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EFFECT OF DIETARY SUPPLEMENTED WITH MEDICINAL HERBS ON NUTRIENT DIGESTIBILITY AND SOME BLOOD METABOLITES OF BUFFALO CALVES

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SUMMARY

Two experiments were conducted to study the effects of medicinal plants on performance of buffalo calves. Firstly was in vitro dry matter and organic matter disappearance of medicinal plants supplemented diets to find out the best levels of medicinal plants supplements that could be applied in vivo. Secondly, 20 suckling buffalo calves were divided into four experimental groups from G1 up to G5 of five animals each. Animals of G1 were fed according to the ordinary feeding regimen of the station farm. While those of G2 were fed a restricted amount of milk and ad libitum amount of the experimental starter. Each of the other groups from G3 to G5 received G2 diet in addition to a supplement of one of the medicinal herbs under investigation where G3 group received lemon grass (*Cymbopogon citratus*; CC); G4 received (*Eucalyptus globules Labill;* EG); G5 received a chamomile supplement (*Matricria chamomile*; Ch) during the first three months of age. The results indicated that IVDMD and IVOMD of the tested diets were improved compared to the control diet, the best level of medicinal plants supplementation were 3% for CC, 2% for EG and 1% for Ch. Addition of medicinal herbs supplements improved calf viability and decreased incidence of diarrhea. In addition, the groups receiving medicinal herbs did not suffer from parasites and weaning shock. Calves of G4 showed higher ($P<0.05$) DM, OM and CF digestibility than that of G1, while CP digestibility coefficient for G1 was lower ($P\leq0.05$) than that of the other groups during the first digestibility trail (at 3 month old), during the second digestibility trail (at 8 month of old) the calves groups G2, G3, G4 and G5 showed higher DM, OM, CP and NFE digestibility than G1, also groups supplemented by medicinal plants showed higher CF digestibility than G1. Concerning blood parameters during. Suckling period total plasma protein and albumin levels were higher ($P\leq0.05$) in G2, G3, G4 and G5 than those of G1. On the contrary, G1 showed higher ($P<0.05$) plasma globulin and urea than the other groups, while insignificant differences between experimental groups were observed in plasma glucose, urea creatinine, total lipids concentration, GPT and GOT activity. Insignificant differences were observed in plasma parameters during the post-weaning period.

***Keywords**: medicinal plants, buffalo calves, health, feed conversion.*

INTRODUCTION

Herbal medicine is a growing area of alternative medicine nowadays. Many of the active ingredients in manufactured drugs are derived originally from plant compounds and

have a wide range of use. It is believed that plants are more natural, less toxic and safer than chemical preparations. The use of natural products is becoming more popular, since drugs of synthetic origin may have a negative impact on the environment and parasite resistance to poisonous chemicals can develop after repeated applications Magi and Sahk (2003).

Using medicinal herbs and plants (MH&P) with humans has been known since the old civilizations. Old drugs industry depended upon the raw material of MH&P and their extracts, which proved safe always. Inversely many synthesized chemicals caused many hazards to animal, plants and humans. The world health organization (WHO) encourages using MH&P to substitute or minimize the use of chemicals through the global trend to go back to nature (Allam *et al.* 1999).

The objective of this study was to investigate the effect of some medicinal plants supplementation as growth promoter and protective materials on health and productive performance of buffalo calves.

MATERIALS AND METHODS

The present study was carried out in the experimental research station located in Shalakan, El-Kanater El-Khairia, Qalubia Governorate, and lab. of animal nutrition, Animal Production Department, Faculty of Agriculture, Ain Shams University. To study the effect of adding some medicinal plants during suckling period on gross performance of buffalo calves during the suckling and the post weaning periods.

The first experiment:

In vitro dry matter disappearance (IVDMD) and *in vitro* organic matter disappearance (IVOMD) of medicinal plants supplemented diets were conducted to find out the suitable level of the medicinal plants supplements, that could be applied *in vivo* during the experimental period.

A mixture containing 20% berseem hay plus 10% rice straw plus 70% calf starter on DM basis was used as a control diet. On the other hand, five levels of each of the three medicinal plants were included to replace 1, 2, 3, 4 and 5 % (DM basis) of the mixture to form 15 tested mixture diet, in addition to the control diet, berseem hay, rice straw and starter samples. Therefore, the 19 tested diets were evaluated by using the two stage *in vitro* technique developed by Tilly and Terry, (1963), while the rumen liquor was collected by using stomach tube from adult rams fed berseem only.

The second experiment:

The experimental animals:

Twenty buffalo suckling calves (10 mal and 10 female) from one week old until weaning were used in this experiment. The animals were divided into five similar groups of five animals each, according to their birth weight, which were 39.3, 36.3, 39.6, 40.1 and 40.1±1.25 Kg for G1, G2, G3, G4 and G5, respectively, each group was assigned randomly to one of five dietary treatments. Animals of G1 were fed according to the feeding regime of the station farm. They sucked nonrestricted amount of milk and were fed a concentrate feed mixture after 60 days of age, and weaned at 90 days of age (the negative control). Animals of G2 were on a restricted amount of milk with ad libitum amount of starter from the second week of age. Animals were weaned when they consumed 1.75 kg of

DM/day for three successive days (positive control). Animals of G3 were fed on feeding regime of G2 plus 0.1 gm lemon grass CC /kg body weight. Animals of G4 were fed on feeding regime of G2 plus 0.1 gm eucalyptus EG /kg body weight. Animals of G5 were fed on feeding regime of G2 plus 0.1 gm chamomile Ch /kg body weight.

The animals were introduced to the treatment at 7 days of age up to 90 days of age. The animals of groups G3, G4 and G5 received the medicinal herbs according to the optimal dose obtained from the in vitro study, which we preferred to be below the lowest level (1%) and the amount of the herb was adjusted biweekly.

The experimental diet:

Calves of each group nursed their dams naturally. A lactation test was done per each experimental dam weekly to adjust the amount of milk suckled. However, animals in the treated groups were allowed to consume restricted amount of milk not to exceed 4 kg daily in addition to ad-libitum quantity of the calf starter during the suckling period, while calves of the negative control group (G1) were under the ordinary station farm regime, which received concentrate feed mixture after the third month of age.

The solids feed included the starter and berseem clover (during winter) or darawa (during summer) plus rice straw were offered ad libitum to the calves from the second week of age. Group 1(the control) was fed concentrate feed mixture (CFM) containing 16% CP composed of yellow corn, cotton seed meal, wheat bran, salts, mineral salts and lime stone, while the other groups (2, 3, 4, and 5) were fed a starter composed of 40% yellow corn, 15% soybean meal, 10% rice bran, 32% wheat bran, 1% salts 0.5% mineral salts and 1.5% lime stone, in addition to the medicinal plant supplements under investigation. Table (1) illustrated the chemical composition of the ingredients used in the experimental diets.

General veterinary care:

Vitality of young calves was judged according to the frequent incidence of diarrhea and visual examination of different appeared regions of the body (e.g. hair, skin, eyes and muzzle) and the rectal temperature. When diarrhea was noticed, it was immediately treated with antibiotic (New diaclean plus mixture of sulphate compound dimiden and quinoczalin) for 3 days. Pneumonia was treated with oxyject vials injection (1 gm daily for 3 days). Incidence of internal parasites was treated with Albendazol and Ivermecten. Morbidity rate were calculated by divided number of diarrhea and Pneumonia incidence on number of animal.

Digestibility trials:

Digestibility trials were performed after weaning. All animals in each treatment were used in each trial. A grab sample method was applied at which acid insoluble ash (AIA) was used as an internal marker according to (Van Keulen and Young 1977) for determining the nutrients digestibility.

Analytical methods:

The proximate analysis of different feedstuffs were analyzed according to the A.O.A.C. (1995)

Statistical Analysis:

The data were analyzed according to statistical analysis system (SAS, 1995) by using the general linear model procedure of completely random design (GLM). Differences among treatments were analyzed by Duncan multiple range tests (Duncan, 1955).

Table (1) the chemical composition % of ration ingredients.

Item	DM	On DM basis						TDN % *	DP % *
		Ash	OM	CF	CP	EE	NFE		
Milk	17.5	4.25	95.75	0.00	26.58	40.0	29.17	23.4	3.3
Berseem	16.55	10.61	89.39	26.49	18.2	2.17	42.53	11.97	2.0
Darawa	18.80	9.29	90.71	38.04	10.70	1.59	40.38	14	2.0
Rice Straw	93.61	21.98	78.02	36.41	3.51	1.70	36.40	40	0.0
Starter	90.76	13.73	86.27	8.94	15.43	2.12	59.78	72.97	10.3
CFM	91.59	8.82	91.18	9.53	15.87	2.81	62.97	63.7	9.8

* According to Abou Raya (1967)

Table (2): Effect of medicinal plants supplementation on *In Vitro* dry and organic matter disappearance (IVDMD and IVOMD) of formulated diets.

Diet	IVDMD %	IVOMD %	Relative improvement of IVDMD	Relative improvement of IVOMD
Berseem hay	55.74	57.61	95.72	85.70
Rice straw	24.59	22.42	42.22	33.36
Calf starter	75.79	80.29	130.16	119.45
Control diet*	58.23	67.22	100	100
Control diet contain 1% CC**	59.30	68.50	101.84	101.91
Control diet contain 2% CC	64.00	70.00	109.92	104.14
Control diet contain 3% CC	67.58	73.77	116.07	109.74
Control diet contain 4% CC	53.11	56.31	91.22	83.76
Control diet contain 5% CC	44.26	57.79	76.02	85.98
Control diet contain 1% EG**	67.01	66.98	115.09	99.64
Control diet contain 2% EG	68.09	73.17	116.94	108.85
Control diet contain 3% EG	43.01	53.14	73.86	79.05
Control diet contain 4% EG	35.25	44.81	60.54	66.66
Control diet contain 5% EG	35.86	44.49	61.60	66.19
Control diet contain 1% Ch**	69.82	71.13	119.91	105.83
Control diet contain 2% Ch	51.86	57.07	89.07	84.90
Control diet contain 3% Ch	46.22	46.71	79.39	69.49
Control diet contain 4% Ch	35.74	45.50	61.39	67.69
Control diet contain 5% Ch	35.64	40.56	61.21	60.34

* Control diet contains 20% berseem hay plus 10% rice straw plus 70% calf starter ;

**CC, Cym*bopogon citrates*, EG, *Eucalyptus globulus* leaves, Ch, *Matricria chamomila*

RESULTS AND DISCUSSION

The first study:

In vitro dry matter and organic matter disappearance:

In vitro DM and OM disappearance (IVDMD and IVOMD) of the tested diets were improved by medical plants supplementation (CC, EG and Ch) compared to the control diet (Table 2). The optimum levels of medicinal plants supplementation were 3% for CC, 2% for EG and 1% for Ch. Above the best levels, formulas has adverse effects on IVDMD and IVOMD. This may be due to enhancing the microbial digestion by a certain level of the essential oils included in the medicinal plants. Above that level an adverse effect on microbial digestion takes place. Trivedi and Hotchandani (2004) observed an inhibition in growth of *E. coli, klebsiella, Proteus* and *Pseudomonas* sp. by low concentrations of the essential oil of EG. Katewa *et al.* (2003) observed that the essential oil of CC has antibacterial activity against *Staphylococcus albus, S. epidermidis, S. aureus, Escherichia coli, Pseudomonas aeruginosa, Salmonella typhi, Cholera* sp. *Vibrio* sp. and *Klebsiella* sp.

The present results are in the line with Aboul-Fotouh *et al.* (1999). They observed that IVDMD of the tested diets were improved by CC and leaves of EG supplementation compared to the control diet and the best levels of herbages were 3% EG and 5% CC.

The second study:

Calves health and viability:

Supplements with medicinal herbs improved calves viability. The highest viability was recorded for G3 followed by G4 and G5 (Table 3). These may be attributed to the medicinal plants supplements which contain essential oils, which have a desirable effect on calf's health (Mahran, (1967); Abou Zeid, (1992); Hmamouchi *et al.* (1992); El-Amary, (1993); Avallone *et al.* (2000); Maryam. Mirza *et al.* (2001) and Juergens *et al.* (2003).

Incidence of diarrhea was also lower in these groups; particularly in the first 15 days of age .The improvement also was observed in morbidity rate. This may be due to the medicinal herbs used in this study contained essential oils which have antimicrobial effect specially CC and EG. The same trend was observed by *(Stenzel et al, 2000)* when they used a mixture of herbs extract in the feeding of calves to three months of age. *Trivedi and Hotchandani (2004)* observed an inhibition in growth of both E. coli and Klebsiella by low concentrations of the essential oil of Eucalyptus. The growth of *Staphylococcus aureus* was inhibited by the essential oil at 25-200 micron, whereas the growth of both Proteus and Pseudomonas sp. were inhibited by the essential oil at 50-200 micron. Also (Mandeep-Sharma et al 2000 and Nayak 2003) used the Eucalyptus Glopulus in combination with some other medicinal herbs and plants to treat sub clinical mastitis. Katewa *et al (2003)* observed the essential oil of Cympobogon citrates have antibacterial activity against *Staphylococcus albus [S. epidermidis], S. aureus, Escherichia coli, Pseudomonas aeruginosa, Salmonella typhi, cholera sp. [Vibrio sp.] and Klebsiella sp.*

In addition, groups received medicinal herbs did not suffer from parasites (scares) after treating them with ivomac (ivermectin compound).

This may be due to the medicinal plants used in this study containing essential oils of insecticide activity particularly CC and EG. Papachristos *et al (2004)* and Sharma *et al (2001)* found that the EG essential oil have insecticidal activity against *Acanthosceides obtectus*. Oyedele *et al* (2002) found that it was possible to formulate an effective mosquito-repellent topical product from lemongrass oil. Also Magi and Sahk *(2003)* guaranteed the use of herbal medicine such as EG used in practice as alternatives to neurotoxic insecticides.

The weaning shock was not observed in the groups receiving medicinal herbs (Table 3). The same observation was observed by Stenzel *et al. (2000)* when they used herbs extract mixture in the feeding of calves to three months of age. This may be due to the gradual decrease of milk consumed by the experimental groups G2, G3, G4 and G5 which led to an increase in the starter intake and that led to a rumen development. On the other hand, use of medicinal herbs and plant might enhance establishment of the microbial population in the rumen and enhance digestion.

Nutrient digestibility and feeding values after weaning:

Higher values of DM, OM, and CF digestibility ($P \leq 0.05$) were recorded for G4 compared to the negative control group (G1) (Table 4), while groups G3 and G5 were higher ($P \geq 0.05$) than groups G1 and G2. The groups supplemented by medicinal plants (G3, G4 and G5) had higher nutrient digestibility values than those of negative and positive control groups (G1 and G2). This may be attributed to two reasons 1) the medicinal plants include essential oils that enhanced nutrients digestibility as was supported by the results in Table 4. The same trend was observed by Allam *et al.* (1999), when they used chamomile and Aboul-Fotouh *et al.* (1999) when they used CC and EG leaves as feed additives in. 2) The nutritional values of the total ration consumed by the experimental groups G2, G3, G4 and G5 were higher ($P \leq 0.05$) than the corresponding value of the negative control group G1.

Digestibility coefficient of CP for G1 was lower ($P \leq 0.05$) than the other groups (G2, G3, G4 and G5). These may be due to the effect of protein source in the concentrate portion of solid feeds in the diet (cotton seed meal in G1 Vs soybean meal in the other groups). Coefficients of EE digestibility were higher ($P \leq 0.05$) in (G1, G2 and G4) than (G3 and G5). Insignificant differences were observed in NFE digestibility coefficient.

The TDN and DCP values of the rations introduced to G2, G3, G4 and G5 were higher ($P \leq 0.05$) than G1 and as a result of the digestibility trial the TDN and DP calculated were higher in G2, G3, G4 and G5 ($P \leq 0.05$) than that of G1. This may be due to 1) values of TDN and DP of the rations consumed by G2, G3, G4 and G5 were higher than the value of the negative control group (G1), 2) the experimental groups G2, G3, G4 and G5 were higher ($P \leq 0.05$) in nutrient digestibility coefficients than that of G1.

The TDN and DCP for G4, which received EG, were higher ($P \leq 0.01$) than the other groups. These may be due to the effect of supplementation by EG which increased ($P \leq 0.05$) nutrients digestibility than those of the other groups. Aboul-Fotouh *et al.* (1999) observed that feeding values as TDN, DCP and DE kcal/100g were improved

Table (3) : Clinical observation of calves of different groups.

Item	G1	G2	G3	G4	G5	SE
Calves viability	Good	Good	Excellent	Excellent	Excellent	-
Diarrhea (total period)	9[a]	8[a]	6[b]	6[b]	7[b]	±١
Diarrhea (0-15 day of age)	2[a]	0[b]	0[b]	0[b]	0[b]	±
Pneumonia	0	0	0	0	0	±٠
Culling	0	1	0	0	0	±٠
Morbidity rate *	9/5[a]	8/4[a]	6/5[b]	6/5[b]	7/5[b]	±٠,٥٦
Mortality rate **	0	0	0	0	0	±٠
Internal parasite	+	+	-	-	-	-
Weaning chock	+	+	-	-	-	-

Means of treatments within the same row with different superscript letters are differ ($p < 0.05$). * Total account of incidence diarrhea and Pneumonia on total account of animal.

** Total account of animal death on total account of animal, + Found - Not found

Table (4): Effect of medicinal plants supplementation on the nutrient digestibility coefficient and feeding values of the buffalo calves'diets after weaning at 3 month old.

Item	G1	G2	G3	G4	G5	SE
DM	65.98[b]	70.38[ab]	71.12[ab]	75.91[a]	70.32[ab]	4.1
OM	68.88[b]	74.25[ab]	75.41[ab]	79.2[a]	74.06[ab]	4.8
CF	55.17[b]	58.66[ab]	62.80[a]	62.61[a]	57.61[ab]	3.9
CP	63.43[b]	73.85[a]	71.19[a]	79.87[a]	72.85[a]	4.9
EE	76.25[a]	72.15[a]	66.34[b]	75.86[a]	58.67[b]	7.4
NFE	74.45	77.30	79.23	81.75	77.36	5.0
TDN*	64.52[b]	75.37[a]	75.37[a]	77.65[a]	77.99[a]	1.16
DCP*	8.73[b]	11.35[a]	11.22[a]	12.08[a]	12.19[a]	0.37
TDN**	63.63[c]	70.97[b]	71.87[b]	76.56[a]	71.41[b]	0.49
DCP**	9.45[c]	12.21[ab]	11.23[b]	13.63[a]	12.80[ab]	0.56

a, b & c Means of treatments within the same row with different superscript letters are differ ($P \leq 0.05$). * The data calculated from tabulated values (Abou Raya, 1967)

** The data calculated from digestibility coefficient observed in this trial.

G1 negative control, G2 positive control, G3 received CC, G4 received EG and G5 received Ch

(P ≤0.05) by adding CC plus leaves of EG compared to the other diets.

Nutrients digestibility at 8 month age:

Groups supplemented by medicinal plants (G3, G4 and G5) showed higher (P≤0.05) values of DM OM, CP, CF and NFE digestibility than the negative and positive control groups G1 and G2 (Table 5). Insignificant differences were observed in digestibility of EE due to the experimental treatments. These may be attributed to 1) the nutritional values of the total ration consumed by the experimental groups G2, G3, G4 and G5 were higher than those for the negative control group G1, which was affected by type of concentrate portion. 2) The effect of previous medicinal plants supplementation on rumen function development.

The TDN and DCP values (calculated from the digestibility trial) of the ration consumed by the calves during the digestibility trial for groups G2, G3, G4 and G5 were higher (P≤0.05) than G1. These may be due to three reasons, 1) the nutritional values of the total ration consumed by the experimental groups G2, G3, G4 and G5 were higher than that for the negative control group G1, which was affected by type of concentrate portion, 2) the experimental groups G2, G3, G4 and G5 were higher (P≤0.05) in nutrient digestibility coefficients than G1 (tale 5). 3) The difference in the main source of the dry feed protein (soybean meal in the treated groups rations versus cotton seed meal in the control ration). Soybean is more degradable and digestible than the cotton seed meal (Abou Raya, 1967). The data also clearly showed that TDN and DCP by G4, which previously received EG, were higher (P≤0.05) than other groups.

Blood plasma metabolites during suckling period:

An increase (P≤0.05) in total plasma protein and albumin concentration was recorded for in groups G2, G3, G4 and G5 than G1 was observed (Table 6). This may be attributed to the increase protein digestibility by groups (G2, G3, G4 and G5) than G1 (Table 4) and increasing protein biosynthesis in the rumen of calves of experimental groups G2, G3, G4 and G5 particularly the groups supplemented by medicinal plants. Bush (1991) reported a positive correlation between dietary protein and plasma protein concentration. Also, the same author stated that the low level of plasma proteins may be attributed to a decrease in the protein absorbed and synthesized and an increase in protein losses and the low level of plasma albumin may be attributed to a decrease of protein absorption and synthesis and an increase of protein losses. Also, that may be explained by the effect of protein source in the ration on plasma protein where G1 received a concentrate feed mixture containing cotton seed meal as a main source of protein while (G2, G3, G4 and G5) received calf starters containing soybean meal as a main source of protein with nutritive and digestible values higher than cottonseed meal (Abou Raya, 1967).

The negative control group G1 had higher (P≤0.05) plasma globulin concentration than the other groups G2 and G4. This may be attributed to a repeated incidence of diarrhea (bacterial infection) in G1 more than other groups (Table 3), which led to an increase in immune globulin production by G1. Bush (1991) reported that acute, sub acute inflammation and any bacterial infection lead to increases in β globulins, α globulins and γ globulins.

Insignificant differences (P≥0.05) among the different groups were

Table (5): Residual effect of medicinal plants supplementation on nutrient digestibility and feeding values of buffalo calves diets at 240 day old of age.

Items	G1	G2	G3	G4	G5	SE
DM	64.72 ^{c}	69.78 ^{b}	73.32^{a}	72.59^{a}	76.35^{a}	1.63
OM	67.50^{b}	76.99^{a}	79.83^{a}	78.52^{a}	81.44^{a}	1.58
CF	46.425 ^{b}	49.84 ^{b}	62.77 ^{a}	57.16 ^{a}	59.48 ^{a}	4.32
CP	65.64 ^{b}	72.32 ^{a}	72.29 ^{a}	74.98 ^{a}	79.82 ^{a}	2.70
EE	74.55	74.46	77.37	72.47	76.88	2.94
NFE	71.48 ^{b}	82.60 ^{a}	83.32 ^{a}	83.34 ^{a}	85.12 ^{a}	1.36
TDN *	66.77 ^{b}	75.07 ^{a}	75.87 ^{a}	75.98 ^{a}	75.90 ^{a}	0.20
DCP *	10.15 ^{b}	11.17 ^{a}	11..25 ^{a}	11..26 ^{a}	12.48 ^{a}	0.36

a, b & c Means of treatments within the same row with different superscript letters are differ ($P \leq 0.05$).

* The data calculated from digestibility coefficient observed in this trial.

G1 negative control, G2 positive control, G3 received CC, G4 received EG and G5 received Ch

Table (6): Effect of medicinal plants supplementation on some blood plasma metabolites in buffalo calves during suckling period.

Item	G1	G2	G3	G4	G5	SE
Total protein (g /dl)	6.60^{b}	6.75^{a}	6.78^{a}	7.01^{a}	6.76^{a}	0.18
Albumin (g /dl)	2.50 ^{b}	3.08 ^{a}	2.83 ^{a}	3.15 ^{a}	2.74 ^{a}	0.22
Globulin (g /dl)	4.10 ^{a}	3.67^{b}	3.95 $^{a b}$	3.86^{b}	4.02 $^{a b}$	0.17
A: g ratio	0.61	0.84	0.72	0.82	0.68	0.21
Urea (mg /dl)	59.97 ^{a}	36.27^{b}	31.15 ^{b}	36.41 ^{b}	32.34 ^{b}	3.14
Creatin (g /dl)	1.45	1.3	1.62	1.60	1.58	0.14
Total lipid (mg /dl)	220.2 ^{b}	272.9$^{a b}$	280.0 $^{a b}$	344.6 ^{a}	324.3 ^{a}	25.3
GOT (unit /L)	49.88	58.66	43.75	50.30	68.04	3.71
GPT (unit /L)	13.194	26.93	24.70	32.35	33.41	2.87

a, b & c Means of treatments within the same row with different superscript letters are differ significantly ($P \leq 0.05$).

G1 negative control, G2 positive control, G3 received CC, G4 received EG and G5 received Ch

Table (7): Effect of medicinal plants supplementation on some blood plasma metabolites during post weaning period.

Items	G1	G2	G3	G4	G5	SE
Total protein (g /dl)	6.94	6.95	6.99	7.22	7.03	0.13
Albumin (g /dl)	3.84	4.13	4.32	4.39	4.23	0.19
Globulin (g /dl)	3.10	2.92	2.67	2.83	2.80	0.35
A: g ratio	1.24	1.41	1.62	1.55	1. 51	0.39
Urea (mg /dl)	39.41	44.21	47.49	50.59	45.51	4.78
Total lipid (mg /dl)	339.81	272.29	296.82	375.41	286.0	63.4
Creatin (g/dl)	0.98	0.98	1.21	1.39	1.45	0.10
GOT (unit /L)	51.17	82.15	67.03	66.08	99.19	3.67
GPT (unit /L)	17.53	14.50	22.21	40.71	41.54	9.66

G1 negative control, G2 positive control, G3 received CC, G4 received EG and G5 received Ch.

observed in A:G ratio, creatinine, glutamic-pyruvic transaminase (GPT) and glutamic-oxaloacetic transaminase (GOT) . These results indicate that different medicinal plants supplementation had no effect on activity of enzymes GPT and GOT which, mean no toxic effect on liver function , cardiac muscle and skeletal muscle Bush (1991).

plasma urea concentration was higher ($P \leq 0.01$) for G1 than G2, G3, G4 and G5.

Blood plasma metabolites during post weaning period:

Slightly higher total plasma protein and albumin concentrations ($P \geq 0.05$) for the experimental groups (G2, G3, G4 and G5) than the negative control group (G1) Table (7). This may be attributed to the increase in DCPI as well as the higher protein digestibility by groups (G2, G3, G4 and G5) than G1 (Table 5) and /or the increase in protein biosynthesis in the experimental groups G2, G3, G4 and G5 particularly the groups previously supplemented by medicinal plants. Also that may be explained by the effect of protein source (Abou Raya, 1967).

Also slightly higher ($P \geq 0.05$) globulin concentration was recorded in G1 than the other groups (G2, G3, G4 and G5). This may be due to 1) the value of globulin concentration is a reflect to total protein minus albumin concentration.

Insignificant differences ($P \geq 0.05$) among the different groups were observed in A:G ratio, creatinine, GPT and GOT . These results indicate that different medicinal plants supplementation had no effect on activity of enzymes glutamic-pyruvic transaminase (GPT) and glutamic-oxaloacetic transaminase (GOT) which, mean no bad effect on liver function , cardiac muscle and skeletal muscle Bush (1991).

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تأثير العلائق المدعمة بالأعشاب الطبية على معاملات الهضم و بعض مقاييس الدم

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تم إجراء تجربتين الأولى تجربة هضم معملية لدراسة تأثير المستويات المختلفة من النباتات الطبية محل الدراسة على الهضم و الثانية تجربة مزرعية استخدام فيها ٢٠ عجل جاموسي (١٠ ذكور و ١٠ إناث) قسمت إلى خمس مجموعات (اربعة حيوانات في كل مجموعة) تبعا لأوزانها عند الميلاد و هي، المجموعة الأولى(كنترول سالب) غذيت تبعا لنظام المحطة ، المجموعات الأخرى غذيت على كميات محددة من اللبن و كميات حرة من البادئ بالإضافة إلى احد النباتات الطبية تحت الدراسة و المجموعة الثانية (كنترول موجب) ، المجموعة الثالثة أضيف لها حشيشة الليمون CC (*Cymbopogon Citratus*)، المجموعة الرابعة أضيف لها أوراق الكافور EG (*Eucalyptus globules Labill*) ، المجموعة الخامسة أضيف لها شيح البابونج Ch (*Matricria chamomile*) خلال الثلاث اشهر الأولى من العمر

و قد اظهرت النتائج أن إضافة (حشيشة الليمون أو أوراق الكافور أو زهرة شيح البابونج) بمستويات مختلفة إلى العليق الضابطة أدى تحسن معدلات اختفاء المادة الجافة و المادة العضوية حتى مستويات ٣، ٢، ١% على التوالي ثم بدأت في الانخفاض. أدت إضافة النباتات الطبية إلى علائق الحيوانات الى تحسن معنوي في حيوية العجول بالإضافة إلى انخفاض ملحوظ في معدلات الإصابة بالإسهالات و من جهة أخرى فإن الحيوانات التي أضيف لعلائقها النباتات الطبية لم تعاني من وجود طفيليات داخلية (ديدان الإسكارس) كما أنها أيضا لم تعاني من صدمة الفطام. كما لوحظ أن معدلات هضم المادة الجافة و المادة العضوية و الألياف الخام لحيوانات المجموعة التي غذيت على أوراق الكافور كإضافة كانت أعلى من معدلات الهضم لحيوانات المجموعة الضابطة السالبة عند مستوى معنوية ٥ % و لم تكن الفروق مع باقي المجموعات معنوية. كما لوحظ أن حيوانات المجموعة الضابطة السالبة كانت اقل في معامل هضم البروتين الخام من حيوانات باقي المجموعات بمستوى معنوية ٥%. و أيضا لوحظ أن بلازما الدم لحيوانات المجموعة الضابطة السالبة كان اقل في تركيز البروتين الكلي و الالبيومين عن باقي المجموعات و كان هذا الانخفاض معنوي عند مستوى ٥%. كما لوحظ أيضا أن تركيز جلوبيولين و يوريا الدم في هذه المجموعة كان مرتفعا.كما لم يلاحظ أي فروق معنوية في كلا من الكرياتين و الدهون الكلية و GPT و GOT .

استخدام البادئ و النباتات الطبية المدروسة تؤدي إلى تحسن الحلة الصحية للعجول و كذلك تؤدي الى زيادة معدلات الهضم و عمليات البناء في لدم. يحتاج مجال استخدام النباتات الطبية كإضافات للعجول الرضيعة إلى مزيد من الدراسات.