomile (at levels 0, 5 and 10g/100kg BW/day) in rations of dairy Zaraibi goats and found that activity of enzymes (GOT, GPT and ALP) were significantly decreased with increasing level of chamomile. Serum cholesterol and alkaline phosphates also significantly decreased with adding chamomile while no significant difference between the two levels.

Generally, all values are within the normal ranges as reported by Jain (1986), Kaneko (1989), Ahmed (1999) and Zeid et al. (2011) for healthy sheep and goats and in line with the finding of Maged (2004), Abdelhamid et al. (2011) and El-Kholany (2015) who used

some medicinal herbs in rations of sheep, goats and cows, respectively.

MILK PRODUCTION

Data presented in Table 4 show the effect of the tested rations on daily milk yield and its composition. The obtained results indicate that daily milk yield of ewes was significantly higher with G2 and G3 compared with G1. The highest yield recorded with G3 (503 g) followed by G2 (465 g) while the lowest with the control (437 g). Thus, the daily milk yield improved with the two chamomile supplemented levels (G2 and G3) by 6.41 and 15.10%, respectively compared with G1. These positive trends agree with Shehata et al. (2004), Zeid and Ahmed (2004) and El-Ghousein (2010) with using medicinal herbs with dairy goats and ewes. The improvement in milk yield may be due to the positive and significant effect of medicinal herbs on digestion coefficients of most nutrients and feeding values (as TDN, SE and DCP) as reported by Mohamed et al, (2003). In this respect, Abdelhamid et al. (2011) reported that daily milk yield of Zaraibi goats reached the peak at the 4th to 6th weeks of lactation. The same authors found that the average milk yield significantly improved by using medicinal herbs (Artemisia absinthium, Rosemarins officinalis and Pimpinella anisum) at the level 6 g/100 kg BW/day.

Table (4): Effect of chamomile levels on milkand milk composition.

Items	G1	G2	G3	±SE
Daily milk yield, g	437^{b}	465^{a}	503^{a}	7.21
Fat, %	5.36^{b}	5.92^{b}	6.69^{a}	0.08
Protein, %	4.01	4.37	4.81	0.06
Lactose, %	4.00^{b}	5.03^{a}	5.11^{a}	0.06
Total Solid, %	13.67^{b}	13.82^{b}	14.68^{a}	0.13
Solids nonfat (SNF), %	9.08	9.39	9.97	0.28
Ash, %	0.79	0.82	0.86	0.01
Daily fat yield, g	23.40^{c}	27.52^{b}	33.63^{a}	0.81
Daily protein yield, g	17.50^{c}	20.31^{b}	24.18^{a}	0.57
Somatic cell count (SCC) × 10^{3}	410^{a}	391^{b}	315^{c}	3.27

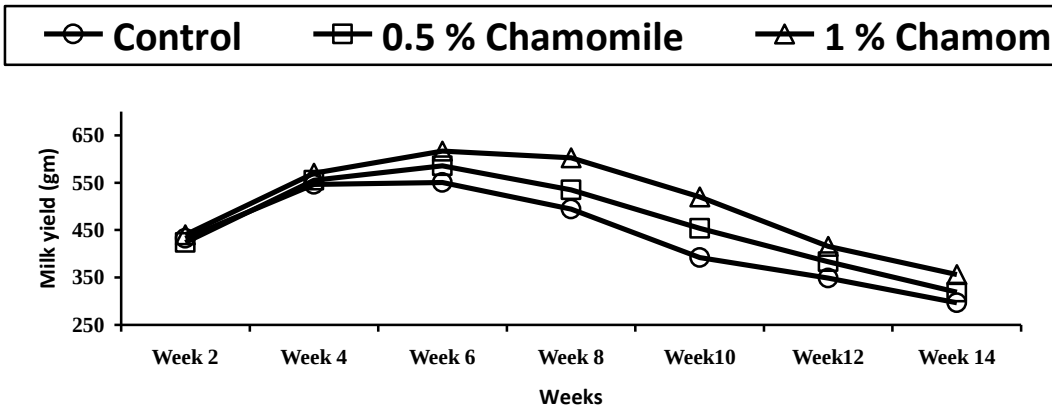

Figure 1: Milk yield in the experimental treatments.

Concerning milk composition (Table 4), the obtained data indicated that percentage of milk fat significantly influenced by the tested treatments. The highest value of fat % was recorded with G3 (6.69) followed by G2 (5.92) and lastly, G1 (5.36). However, the effect of tested rations on protein percentage was not significant. Lactose % significantly increased by adding chamomile. The percent of total solids significantly increased (13.67, 13.82 and 14.68) with the high level of chamomile. Similar results observed by Zeid and Ahmed (2004) and El-Ghousein (2010) with using medicinal herbs in rations of does and ewes. Shehata et al. (2004) reported that most measured components especially fat and total solids tended to increase with addition of chamomile to Zaraibi goat diets. Generally, no noticeable effect of tested rations was observed for other milk content (solids nonfat and ash) and the obtained values of milk constituents are within normal ranges reported by Ahmed (1999), El-Ghousein (2010) and Abdelhamil et al. (2011) for lactating Zaraibi Goats and Awassi ewes.

Lambs growth performance

The effects of supplementing Farafra ewes ration with chamomile on their newborn lambs presented in Table 5. Body weight at birth and weaning and total gain improved by adding chamomile. The significance of improvement proved with G3 only in birth and weaning weights. Total weight gain had significant increase with both levels of chamomile, with no difference in between.

Similar results for birth and weaning weights were reported by El-Ghousein (2010) suckling Awassi lambs and Shehata et al. (2007) who reported that using of chamomile flower in doe's ration had positive effect on both birth and weaning weight and consequently, the daily body weight gain (DBG).

Table (5: Effect of chamomile levels on average live body weight (LBW) :

Items	G1	G2	G3	±SE
Average birth weight (Kg)	3.32^{b}	3.72^{ab}	4.11^{a}	0.05
Average weaning weight (Kg)	12.51^{b}	13.47^{ab}	14.41^{a}	0.34
Total live body gain (Kg)	9.19^{b}	9.75^{a}	10.30^{a}	0.26
Daily body gain (g)	153.17	162.50	171.67	0.73

CONCLUSION

It could be concluded that using chamomile flowers in ewes' rations, during late pregnancy and suckling periods, had a positive effect on daily milk yield and composition besides reduction of the somatic cell count (SCC) and consequently improving milk quality.

Moreover, most blood metabolic parameters were also batter with chamomile addition. This improvement reflected on born lambs performance and production of robust lambs at weaning.

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تأثير اضافة زهرة البابونج لغذاء النعاج الفرافرة على أدائها الإنتاجي وحملانها المولودة.

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تهدف هذه الدراسة الى تقييم تأثير اضافة الكاموميل فى علائق نعاج الفرافرة على انتاج اللبن وتركيبه وقياسات الدم وأداء الحملان المولودة ، ولتحقيق هذا الهدف تم إستخدام 21 نعجة فرافرة أثناء فترة الحمل ، قسمت الى ثلاث مجموعات متساوية عشوائيا (مج1 ، مج2 ، مج3) وغذيت طبقا لمقررات NRC لعام 1985 مع أضافة صفر ، 5 ، 10 جم كاموميل لكل 100كجم وزن حى للمجموعات الثلاثة على التوالى ، بدأت التجربة مع نهاية الحمل واستمرت أثناء فترة الحليب حتى الفطام.

أظهرت الدراسة تحسن المأكول اليومى من المادة الجافة مع زيادة مستوى الكاموميل فى العلائق والأختلافات كانت معنوية. وبالمثل حدث تحسن معنوى فى المأكول من المركبات المهضومة الكلية (931.20 ، 937.28 جم / يوم) مع أستخدام الكاموميل فى العلائق (مج2 ، مج3 على التوالى).

فيما يتعلق بقياسات الدم فقد أظهرت النتائج أن بعض قياسات الدم لم تتأثر معنويا بواسطة العلائق المختبرة ، فى حين حدث زيادة فى الجلوكوز والبروتين الكلى والجلوبيولين بينما أنخفض تركيز الكلوستيرول وأنشطة الأنزيمات كنتيجة لإضافة الكاموميل خاصة مع المستوي المرتفع (مج3). هذا بالإضافة للتأثير الإيجابي للكاموميل على قياسات الهيماتولوجى خاصة الهيموجلوبين والهيماتوكريت.

أما فيما يتعلق بمحصول اللبن فقد أظهرت النتائج تحسن فى معدل انتاج اللبن اليومى بنسبة 6.41 ، 15.10% لمجموعتى الكاموميل (مج2 ، مج3 على التوالى) مقارنة بالكنترول وفى نفس الاتجاه حدث تحسن معنوى فى نسبة الدهن والجوامد الكلية مع استخدام الكاموميل فى علائق النعاج المنتجة للبن، وعلى عكس ذلك حدث ارتفاع معنوى فى عدد الخلايا الجسدية فى اللبن مع مجموعة المقارنة مقارنة بالمجموعتين الأخرتين على عكس اتجاه محصول اللبن اليومى.

أما نتائج الحملان المولودة فقد أظهرت تحسنا معنويا فى وزن الميلاد والفطام مع ارتفاع مستوى الكاموميل فى علائق النعاج والذى أنعكس ايجابيا على معدل النمو اليومى والزيادة الكلية فى وزن الحملان المولودة.

من هذه الدراسة يتضح أن استخدام الكاموميل فى علائق النعاج أثناء فترة الحمل وفترة الحليب له تأثير إيجابي على إنتاج اللبن ومعظم قياسات الدم والذى أنعكس بدوره على أداء الحملان المولودة.