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INFLUENCE OF SOME MEDICINAL PLANTS SUPPLEMENTATION : 1 - ON DIGESTIBILITY, NUTRITIVE VALUE, RUMEN FERMENTATION AND SOME BLOOD BIOCHEMICAL PARAMETERS IN SHEEP.

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SUMMARY

Forty ewes used to investigate the effect of some medicinal plants supplementation (*Nigella Sativa* (NS), *Matricarla Chamomile* (MC) and *Rosemarinus Officinalis* (RO) on nutrient digestibility, nutritive values, rumen fermentation and electrophoretic pattern of sheep serum protein in addition to their effect on some blood enzymes related to liver and kidney functions.

Ewes were divided into four similar groups and fed randomly on one of the tested diets. The first group which was free from feed supplementation as control group D1, consisted of 45% concentrate feed mixture (CFM), 30% berseem hay (BH) and 25% wheat straw (WS). Other three tested groups (D2, D3 and D4) received control diet plus one of the following supplementation feeds (NS, MC and RO) by following rates 100, 500 & 150 mg / kg live body weight LBW, respectively. Four digestible trials were conducted to study the effect of previous diets on the digestibility , nutritive values and rumen fermentation .

Results showed that significant ($P<0.05$) improvement in digestibility coefficients of DM, OM, CP, CF and NFE and nutritive values as TDN , SE and DCP for all supplementation groups compared with control group. Group D2 with NS showed the highest value for the digestion coefficients and nutritive values. While D3 with (C) supplementation had a minimum improvement. The ammonia N. concentration was decreased significantly ($P<0.05$) with (D2 and D4 groups) than the control group. The D2 group showed the highest proportion of propionic and the lowest of acetic and butyric in comparison with other groups.

Supplementary NS showed a significant ($P\leq0.05$) increase in each of serum total protein (T.P.), total globulin (T.g) and it s fractions $\alpha1$, $\beta1$, $\beta2$ and $\gamma2$ globulins concentrations. Furthermore, serum aspartate aminotransferase (AST) and urea level increased significant ($P\leq0.05$) in D2 supplemented with NS than control group. In respect to (MC) supplemented group significant ($P\leq0.05$) increase in terms serum T.P., $\alpha1$, $\alpha2$, $\beta1$, $\beta2$ and $\gamma2$ globulins concentration were observed. The supplementation of (RO) showed a significant ($P\leq0.05$) elevation in $\alpha1$ and $\beta2$

Globulins concentrations. Meanwhile, $\alpha2$-globulin concentration declined. Serum AST increase significantly ($P<0.05$) while alkaline phosphatase (AP) activity were decreased significantly.

Keywords: *nigella sativa, matricarla chamomile, rosemarinus officinalis digestibility, rumen liquor and blood biochemical parameters*

INTRODUCTION

There are a large number of feed additives available for inclusion in animal rations to improve animal performance. However, the use of chemical products especially (hormones and antibiotics). may cause unfavorable side effects. Moreover, there is evidence indicating that these products could be considered as pollutants for human and threaten their health on the long-run. Attempts to use the natural materials such as medicinal plants could be widely accept as feed additives to improve the efficiency of feed utilization and animal's productive performance. Several studies showed that adding medicinal plants and herbs to the diets of, cows, buffaloes and sheep (Awadalla , 1997: Aboul-Fotouh *et al* .,1999 and Salem and El-Mahdy,2001) improve their feed intake and nutrient digestibility . Also, milk production (El-Saadany *et al* .,1996, Katedra *et al* 1998, Allam *et al* ., 1999). In addition, some studies indicated that medicinal plants had favorable effects on live weight gain and feed efficiency in buffaloes and sheep (Castro *et al*., 1995, El- Saadany *et al*., 2001). Further more different investigations reported dealing with the effect of these supplementation on some blood biochemical parameters in chicken (Khadary *et al* ., 1996 and El-Sayed and Hashem ,2000), buffaloes (Youssef *et al* .,1998), sheep (Korshem *et al*., 1998), kids (Hoda El-Hosseiny *et al*., 2000) and in rats (Galisteo *et al*., 2000 and Zaoui *et al* .,2002).

For more investigation, this study was aimed to evaluate the effect of supplementation of Nigella Sativa (NS), Matricarla Chamomile (MC) and Rosemarinus Officinalis (RO) on nutrient digestibility, nutritive value, rumen fermentation, electrophoretic pattern of sheep serum protein in addition to their effect on some blood enzymes related to liver and kidney functions.

MATERIALS AND METHODS

Forty ewes were divided into four similar groups at Sahka Experimental Research Station at Kafer El-Shake province, Animal Production Research Institute, Agricultural Research Center. The ewes averaged 47.50 kg live body weight and aged 3-4 years. Animals were fed according to NRC, (1989) allowances for sheep.

Six mature rams of average body weight 51.50 kg were used to conduct four digestibility trials to determine the digestibility and nutritive values of the tested diets in response to the tested additives. Each trial lasted for two weeks as preliminary period followed by one week collection period.. All ewes and rams of DI group (control group) were fed on control diet which consisted of 45% concentrate feed mixture (CFM)*, 30% berseem hay (BH) and 25% wheat straw (WS), with no feed additives. The second group (D2) received the control diet plus Nigella Sativa (NS) 100 mg/kg live body weight (LBW / day) according to (Allam *et al*., 1999). The third group (D3) received the control diet plus Chamomile (MC) 500 mg/kg LBW / day (Allam *et al*., 1999). The fourth group (D4) received the control diet plus (RO) 150 mg/kg LBW / day, (Debersae *et al* . , 2001).

The chemical composition of different ingredients and control ration are given in Table (1). Animal were fed twice daily at 8 a.m. and 15 p.m. and water was offered three times daily. Animals were kept under veterinary supervision throughout the experiment. Feces of rames were collected daily during the collection period, 5% of the daily amount was dried at $60C^{o}$ for 24

hours to obtain the composite samples at the end of the week.

Rumen liquor parameters

Rumen liquor samples were taken, at 4 hours post morning feeding by using stomach tube. The rumen liquor were extracted by filtering the rumen contents through four layers of cheesecloth and tested for pH, ammonia -N concentration. Filtered rumen liquor samples were sub sampled and kept frozen at $-20C^0$ for VFA's fractions analysis.

Chemical analysis

Representative samples of feeds and feces were air dried and kept for analysis. Chemical Analysis of feedstuffs and feces was determined according to the A.O.A.C (1990). The rumen liquor samples were strained for determination of pH using pH meter (Orion research, model 201/ digital) Ammonia-N concentration was determined according to Conway, method (1963). The strained rumen liquor samples were prepared for volatile fatty acids (VFA's) fractions analysis by high-pressure liquid chromatography (HPLC) according to Bush *et al.*, (1979).

Blood biochemical parameters

Blood samples from all ewes were collected biweekly for two months from the jugular vein before morning feeding. Serum were separated after collecting by centrifugation at 3000 rpm for 10 minutes and kept frozen at - 20C0 for biochemical studies. Serum total protein was determined according to Weicheslbaum, (1946), serum protein electrophoresis (Davis, 1964), alanine and aspartate amino transferees activities (ALT and AST) according to Reitman and Frankel (1957). Alkaline phosphates (AP) as mentioned by Kind and King, (1954). Urea was determined at the day of sampling as described by Wybenga et al ., (1971) and creatinine as mentioned by Bartels , (1971).

Statistical analysis

Statistical analysis was carried out according to Snedecor and Cochran, (1980). Duncan's multiple range test (Duncn, 1955) was used to test the significant differences between means in case digestion coefficients, nutritive values and rumen fermentation. Meanwhile , student t. test was used to test the significance of differences between means and standard errors (M ± SE) in case of Blood biochemical parameters.

RESULTS AND DISCUSSION

Digestion coefficients and nutritive values

Data concerning digestibility coefficients and nutritive values are presented in Table (2). Results of nutrients digestibility (Table 2) showed cleared that the digestion coefficients of all nutrients except EE, were significantly ($P < 0.05$) improved by adding (NS), (MC) or (RO) to (D2,D3 and D4) diets, respectively as compared with control diet (D1). The improvement ranged between 5.42 - 10.66%, 6.11 -11.53% and 7.58 -15.41% for DM, OM and CP,, respectively. Meantime, the improvement for CF and NFE Digestibility ranged between 5.96-15.04% and 4.53-10.20%, respectively. However, the lowest values of digestion improvement were found with (MC) additive (D3 diet). Whereas, the highest values of digestion improvement were found with (NS) additive D2 diet.

The improvement in digestion coefficients with (NS) supplementation may be because of the role of (NS) as inhibitor of Gram-positive and gram-negative bacteria, (Hanafy and

Table (1): Chemical composition of ingredients and control ration

Chemical composition	Item			
	CFM	BH	WS	Control diet
DM	90.82	90.32	91.08	90.32
OM	90.08	89.87	87.92	89.18
CP	17.58	9.60	4.07	13.20
CF	13.32	25.64	35.62	22.60
EE	3.45	1.36	1.72	2.02
NFE	55.73	53.27	46.51	51.36
Ash	9.92	10.13	12.08	10.82

*DM: Dry matter; OM :organic matter ; CP: crude protein; CF: crude fiber ; EE :ether extract; NFE :nitrogen free extract ; BH : Berseem hay; WS:: wheat straw and CFM :Concentrate feed mixture which consisted of 25% undecorticated cotton seed cake, 35% wheat bran, 30%corn, 3% rice bran, 4% molasses , 2% limestone and 1% salt.

Table (2): Effect of the tested rations on the digestion coefficients and nutritive values

Item	Experimental diets				
	D1	D2	D3	D4	SE
Digestion coefficients					
DM	57.53[c]	63.65a	60.72b	62.81ab	1.63
OM	60.72[c]	67.72a	64.43b	66.52ab	1.45
CP	66.33[c]	76.55a	71.36b	74.23ab	4.84
CF	54.19[c]	62.34a	57.42b	59.46ab	4.62
NFE	68.63[c]	75.63a	71.74b	73.45ab	1.75
EE	74.42	77.72	76.10	77.63	1.62
Nutritive Values					
TDN[1]	60.39[c]	67.41a	63.51b	65.32ab	1.50
SE[2]	46.80[c]	53.73a	49.89b	51.66ab	0.94
DCP[3]	9.20[c]	10.62a	9.90b	10.30ab	0.54

a, b and c means in the same raw with different superscripts differ (P<0.05)
1-TDN: total digestible nutrients 2-SE: starch equivalent. 3-DCP: digestible crude protein.

Table (3): Effect of the tested rations on the rumen liquor parameters

Item	Experimental diets				
	D1	D2	D3	D4	SE
Rumen parameters					
pH	5.69	5.78	5.83	5.91	0.67
Ammonia – N mg/100ml	37.28[a]	34.84b	6.58ab	35.28ab	1.72
T.VFA's	9.42	11.62	10.58	11.48	1.27
Acetic	45.65[a]	42.61b	4.28ab	43.17ab	0.95
Propionic	22.54[b]	25.68a	23.72ab	24.34b	1.28
A/P ratio	2.02	1.61	1.77	1.86	1.86
Butyric	15.38[a]	12.88b	13.76ab	13.42a	14.18a
Valeric	6.83	7.27	6.63	6.82	6.32

a, ,b ,c Means in the same raw with different superscripts differ (P<0.05).

Hatem, 1991). Ferdous *et al.*, (1992) observed that the oil of (NS) has therapeutic potential for the treatment of diarrhea caused by isolates of Shigella sp. and 10 strain of V. Cholera and E. Coli. Meanwhile, the results with chamomile were in agreement with Abou-Zeid, (1986) and Mericli , (1990) who recorded that chamomile has anti-inflammatory, anti-septic and spasmolytic activities.

Nutritive values of tested diets are presented at Table (2). Data of nutritive values calculated as TDN, SE and DCP (Table 2) showed that all feed additives improved significantly ($P<0.05$) the nutritive value as TDN, SE and DCP than D1 group. Group D2 showed the highest nutritive values, while the D3 showed the minimum significant ($P<0.05$) improvement than D1 group. The improvement ranged between 5.17 – 11.62 %; 6.60 – 14.81 % and 7.61-15.43 % for TDN , SE and DCP, respectively, Such results are reflections of the same trend found with nutrient digestibilites of tested diets. Results of feeding values were nearly similar to those obtained by El-Saadany *et al.* (1996) , Aboul-Fotoub *et al.*, (1999) and Salem and El-Mahdy (2001). On the meantime, results obtained might indicate a stimulated rumen micro-flora activity through one of the following: 1) Decreasing number and activity of antagonistic organisms, 2) saving some micro factors to rumen micro-flora as micro elements, (vitamins , hormones, enzymes or unknown factors which are required to the efficient digestion , absorption and metabolism and available as effective groups. Or components in medical plants, 3) decreasing hazards of some harmful heavy metals and 4) minimizing effectively hazards of mycotoxins by inhibition of fungi growth and aflatoxion production (Allam *et al* ., 1999) .

Rumen liquor parameters:

Results in Table (3) showed that medicinal plant supplementation in ewes diets did not significantly affect on rumen pH values. This results agreed with Mahdi and Abdel –Aziz, (1993), Youessef et at., (1998) and Allam *et al.*, (1999) who reported that the pH value of rumen liquor did not significantly affect by medicinal plants supplementation. Data show also , that ammonia-N concentration tended to decrease significantly ($P<0.05$) with (D2 & D4) groups than control group. It could be suggested that these results might be attributed to acting Nigella sativa and Rosemary as buffer, Debersac *et al.* (2001). Values of NH3-N obtained agree with Ferdous *et al* ., (1991) and Salem and El-Mahdy , (2001) , who mentioned that NH3-N concentration varied with type of feeds.

Regarding the molar proportion of individual VFA,s are presented in Table (3). Differences in acetic, propionic and butyric acids were significant due to NS and R supplementation. The D2 group showed the highest proportion of propionic and the lowest of acetic and butyric in comparison with other groups. The rank of groups in A/P ratio indicated an improvement of propionate production in diet with medicinal plant. In consequence, the minimum A/P ratio was that of the D1 group.

Blood biochemical parameters

The effect of medicinal plants supplementation on blood biochemical parameters are displayed in Tables 4, 5 and 6. *Nigella Sativa* (NS) supplementation was a companied with significant ($P\leq0.05$) increase in each of serum total protein (TP), total globulin (TG) and its fractions Alpha (α-)-1, Beta (β) -I , Beta (β) –2 and Gamma (γ) –2 globulins concentrations as compared with control group. Further more the

Table (4): Serum total protein and its major fractions (g/dl) of ewes supplemented with medicinal plants .

Parameters	Groups	Time (weeks)			
		2	4	6	8
	D1	5.99+ 0.33	6.13+0.31	5.5+0.26	5.88+0.28
Total protein	D2	6.37+0.37	7.21+ 0.36*	6.29+0.27*	6.81+0.25*
	D3	6.45+ 0.25	6.68+ 0.31	6.96.+0.32*	6.75+0.29*
	D4	6.38+ 0.29	5.53+ 0.28	5.78+0.29	5.78+0.37
Albumin	D1	1.84+0.11	2.03+0.10	1.91+0.13	1.81+0.11
	D2	1.88+0.09	2.26+0.13	2.01+0.13	2.20+0.20
	D3	2.14+0.15	2.37+0.17	2.29+0.15	2.18+0.15
	D4	2.22+0.17	2.19+0.18	2.33+0.21	2.10+0.19
Total Globulin	D1	4.14+0.23	3.97+0.22	3.58+0.19	4.04+0.17
	D2	4.50+0.21	4.96+0.21*	4.23+0.21*	.63+0.20*
	D3	4.30+0.18	4.45+0.24	4.23+0.31	4.56+0.33
	D4	4.17+0.25	3.36+0.7	3.46+0.16	3.63+0.21
A/G ratio	D1	0.44+0.03	0.51+0.04	0.53+0.04	0.45+0.04
	D2	0.42+0.02	0.46+0.03	0.47+0.03	0.48+0.03
	D3	0.52+0.04	0.53+0.04	0.54+0.04	0.48+0.03
	D4	0.58+0.04	0.65+0.06	0.67+0.06	0.58+0.05

* Significant at $P \leq 0.05$

Table (5): Serum globulin fractions (g/ dl) of ewes supplemented with some medicinal plants.

Parameters	Groups	Times (weeks)			
		2	4	6	8
Alpha 1-globulin	D1	0.44+0.03	0.41+0.02	0.38+0.02	0.47+0.03
(α-1)	D2	0.55+0.03*	0.60+0.04*	0.52+0.03*	0.56+0.03*
	D3	0.69+0.04*	0.75+0.04*	0.52+0.02*	0.63+0.03*
	D4	0.67+0.03*	0.53+0.04*	0.54+0.03*	0.57+0.03*
Alpha 2-globulin	D1	0.78+0.04	0.90+0.04	0.72+0.03	0.81+0.03
(α-2)	D2	0.86+0.05	0.81+0.05	0.72+0.03	0.87+0.04
	D3	0.98+0.05*	1.10+0.04*	0.88+0.04*	0.99+0.04*
	D4	0.65+0.03*	0.60+0.03*	0.63+0.02*	0.60+0.03*
Beta 1-globulin	D1	0.26+0.02	0.23+0.01	0.15+0.02	0.21+0.02
(β-1)	D2	0.25+0.02	0.31+0.02*	0.41+0.03*	0.30+0.02*
	D3	0.33+0.02*	0.28+0.02*	0.28+0.02*	0.30+0.03*
	D4	0.30+0.02	0.21+0.02	0.22+0.03	0.21+0.02
Beta 2- Globulin	D1	0.12+0.01	0.10+0.01	0.09+0.01	0.13+0.01
(β-2)	D2	0.22+0.02*	0.16+0.01*	0.20+0.02*	0.23+0.02*
	D3	0.18+0.02*	0.19+0.02*	0.19+0.02*	0.25+0.03*
	D4	0.26+0.02*	0.15+0.01*	0.14+0.01*	0.26+0.02*
Gamm 1-globulin	D1	2.10+0.19	1.94+0.15	1.91+0.14	2.04+0.17
(γ-1)	D2	1.91+0.15	2.40+0.18	2.01+0.13	2.15+0.12
	D3	1.62+0.14	1.62+0.12	1.79+0.13	1.86+0.13
	D4	1.82+0.13	1.55+0.12	1.58+0.11	1.63+0.13
Gammm 2-	D1	0.43+0.03	0.39+0.02	0.33+0.02	0.38+0.02
globulin	D2	0.70+0.04*	0.66+0.03*	0.41+0.02*	0.50+0.03*
(γ-2)	D3	0.53+0.03*	0.49+0.03*	0.57+0.03*	0.55+0.04*
	D4	0.41+0.03	0.33+0.03	0.36+0.03	0.37+0.02

* Significant at $P \leq 0.05$

Table (6) : Effect of some medicinal plants on serum enzymes related to liver function in ewes

Parameters	Groups	Times (weeks)			
		2	4	6	8
AST (IU/L)	D1	27.51+2.21	28.77+1.55	26.12+1.15	24.23+1.81
	D2	43.56+2.10*	36.41+1.77*	37.61+1.91*	33.72+1.77*
	D3	27.55 ± 1.51	29.81+1.88	26.71+1.41	25.19+1.77
	D4	51.75±3.01*	48.33+2.13*	41.29+2.17*	36.21+1.91*
ALT (IU /L)	D1	11.55+0.65	10.11+0.75	9.37+0.61	10.55+0.66
	D2	9.91+0.55	8.85+0.55	10.33+0.57	10.15+0.51
	D3	10.61+0.66	9.17+0.61	9.63+0.53	10.31+0.77
	D4	10.10+0.73	9.11+0.65	10.51+0.71	11.05+0.73
AP (IU / L)	D1	188.2+9.31	184.6+9.63	160.8+6.91	177.5+7.17
	D2	177.1+8.83	198.41+7.2	179.1+8.33	184.7+9.16
	D3	187.4+4.50	191.2+8.10	188.2+9.51	171.2.+8.33
	D4	170.2+8.13	168.5+9.70	128.2+4.41	133.2.+7.21*
Urea (mg /dl)	D1	44.35+2.81	48.17+2.87	44.06+3.11	24.23+1.81
	D2	55.79+2.63*	59.69+2.71*	55.43+2.31*	66.15±3.51*
	D3	39.13+2.58	41.19+2.22	46.15+3.41	52.11.+2.55
	D4	42.25+2.55	45.11+3.21	47.13+3.31	51.10+2.71
Creatinin	D1	0.91+0.06	1.06+0.07	1.03+0.06	0.93+0.05
(mg/dL)	D2	0.88+0.06	0.93+0.05	0.91+0.05	0.99+0.05
	D3	1.11+0.07	1.17+0.07	1.11+0.06	1.15+0.08
	D4	1.11+0.06	1.21+0.08	0.97+0.07	0.95+0.08

Significant at ($P < 0.05$)

level of aspartate aminotransferase (AST) and urea level increased significantly ($P \leq 0.05$) in ewes supplemented with (NS) when compared with non supplemented ewes. The significant increase in serum TP as a function of (NS) supplementation might be a reflection to the rise in serum T.G values. In (MC) supplemented ewes the significant ($P<0.05$) increases in terms of serum TP, α -1, α-2 , β-1, β-2 and γ-2 globulins were indicated as compared with control group.

In respect of serum globulin fractions of Rosemary supplemented ewes a significant ($P \leq 0.05$) elevation in Alpha - 1 and Beta-2 globulins was found. Meanwhile, alpha -2 globulin was declined ($P<0.05$) significantly. Serum AST level significantly ($P \leq 0.05$) increased , meanwhile serum alkaline phosphatase (AP) activity decreased significantly in Rosemary supplemented ewes as compared with control group.

The further increase in serum total protein with NS supplementation may be attributable the role of NS in manipulation the metabolic function (Youssef *et al.*, 1998). These results were in agreement with finding of Khadary *et al.*, (1996) and Korsham *et al.* (1998).

In regarding to (C) supplemented ewes the rise in serum total protein was parallel to that mentioned by Hoda *et al.*, (2000) in kids. Elevation in serum total globulin in ewes supplemented with (NS) may indicate the improvement of humoral immunresponse. This result was in agreement with the results of Khadaray *et al.*, (1996) in laying hens and Korshom *et al.* (1998). in sheep treated with (NS). The significant increase in α-1 globulin concentration in response to supplemental NS , RO or MC to ewes may be attributed to inflammatory reaction as mentioned by Pesce and Kaplan, (1987). Whereas, α-2 globulin declined in (R) supplemented ewes meanwhile, it increased significantly in (C) supplemented one. These changes may be attributed to hepatocyte stimulation for synthesis of α-2 globulin in response to tissue damage and inflammation reaction, Koj, (1984). The significant increase ($P<0.05$) in β-globulin detected in ewes supplemented with (NS, R and C) corresponds with the observations made in cirrholic patient given NS (Mahdi, and Abdel-Aziz , 1993). Similar increases β-globulin associated with inflammation, hyperlipidemia and nephrotic syndrome are also usual documented (Pesce and Kaplan , 1987 and Kaneko *et al.*, 1997) .

Various reports indicated that a rise in γ-globulin is a significant reflection of humoral immune response, and that globulin in general and γ-globulin in particular have some bearing on the production of antibodies . The gamma region contain most of the immunoglobulin (IgG, IgA, IgM, IgD and IgE) as mentioned by Kaneko *et al.*, (1997). In views of this fact, elevating in γ- 2 globulin in ewes supplemented with NS or MC may also be incriminated for the production of immunoglobulin. El-Sayed and Hashem, (2000) indicated that NS seeds can be used as immunostimulant before and during Eimeria vaccination of chicken . Furthermore, Hoda *et al.*, (2000) mentioned that NS or MC supplemented kids exhibit a significant increase in their serum globulin.

In the present study the significant increase ($P<0.05$) in serum AST in ewes supplemented with NS seed or (RO) could be explained on the basis that the elevation in serum AST might be a result of destruction in a wide variety of tissues since it is present in all tissues of the body (Coles, 1986). Zaoui *et al.*, (2002) mentioned that (NS) did not adversely affect liver enzymes in rats including serum AST. These disagreement may be

attributed to species and dose difference . Meanwhile, Youssef *et al* ., 1998 indicated that NS cake tend to relative increase in transaminase enzymes of treated buffaloes.

In regarding to the significant decrease ($P \leq 0.05$) in AP activities in (RO) supplemented ewes, this result was in agreement with Galisteo *et al* ., (2000) who mentioned that pre-treatment with (Rosmarinus tomentosus) vegetal species closely related to *Rosemary Omentosus* significantly reduce AP activities in treated rates. The significant increase in serum urea of NS supplemented ewes without significant alteration in creatinine level, indicates the role NS in manipulating the metabolic function . These results were supported with the forementioned by Youssef *et al* ., (1998) who found that NS cake treatment tend to manipulate the metabolic function as revealed by increase in blood urea, total lipids, transaminases, calcium and phosphorus content of treated buffaloes.

In conclusion, NS is more efficient to ewes followed by RO than MC supplementation due to NS or R tend to modulate digestion coefficient, nutritive values, rumen fermentation , blood biochemical indices and some aspects of immune response which are mostly reflected in improvement of ewes performance.

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أثر أضافه بعض النباتات الطبية على عوامل الهضم والقيمة الغذائية والتخمر في الكرش وبعض العوامل البيوكيميائية في دم الأغنام

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استخدمت ٤٠ نعجة متوسط وزنها ٥و٤٧ كجم وعمرها ٣-٤ سنوات قسمت الى ٤ مجموعات متماثلة. غذيت النعاج عشوائيا على إحدى العلائق التالية: عليقه المقارنة (خالية من الإضافات الغذائية) ع١ مكونة من مخلوط علف مركز ٤٥% دريس برسيم ٣٥% تبن قمح ٢٠% . بينما غذيت المجاميع الأخرى على عليقه المقارنة مضاف لها إحدى الإضافات التالية بذور حبة البركة ح ب، زهرة شيح البابونج ش ب ، حصا اللبان ح ن للعلائق ع٢،ع٣،ع٤ بمعدل ٥٠٠،١٠٠، ١٥٠ملجم / كجم وزن حي على التوالى.

أظهرت النتائج تحسنا معنويا (احتمال ٠٥و٠) في معاملات الهضم للمادة الجافة والمادة العضوية والبروتين الخام والألياف الخام ومستخلص خالي الأزوت والقيمة الغذائية محسوبة كمركبات غذائية مهضومة كلية ومعادل نشا وبروتين خام مهضوم لجميع العلائق المختبرة مقارنة بعليقه المقارنة. وأظهرت العليقه ع٢ أعلى قيم للتحسن لكل من معاملات الهضم والقيمة الغذائية . بينما كانت العليقة ع٣ أقلها تحسنا مقارنه مع العليقتين (ع٢ &ع٤) . بينما لم تؤثر العلائق المختبرة معنويا على درجة pH لسائل الكرش . بينما حققت كل من العليقتين (ع٢ &ع٤) انخفاضا معنويا(احتمال ٠٥و٠) لقيمة تركيز أمونيا سائل الكرش مقارنة بالمجموعة الضابطة . بينما ازداد تركيز الأحماض الدهنية الطيارة زيادة معنوية (احتمال ٠٥و٠) بسائل الكرش لكل من المجموعتين (ع٢ &ع٤) مقارنة بالمجموعة الضابطة . وكانت أعلى القيم المتحققة للمجموعة ع٢ . كما أدت الإضافة إلى زيادة تركيز حامض البروبيونيك بينما خفضت تركيز حامض الأسيتك مقارنة بقيمها للمجموعة الضابطة.كما أدى إضافة حبة البركة مع ع٢ إلى زيادة معنوية في كل من البروتين الكلى والجلوبيولينات الكلية فى مصل هذه النعاج وكذلك ارتفاع قيم كل من (ألفا -١ ، بيتا -١بيتا -٢، جاما -٢ جلوبيولين هذا بالإضافة آلي زيادة معنوية في كل من إنزيم الأسبر تيت أمينو ترانسفيرز ومستوى اليوريا فى مصل النعاج التى غذيت على بذور حبة البركة مقارنة بقيمها للمجموعة الضابطة. أما بالنسبة لإضافة زهرة البابونج فلقد إلى زيادة معنوية في كل من البروتين الكلى و ألفا -١ ، ألفا -٢، بيتا -١بيتا -٢، جاما -٢ جلوبيولين مقارنة بقيمها للمجموعة الضابطة. أما بخصوص إضافة حصا اللبان لعليقه النعاج فلقد لوحظ زيادة معنوية في كل من الفا -١ ، بيتا -٢، جلوبيولين بينما من الفا -٢، جلوبيولين قد تناقصت معنويا مقارنة بالمجموعة الضابطة. هذا بالاضافة الى زيادة معنوية فى انزيم الأسبر تيت أمينو ترانسفيرز ونقص معنوى فى مستوى انزيم الفوسفاتيز القلوى .

وبناء على ما سبق يتضح ان إضافة بذور حبة البركة لعلائق النعاج قد تأثيرا ايجابيا على كل من معاملات الهضم والقيمة الغذائية وتخمرات الكرش . كذلك على بعض العوامل البيوكيميائية فى الدم وكذلك بعض عوامل المناعة المصلية التى تؤدى الى تحسن فى أداء النعاج يليها فى ذلك حصا اللبان ثم زهرة البابونج.