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EFFECT OF SOME MEDICINAL PLANTS AS FEED ADDITIVES ON GROWTH AND SOME METABOLIC CHANGES IN RABBITS.

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SUMMARY

A total number of 63 male growing New Zealand rabbits were classified into 7 equal groups. The first group was used as a control that received free basal ration. Groups from two to seven received a basal ration supplemented with either rocket, carrot and laurel at the levels of 0.5 and 1 %, respectively.

Final body weight and daily gain for rabbit received rocket at the level of 0.5 and 1% or laurel at the level of 1% showed significant ($P<0.05$) increment compared to the control group. Daily feed intake for rabbit received either rocket or laurel at the level of 0.5 or 1% showed significant ($P<0.05$) increment compared to the control group. Feed conversion ratio for rabbit received carrot at the level of 0.5 and 1% showed significant ($P<0.05$) increased compared to the control group.

Total lipids and cholesterol levels for rabbit groups received rocket or carrot at the level of 0.5 and 1% and laurel at the level of 1% showed significant ($P<0.05$) decrease compared to the control group. Triglycerides value for rabbits group received 1% rocket was significantly ($P<0.05$) decreased by 5.0% compared to the control group. Packed cell volume (PCV%) for rabbit groups received rocket, carrot and laurel at the level of 0.5 and 1% was significantly ($P<0.05$) increased compared to the control group. GOT activity for rabbits group received 1% carrot significantly ($P<0.05$) improved compared to the control group. Urea % for rabbit groups received rocket at the level of 0.5 and 1% was significantly ($P<0.05$) decreased compared to the control group. Creatinine % for rabbit groups received rocket, carrot and laurel at the level of 0.5 and 1% was significantly ($P<0.05$) decreased compared to the control group.

Dressing % for rabbits group received 1% carrot was significantly ($P<0.05$) increased by 22.9% compared to the control group. Kidney weight % for rabbit groups received 1% of either rocket, carrot or laurel were significantly ($P<0.05$) increased compared to the control group. Total giblets % for rabbit groups received 1% of either rocket or carrot was significantly ($P<0.05$) increased compared to the control group. Abdominal fat % for rabbits group received 1% rocket was significantly ($P<0.05$) increased by 22.9% compared to the control group, while it was significantly decreased for rabbits group received carrot at the level of .05 and 1% compared to the control group.

The economic efficiency % showed descending values for rabbit treatment groups that received 1% rocket, 1% laurel and 0.5% rocket respectively compared to the control group.

Keywords: *feeding, rocket, carrot, laurel, rabbits performance, digestibility, blood*

INTRODUCTION

Rocket, carrot and laurel are rich sources of vitamin A. Vitamin A is not found in plant material - but carotene is. Vitamin A is considered the most important vitamin in the body for normal growth, protective mucous membranes, reproduction, immune functions and sight. Vitamin A deficiency has been associated with several abnormalities. Vitamin A is found in a variety of dark green leaves and deep orange colour seeds (F. A. S. E. B, 1995). According to the American Cancer Society, a diet rich in beta-carotene may protect body cells by lowering the risk of some forms of cancer (Rinzler, 1990). Rabbits are unique in that they can convert 100% of dietary beta-carotene into retinol (Frater, 2001). There is no available information about using either rocket and carrot seeds or laurel leaves in rabbits nutrition.

Rocket or taramira used is the dried seeds of *Eruca sativa Mill.* Rocket is a good source of beta-carotene (Rinzler,1990). Rocket contain a number of health promoting agents including carotenoids, vitamin C, fibers, glucoerucin and flavonoids (Barillari *et al.*, 2005). The major constituent of *Eruca sativa* seed volatile oil was isothiocyanates which has antioxidant, antimicrobial and anticarcinogen activity (Badee *et al.*, 2003, Haristoy *et al.*, 2005 and Barillari *et al.*, 2005). Rocket contains flavonoids such as appiin and luteolin, volatile oils like myristicin, apiole and B-phellandrene, fats as the furocoumarin bergapten, polyynes protein, sugars and vitamin A & C (Bradley, 1992 and Leung and Foster, 1996). Flavonoids have antiviral activity (Hertog *et al.*, 1993).

Carrot used is the dried seeds of *Daucus carota.L.* In carrot seeds the benefit predominant fatty acids are oleic, linoleic and palmitic in fighting infection (vitamin A keeps cell membranes healthy, making them stronger against disease-causing microorganisms) (Prasad, *et al.*, 1987). Carotol is the strongest antifungal activity constituent of carrot seed oil (Jasicka *et al.*, 2004). The glycosides in carrot may be responsible for the blood pressure lowering effect of the hypertension and exerts anti-hyperglycemic effects (Gilani *et al.*, 2000 and Suzuki *et al.*, 2005).

Bay, sweet bay or laurel used is the dried leaves of *Laurus nobilis Linn.* One hundred gram dried leaves of *Laurus nobilis* provides 10715 I.U of vitamin A (Rinzler, 1990). *Laurus nobilis* leaves are considerd as natural antioxidants (Gomez *et al.*,2004). The primary constituents of laurus oil is eugenol, elemicin, spathulenol, and beta-eudesmol (Rinzler, 1990 and Diaz *et al.*,2002). Carvacrol, 1,8-cineole, fenchone, trans-anethole, phenols and linalool were the predominant constituents in bay laurel essential oils (Dadalioglu and Evrendilek 2004 and Kilic *et al.*,2004). The leaf essential oil of laurel has anti-inflammatory activities and anticancer therapy in mice and rats (Sayyah *et al.*, 2003 and Huang *et al.*, 2004). *Laurus nobilis* oil showed inhibition against all the microorganisms tested (Baratta *et al.*, 1998).

The present study aimed to shed some light on the effects of rocket and carrot seeds or laurel leaves as growth promoters on growing rabbit performance and some metabolic changes.

MATERIALS AND METHODS

The present study was carried out at the Department of Animal Production, National Research Centre, at the experimental farm in newly reclaimed area of West Nubaria (Al-Hussein Village).

A total number of 63 male weaning New Zealand White rabbits with an average body weight of 779 ± 48 g, were divided into seven equal groups of 9 each. The basal experimental ration (Table 1) was formulated and pelleted to cover the requirements of rabbits according to NRC (1977). Rocket and carrot seeds or laurel leaves used as DM basis.The experimental period lasted for 60 days and the experimental groups were classified as follow:

Group 1 was fed the basal diet only and served as control,

Group 2 was fed the basal diet + 0.5 % rocket seeds,

Group 3 was fed the basal diet + 1% rocket seeds,

Group 4 was fed the basal diet + 0.5 % carrot seeds,

Group 5 was fed the basal diet + 1 % carrot seeds,

Group 6 was fed the basal diet + 0.5 % bay laurel leaves and

Group 7 was fed the basal diet + 1% bay laurel leaves.

New Zealand White rabbits were housed in galvanized cages provided with feeder and automatic drinkers. Rabbits of all groups were kept individually under the same managerial conditions. Feed was offered *ad-libitum* and live body weight were recorded biweekly during the experimental period.

At the end of the experiment, 3 males of each rabbit's treatment were kept in metabolic cages. Faeces were collected separately without urine. Feed and water were offered *ad-libitum*. Feed intake and excreted faeces were recorded daily for 5 days. The total excreted faeces during the 5 – day's period were pooled, well mixed, weighted and sampled for analysis. Chemical composition of feed and dried excreta was determined according to A. O. A. C. (1980), (Table, 2).

Blood samples at the end of experiment, were taken from the ear vein of three rabbits from each group for determination of plasma total protein, total lipids, cholesterol, triglycerides, packed cell volume %, glutamic purvic transaminase (GPT) and glutamic oxalacetic transaminase (GOT), urea and creatinine by using reagent commercial kits purchased from Bio- Merieux (France) following to the same steps as described by manufactures.

At the end of the experiment, 3 males of each rabbit's treatment were randomly chosen for slaughter test, and carcass weights were calculated as percentage of live body weight.

Economical efficiency % (Y) was calculated according to the following equation:

Y= [(A-B)/B] x100, where A is the selling price of one kilogram live body weight gain obtained (10.0 L.E.) and B is the feeding cost of this gain (1.20 L.E.), while the cost of one kilogram of rocket seeds were (4.00 L.E), carrot seeds (6.00 L.E) and laures leaves were (11.00 L.E).

Data were statistically analyzed using one-ways analysis of variance (SAS, 1998) and Duncan's multiple range test was used for comparison between means (Duncan, 1955).

RESULTS AND DISCUSSION

Rabbit performance :

Final body weight and daily gain for rabbit received rocket at the level of 0.5 and 1% or laurel at the level of 1% showed significant ($P<0.05$) increment by (7.9, 8.8 and 9.4 %) and by (10.4, 15.8 and 14.9%), respectively compared to the control group. Daily feed intake for rabbit received either rocket or laural at the level of 0.5 or 1% showed significant ($P<0.05$) increment by (10.7 and 11.3%) and by (6.2 and 9.1 %), respectively compared to the control

Table (1): The constituents of the basal ration.

Item	%
Yellow corn	22.00
Wheat bran	31.50
Clover hay	20.00
Soybean meal (44%)	6.00
Sunflower seed meal (28%CP)	18.00
Limestone	1.50
Vit.&Min.Mix*	0.60
DL-Methionine	0.10
Salt	0.30
Total	100
Chemical composition as fed basis	
DM	92.19
CP	17.19
EE	4.00
NFE	50.00
CF	14.00
Ash	7.00
DE(kcal/kg)**	2659

*** Vitamins and Minerals per one kilogram :**
Vit. A 4000000 IU, Vit. D3 50000 IU; Vit. E 16.7 g, Vit. K 0.67 g, Vit. B1 0.67 g, Vit. D_3 180000 IU, Coline chloride 400g, Pantothenic acid 6.67g, Niacin 1000 mg, Folic acid 1.67g, Biotin 0.07g, Manganese 10g, Zinc 23.3g, Iron: 25g, Calcium1.067g, Copper 600 mg, Selenium 0.033 g, Iodine 40 mg and Magnesium 133.4g.
**** Calculated according to NRC (1977).**

Table(2) : Growth Performance of rabbits fed diets supplemented with Rocket, Carrot and Laurel (Means ±SD).

Item	Control	Rocket		Carrot		Laurel	
		0.5%	1%	0.5%	1%	0.5%	1%
Initial live body weight (g)	771 ±51	802 ±36	758 ±35	767 ±43	762 ±36	785 ±25	780 ±37
Final live body weight (g)	1985 ±86cd	2142 ±92ab	2160 ±85ab	1953 ±44cd	1841 ±47d	2053 ±68bc	2172 ±79a
Daily body weight gain (g)	20.2 ±1.3cd	22.3 ±1.0ab	23.4 ±1.0a	19.3 ±0.7d	19.6 ±0.6d	21.1 ±1.0bc	23.2 ±0.9a
Daily feed intake (g)	85.0 ±2.0d	94.1 ±3.7a	94.6 ±1.4a	87.9 ±2.3cd	89.3 ±3.0bcd	90.3 ±4.1abc	92.7 ±2.1ab
Feed conversion (ratio)	4.23 ±0.3b	4.23 ±0.3b	4.06 ±0.2b	4.57 ±0.3a	4.55 ±0.3a	4.28 ±0.2ab	4.00 ±0.2b
Economic Efficiency %	100	113	125	79	78	100	115

a.b.c.d.e Means in the same row bearing different letters, differ significantly (P<0.05).

group. Feed conversion ratio for rabbit received carrot at the level of 0.5 and 1% showed significant ($P<0.05$) improvement by 8.0 and 7.6%, respectively compared to the control group (Table 2).

In rocket treatments the significant performance values with increasing the amount of feed consumed may be due to its beneficial effect for stimulation and activity the digestive system by improving the diet palatability and enhancing appetite of rabbit. Similar results in broiler were observed by (Namur *et al.*, 1988). In laurel, it may be due to the potential of euganol as a feed preservation (Stager *et al.*, 1991). Euganol is effective as antiparasites (Moretti *et al.*, 1998), antimutagenesis and carcinogenesis (Selvi and Niranjali, 1998) as well as the antioxidant (Gomez *et al.*, 2004). In carrot seeds, the significant increased in feed conversion ratio may be due to the antisteroidogenic effect. Similar result noticed by Majumder *et al.*, (1997) who reported that, the fraction 5 (fatty acids) present in carrot seeds acts as an antisteroidogenic agent. The slightly decrease in final body weight may be due to the glycosides which inhibiting maltase activity. Similar result obtained by Suzuki *et al.* (2005) who reported that glycosides exerts anti-hyperglycemic effects in rats by inhibiting maltase activity.

Digestion coefficient:

Crude fiber digestion % for rabbit groups received 1% of either rocket or carrot were significantly ($P<0.05$) increased by 12.4 and 12.8 %, respectively compared to the control group (Table 3).

In rocket treatment the significant increase of crude fiber digestibility may be due to the effect of flavonoids essential oils which had beneficial effect for stimulation and activity of digestive system . Similar results are observed in rat by (Namur *et al.*, 1988 and Bradley, 1992). In carrot seeds, it may be due to the effect of beta-carotene that improve metabolism of caecal micro organisms on fiber digestion in rabbit. Gronowska *et al.*, (1986) found that, the chemical composition of fiber in diet significantly affects the process of beta-carotene absorption and conversion in the digestive tract of the rat. Also, it may be due to the synergistic effect of fiber and associated antioxidants as observed in rat by Nicolle *et al.*, (2003).

Blood parameters:

Total lipids and cholesterol levels for rabbit groups received rocket and carrot at the levels of 0.5 and 1% and laurel at the level of 1% showed significant ($P<0.05$) decrease by (4.1, 4.9, 3.3, 4.5 and 4.1 %) and (5.4, 7.2, 4.8, 7.7 and 4.7%), respectively compared to the control group. Triglycrides for rabbits group received 1% rocket significantly ($P<0.05$) decreased by 5.0% compared to the control group (Table 4). In rocket treatments the significant decreased values of total lipids, cholesterol and triglycrides may be due to the high diversity of vitamin A in the daily diet which allows a sufficient nutrient intake and is an important approach for health promotion (Kucuk *et al.*, 2003). Similar results obtained by El-Gengaihi *et al.*, (2004) who found that significant decreases in total lipids. triacylglycerols and total cholesterol of hyperlipemic rats receiving the rocket oil as compared with the control. In carrot, it may be due to its ability on modifying cholesterol absorption. Similar result observed by Nicolle *et al.*, (2003), who found that carrot consumption modifies cholesterol absorption and bile acids excretion as well as increases antioxidant status and these effects could be interesting for cardiovascular protection. In laurel, it

Table (3) : Digestibility% of rabbits fed diets supplemented with Rocket, Carrot and Laurel (Means ±SD).

Item	Control	Rocket		Carrot		Laurel	
		0.5%	1%	0.5%	1%	0.5%	1%
DM	82.2	80.6	80.1	80.4	81.2	80.9	80.7
%	±1.0	±0.4	±1.0	±0.6	±1.0	±1.1	±0.8
OM	80.8	80.6	78.7	79.1	79.3	78.4	77.3
%	±1.2	±1.8	±2.2	±0.7	±1.4	±0.7	±1.8
CP	71.9	74.3	72.7	74.2	72.5	72.9	73.7
%	±2.4	±1.9	±1.0	±1.3	±0.3	±1.2	±1.9
CF	28.2	27.8	31.7	27.1	31.8	27.8	27.4
%	±0.9bc	±0.8 c	±1.0 a	±1.0 c	±0.5 a	±1.0 c	±0.9 c
EE	67.9	70.1	69.7	70.5	70.5	71.6	71.7
%	±1.7	±2.0	±1.2	±1.4	±0.6	±1.6	±1.2
NFE	74.2	73.9	73.4	74.0	73.9	73.4	75.1
%	±0.7	±0.8	±1.1	±0.8	±0.3	±0.6	±0.6

a.b.c.d.e Means in the same row bearing different letters, differ significantly (P<0.05).

Table (4): Blood parameters of rabbits fed diets supplemented with Rocket, Carrot and Laurel (Means ±SD).

Item	Control	Rocket		Carrot		Laurel	
		0.5%	1%	0.5%	1%	0.5%	1%
Total protein (mg/dl)	8.24 ±1.1	8.18 ±0.7	8.27 ±0.4	8.50 ±0.6	8.66 ±0.1	8.34 ±0.7	8.7 ±1.0
Total lipids (mg/dl)	243 ±2.0 a	233 ±3.3 b	231 ±2.0 b	235 ±1.6 b	232 ±1.3 b	237 ±3.1 a	233 ±2.2 b
Cholesterol (mg/dl)	83.0 ±1.1 a	78.5 ±1.1 bc	77.0 ±1.0 c	79.0 ±0.6 bc	76.6 ±1.5 c	82.2 ±0.9 ab	79.1 ±0.6 bc
Triglycride (mg/dl)	80.6 ±1.3 a	78.3 ±0.5 ab	76.6 ±0.8 b	79.5 ±1.4 ab	78.6 ±0.4 ab	79.0 ±0.7 ab	78.4 ±0.8 ab
GOT (unit /l)	85.8 ±1.5 a	82.3 ±1.0 ab	79.8 ±1.0 ab	82.2 ±1.4 ab	79.0 ±1.5 b	84.4 ±2.1 a	83.0 ±1.4 ab
GPT (unit /l)	25.5 ±1.4	25.2 ±1.4	24.8 ±0.7	24.7 ±0.2	24.3 ±0.8	24.8 ±1.0	24.3 ±1.2
PCV %	40.4 ±0.6 c	44.3 ±0.9 ab	44.7 ±0.3 ab	45.3 ±0.4 ab	46.1 ±1.3 a	43.5 ±0.9 b	43.6 ±0.6 b
Urea (mg/dl)	45.4 ±2.0 a	33.5 ±2.0 b	33.1 ±2.1 b	42.0 ±1.8 a	41.4 ±1.1 a	45.7 ±0.4 a	45.4 ±0.7 a
Creatinine (mg/dl)	5.17 ±0.3 a	3.63 ±0.3 bc	3.47 ±0.1 c	4.17 ±0.4 b	4.27 ±0.5 b	4.16 ±0.2 b	3.93 ±0.1 bc

a.b.c Means in the same row bearing different letters, differ significantly (P<0.05).

may be due to the main effective essential oil eugenol, that inhibits accumulation of lipid peroxidation products and maintains the activities of antioxidant enzymes. Similar result observed in rat by Paraskty *et al.*, (1996).

PCV% for rabbit groups received rocket, carrot and laurel at the level of 0.5 and 1% significantly (P<0.05) increased by (9.7 and 10.6%), (12.1 and 14.1%) and by (7.7 and 7.9%), respectively compared to the control group. In rocket treatments the significant PCV% may be due to its contain a number of health promoting agents including carotenoids, vitamin C, fibers, flavonoids, and glucosinolates as reported by Barillari *et al.* (2005). In carrot seeds, it may be due to the benefit predominant fatty acids oleic, linoleic and palmitic in boosting immunity. Similar result in human (especially among older people) observed by (Dhar, 1990). In laurel, it may be due to flavonoides in laurus leaves which are antiviral activity as reported by (De *et al.*, 2004), or may be due to the antioxidant effect that can prevent oxidation of harmful LDL cholesterol as well as preventing the build-up of atherosclerotic plaque (Hertog *et al.*, 1993).

GOT activity for rabbits group received 1% carrot significantly (P<0.05) improved by 7.9% compared to the control group while did not show any trend for other groups.This result in carrot may be due to the antioxidant status of carrot seed oil as reported by Nicolle *et al.*, (2003).

Urea % for rabbit groups received rocket at the 0.5 and 1% significantly (P<0.05) decreased by 26.2 and 27.1%, respectively compared to the control group. Creatinine % for rabbit groups received rocket, carrot and laurel at the level of 0.5 and 1% significantly (P<0.05) decreased by (29.8 and 32.9%), (19.3 and 17.4 %) and by (19.5 and 24%), respectively compared to the control group. In rocket treatments the significant decrease in urea and creatinine may be due to the effective role of rocket isothiocyanates volatile oil as diuretics. Mahran *et al.* (1992) found that the ethanolic extract and volatile oil of *Eruca sativa* seeds have been shown to act as diuretics in dogs, and the oil significantly increased Na+, K+ and Cl- excretion in urine. *E. sativa* seeds are used in folk medicine as a lactagogue aphrodisiac, diuretic, antiscorbutic, antimicrobial, to disintegrate renal calculi, and to induce vomiting (Boulos, 1983). In carrot seeds, it may be due to the glycosides that acting through blockade of calcium channels and this effect may be responsible for the blood pressure lowering effect of the hypertension (Gilani *et al.*, 2000).

Carcass characteristics:

Abdominal fat % for rabbits group received 1% rocket significantly (P<0.05) increased by 22.9% compared to the control group (Table 5).While its significantly (P<0.05) decreased for rabbits group received carrot at the level of .05 and 1% by 16 and 32.1%, respectively compared to the control group. In rocket treatment, the significant increased of abdominal fat % may be due to the rich rocket in volatile oils, fats, protein, sugars and vitamins which had beneficial effect for stimulation and activity of digestive system. Similar results are reported by (Leung and Foster, 1996) who found that rocket contains volatile oils like myristicin, apiole and B-phellandrene, fats, protein, sugars and vitamins A & C. In carrot, it may be due to antisteroidogenic agent as reported by (Majumder *et al.*, 1997).

Dressing % for rabbits group received 1% carrot significantly (P<0.05) increased by 6.6% compared to the

Table (5) : Carcass characteristics of rabbits fed diets supplemented with Rocket, Carrot and Laurel (Means ±SD).

Item	Control	Rocket		Carrot		Laurel	
		0.5%	1%	0.5%	0.5%	1%	0.5%
Abdominal fat %	1.31 ±0.1 c	1.42 ±0.1 bc	1.61 ±0.1 a	1.10 ±0.1 d	0.89 ±0.4 e	1.40 ±0.1bc	1.45 ±0.1 bc
Dressing %	63.7 ±0.3 bc	65.3 ±1.2 abc	66.9 ±0.6 ab	66.2 ±0.4 abc	67.9 ±1.4 a	64.8 ±0.8bc	65.2 ±0.7 abc
Liver weight %	2.64 ±0.12	2.92 ±0.10	3.24 ±0.3	3.02 ±0.2	3.09 ±0.5	2.64 ±0.1	3.2 ±0.3
Heart weight %	0.50 ±0.1	0.52 ±0.1	0.51 ±0.1	0.54 ±0.1	0.52 ±0.1	0.55 ±0.1	0.55 ±0.1
Kidney weight %	1.00 ±0.1 d	1.08 ±0.1bcd	1.29 ±0.2abc	1.20 ±0.2bcd	1.29 ±0.1 abc	1.35 ±0.1ab	1.47 ±0.1 a
Total giblets %	1.30 ±0.9 b	1.42 ±1.0 ab	1.71 ±1.2 a	1.50 ±1.0 ab	1.61 ±1.1 a	1.43 ±0.8ab	1.65 ±1.0 a

a.b.c Means in the same row bearing different letters, differ significantly (P<0.05).

control group (Table 5). Kidney weight % for rabbit groups received 1% of either rocket, carrot or laurel at the level of 0.5 and 1% significantly ($P<0.05$) increased by 29, 29, 35 and 47%, respectively compared to the control group. Total giblits % for rabbit groups received 1% of either rocket or carrot significantly ($P<0.05$) increased by 31.5 and 23.8%, respectively compared to the control group. In carrot, the significant increased of dressing and total giblit % may be due to the ability of carrot as a professional diet as modifies cholesterol absorption and bile acids excretion and increases antioxidant status (Nicolle *et al.*, 2003) as well as significantly reduced in the respective phospholipids (Prasad *et al.*, 1987). While for kidney weight%, it may be due to the ability of carrot in preventing endotoxin-induced oxidative renal tissue damage and shows potential for clinical use as reported by (Kanter *et al.*, 2005). In rocket, the significant increased of kidney weight% may be due to the diuretic effect of the rocket volatile oil as reported by Mahran *et al.* (1992).

Economical efficiency (EE)%:

The economic efficiency % showed descending values for rabbit treatment groups that received 1% rocket, 1% laural and 0.5% rocket by 25, 15 and 13% respectively compared to the control group. These values were controlled by the relationship between feed conversion ratio, the price of basal diet, rocket and laurel and as well as the final body weight (Table 2).

In rocket, the higest EE% due to it was a cheap price as a feed additive in diet on the productive performance. Similar result observed by (Leung and Foster, 1996), who found in broiler chicks that rocket cakes is cheap untraditional source of protein. In laurel, nevertheless the high price of dried laurel leaves may be due to its considered a rich source of vitamine A as reported by (Rinzler,1990) , rich in alpha-tocopherol as reported by (Gomez *et al.*, 2004) and its anti-bacterial effects as reported by (Gupta *et al.*, 1991).

CONCLUSION

It appears that 1% rocket, 1% laural or 0.5% rocket, respectively can be individualy used as natural feed additives witch can improve the growth performance, digestion coefficient, biochemical blood parameters and the economic efficiency in growing rabbits.

REFERENCES

A. O. A. C. (1980). Association of Analytical chemist. Official Methods of Analysis 13th Ed., Washington, D.C..

Badee, A.Z.M.; S.A. Hallabo and M.A.A Aal (2003). Biological evaluation of Egyptian *Eruca sativa* seeds and leaves. Egypt. J. Food Science, 31: 67-78.

Baratta, M.T.; H.J.D. Dorman; S.G. Deans; D.M. Biondi and G. Ruberto (1998). Chemical composition, antimicrobial and antioxidative activity of laurel, sage rosemary, oregano and coriander essential oils. J. Essential Oil Research, 10: 618-627.

Barillari J.; D. Canistro; M. Paolini; F. Ferroni; G.F. Pedulli; R. Iori and L. Valgimigli (2005). Direct antioxidant activity of purified glucoerucin, the dietary secondary metabolite contained in rocket (*Eruca sativa Mill.*) seeds and sprouts. J. Agric Food Chem., 53 :2475-2482.

Bradley, P.R (1992). British Herbal Medicine Association. British Herbal Compendium, Vol.1. Rolniczych. 434: 395-399.

Boulos, I. (1983). Medicinal plants of North Africa reference publication. Inc. proc., 2nd Con.Fac.Vit. Me. Cairo. Univ., Cairo, Egypt (1992).

Dadalioglu. I and G.A. Evrendilek (2004). Chemical compositions and antibacterial effects of essential oils of Turkish oregano (*Origanum minutiflorum*), bay laurel (*Laurus nobilis*), Spanish lavender (*Lavandula stoechas L.*), and fennel (Foeniculum vulgare) on common foodborne pathogens. J Agric. Food Chem., 52:8255-8260.

De M.S.; N. Borbone; F. Zollo; A. Ianaro; M.P. Di and M. Iorizzi (2004). Megastigmane and phenolic components from Laurus nobilis L. leaves and their inhibitory effects on nitric oxide production. J Agric, Food Chem. 52:7525-7531.

Dhar, V. J. (1990). Studies on Daucus carota seeds. Fitoterapia. 1990. 61: 255-258..

Diaz., M.; C. Perez. and Cabezudo (2002): Effect of drying method on the volatiles in bay leaf (*Laurus nobilis L.*). J. Agric. Food Chem., 50: 4520-4524.

El-Gengaihi, S.E.; A. Salem; S.A. Bashandi; N.A. Ibrahim and S.R.A. El-Hamid (2004). Hypolipidemic effect of some vegetable oils in rats. J. Food Agriculture & Environment, 2: 88-93.

F.A.S.E.B. (1995). Federation of American Societies for Experimental Biology, Life Sciences Research Office. Prepared for the Interagency Board for Nutrition Monitoring and Related *Research.* Third Report on Nutrition Monitoring in the United States: Volumes 1 and 2. U.S. Government Printing Office, Washington, DC.

Frater, J. (2001). Hyperostotic polyarthropathy in a rabbit--a suspected case of chronic hypervitaminosis A from a diet of carrots. Aust .Vet .J., 9: 608-611.

Gilani, A.H.; F. Shaheen; S.A. .Saeed; S. Bibi; S.M. Irfanullah, and S. Faizi (2000). Hypotensive action of coumarin glycosides from Daucus carota Phytomedicine. Urban & Fischer Verlag GmbH & Co. KG, Jena, Germany: 7: 5

Gomez, C.D.J.; E. Ibanez; F.J. .Ruperez and C. Barba (2004).Tocopherol measurement in edible products of vegetable origin. J Chromatogr. A.,1054 :227-233.

Gronowska, S.A.; E. Smaczny and E. Weremska, (1986). Effect of natural low- and high-fibre diets on the conversion of beta-carotene to vitamin A. Roczniki-Panstwowego-Zakladu-Higieny, 37: 394-399.

Gupta, M.; A. Bagchi; and A.B. Ray (1991). prospective of botanical and microbial products as pesticides fortomerrow. J. Natural product. 54-59.

Haristoy, X.; J.W. Fahey; I. Scholtus and A.Lozniewski (2005). Evaluation of the antimicrobial effects of several isothiocyanates on Helicobacter pylori. Planta Med., 71:326-330.

Hertog, M.G.; E.J. Feskens; P.C. Hollman; M.B. Katan, and D. Kromhout (1993). Dietary antioxidant flavonoids and risk of coronary heart disease: the Zutphen Elderly Study. Lancet, 342: 1007-1011.

Huang, W.C.; S.T. Chan; T.L. Yang; C.C. Tzeng and C.C. Chen (2004). Inhibition of ICAM-1 gene expression, monocyte adhesion and cancer cell invasion by targeting IKK complex: molecular and functional study of novel alpha-methylene-gamma-butyrolactone derivatives. Carcinogenesis.25:1925-1934.

Jasicka, M.I.; J. Lipok; E.M. Nowakowska; P.P. Wieczorek; P. Mlynarz and P. Kafarski (2004).

Antifungal activity of the carrot seed oil and its major sesquiterpene compounds. Naturforsch [C]. 59:791-796.

Kanter, M.; O. Coskun; F. Armutcu; Y.H. Uz and G. Kizilay (2005). Protective effects of vitamin C, alone or in combination with vitamin A, on endotoxin-induced oxidative renal tissue damage in rats. Tohoku J. Exp. Med., 206:155-162.

Kilic, A.; H. Hafizoglu; H. Kollmannsberger and S. Nitz (2004). Volatile constituents and key odorants in leaves, buds, flowers, and fruits of Laurus nobilis L. J. Agric. Food Chem., 52 :1601-1606.

Kucuk, O.; N. Sahin and K .Sahin (2003). Supplemental zinc and vitamin A can alleviate negative effects of heat stress in broiler chickens. Biol. Trace Elem. Res., 94 :225-235.

Leung, A.Y.; and S. Foster (1996). Drugs and Cosmetics, 2nd Encyclopedia of Common Natural Ingredients used in food. New york: John Wiley& Sons, Inc.

Mahran, G.H.; H.A. Kadry; C.K. Thabet; M.M. El-Olemy; M.M. Al-Azizi; P.L. Schiff and L.K. Wong (1992). GC/MS analysis of volatile oil from Eruca sativa seeds. International Journal of Pharmacognosy. 30: 135-137.

Majumder, P.K.; S. Dasgupta; R.K. Mukhopadhaya; U.K. Mazumdar and M. Gupta (1997). Anti-steroidogenic activity of the petroleum ether extract and fraction 5 (fatty acids) of carrot (*Daucus carota L.*) seeds in mouse ovary.1: J Ethnopharmacol., 57:209-212.

Moretti, M.D.L.; E. Bazzoni; G.S. Passino and R. Prota (1998). Antifeedant effects of some essential oils on Ceratitis capitata Wied. J. Essential Oil Research, 10: 405–412.

NRC (1977). National Research Council: Nutrient Requirements of Domestic Animals. Nutrient Requirements of Rabbits. Second revised edition. National Academy of Sciences, Washington. D.C., U.S.A.

Namur, A.P.; J. Morel and H. Bichek (1988). Compound animal feed and feed additives. In Deboer, F., H. BICHEL, eds. Livestock feed resources and feed evaluation in Europe. Elsevier. Sci. publ., Amsterdam..

Nicolle,C.; N. Cardinault; O. Aprikian; J. Busserolles; P. Grolier; E. Rock; C. Demigne ;A. Mazur; A. Scalbert; P. Amouroux and C. Remesy (2003). Effect of carrot intake on cholesterol metabolism and on antioxidant status in cholesterol-fed rat. Eur. J. Nutr., 42: 254-261.

Parasakty, K.; S. Smanthi; D.P. Dakshinamoorhy and N.S. Devaraj (1996). The antioxidant effect of eugenol on cc14 induced erythrocyte damage in rats. J. Natural Biochemistry, 7 : 23 – 28.

Prasad, R. B. N.; Y. N. Rao and S. Rao (1987). Phospholipids of palash (*Butea monosperma)*, papaya *(Carica papaya)*, jangli badam Phospholipids of (*Sterculia foetida*), coriander (*Coriandrum sativum*) and carrot (*Daucus carota*) seeds. J. American Oil Chemists' Society. 64:1424-1427.

Rinzler, C. A. (1990). The complete book of herbs, spices and condiments. Focts on file, New York. Oxiford.

SAS. (1998). SAS, Procedure Guide.Version b 12 Ed. "SAS" Institute Inc., Cary, NC, USA.

Sayyah, M.; G. Saroukhani; A. Peirovi and M. Kamalinejad (2003). Analgesic and anti-inflammatory activity of the leaf essential oil of Laurus Scientia Horticulturae. Elsevier Science B.V., Amsterdam, Netherlands, 92: 75-81.

Selvi, R. T. and S. Niranjali (1998). Inhibition by eugenol of diethylnitrosamine induced microsomal degranulation. Fitoterapia, 69: 115 - 117.

Stager, J., B. Wuthrich and S. G. O. Johansson (1991). Spice allergy in celery sensitive. Allergy Copenhagen, 46: 475 - 478.

Suzuki, Y.A.; Y. Murata; H. Inui; M. Sugiura and Y.Nakano (2005). Triterpene glycosides of Siraitia grosvenori inhibit rat intestinal maltase and suppress the rise in blood glucose level after a single oral administration of maltose in rats. J Agric Food Chem. 53 :2941-2946.

Webster, C. D.; K. R. Thompson and Muzinic, L. (2002): Feeding fish and how feeding frequency affects sunshine bass. World Aquac. , 33:20-24.

تأثير بعض النباتات الطبية كإضافات غذائية على النمو وبعض التغيرات التمثيلية فى الأرانب

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أجريت هذه الدراسة لبيان التأثيرات الناجمة عن تغذية الأرانب فى مرحلة النمو على علائق مضاف إليها كل من الجرجير و الجزر و اللورا كمنشطات طبيعية وذلك على مظاهر النمو وبعض التغيرات التمثيلية ، حيث استخدم فى هذا البحث ٦٣ أرنب نمو مقسمة إلى ٧ مجموعات متساوية. تمت التغذية على عليقه متوازنة واختلفت المجموعات باختلاف الإضافات حيث غذيت المجموعة الأولى بالعليقة الأساسية و اعتبرت هى المجموعة القياسية أما المجموعات من الثانية حتى السابعة فغذيت بإضافة بذور كل من الجرجير والجزر وورق اللورا بنسبة ٠,٥ ، ١ % على الترتيب إلى العليقة الأساسية وتم الحصول على النتائج الآتية:

١- أدت إضافة بذور الجرجير عند مستوى أى من ٠,٠٥ أو ١% أو ورق اللورا بنسبة ١% إلى العليقة الأساسية إلى زيادة معنوية فى الوزن الحى النهائى للأرانب بنسبة قدرها (٧,٨ ، ٨,٨ و ٩,٤ %) و بنسبة (١٠,٤ ، ١٥,٨ و ١٤,٩%) على الترتيب مقارنة بالمجموعة القياسية .

٢- أدت إضافة بذور الجرجير أو ورق اللورا عند مستوى أى من ٠,٠٥ أو ١ % إلى زيادة معنوية فى كمية العلف المأكول يومياً بنسبة (١٠,٧ و ١١,٣%) و (٦,٢ و ٩,١ %) على الترتيب مقارنة بالمجموعة القاسية.

٣- أدت إضافة بذور الجزر عند مستوى ٠,٠٥ أو ١ % إلى العليقة الأساسية إلى تحسن فى قيمة معامل التحويل الغذائى بنسب قدرها ٨,٧ و ٧,٦ % على الترتيب مقارنة بالمجموعة القاسية.

٤- أدت إضافة بذور الجرجير أو الجزر عند مستوى أى من ٠,٠٥ أو ١% وورق اللورا عند مستوى ١% إلى نقص معنوى فى كل من النسبة المئوية للدهون الكلية بنسبة (٤,١ ، ٤,٩ ، ٣,٣ ، ٤,٥ و ٤,١%) ومستوى الكوليسترول بنسبة (٥,٤ ، ٧,٢ ، ٤,٨ ، ٧,٧ و ٤,٧%) على الترتيب مقارنة بالمجموعة القاسية.

٥- أدت إضافة بذور الجرجير عند مستوى ١% إلى إنخفاض معنوى فى مستوى الجلسريدات الثلاثية بنسبة ٥ % مقارنة بالمجموعة القياسية.

٦- أدت إضافة بذور الجرجير أو الجزر وورق اللورا عند مستوى ٠,٠٥ أو ١% إلى زيادة معنوية فى النسبة المئوية لكرات الدم المضغوطة كأحد قياسات المناعة بنسبة (٩,٧ ، ١٠,٦%) ، (١٢,١ ، ١٤,١%) وبنسبة (٧,٧ ، ٧,٩%) على الترتيب مقارنة بالمجموعة القياسية.

٧- أدت إضافة بذور الجزر عند مستوى ١% إلى تحسن معنوى فى نشاط إنزيم الكبد الناقل لمجموعة الأمين (GOT) بنسبة ٧,٩% مقارنة بالمجموعة القياسية.

٨- أدت إضافة بذور الجرجير عند مستوى أى من ٠,٠٥ أو ١% إلى انخفاض معنوى فى نسبة اليوريا بنسبة ٢٦,٢ و ٢٧,١ % على الترتيب مقارنة بالمجموعة القياسية.

٩- أدت إضافة بذور الجرجير أو الجزر إلى زيادة معنوية فى نسبة الألياف المهضومة بنسبة ١٢,٤ و ١٢,٨% على الترتيب مقارنة بالمجموعة القياسية.

١٠- أدت إضافة بذور الجرجير عند مستوى ١ % إلى زيادة معنوية لكمية دهن البطن بنسبة ٢٢,٩% مقارنة بالمجموعة القياسية.

١١ - أدت إضافة بذور الجزر عند مستوى ١ % إلى نقص معنوى لكمية دهن البطن بنسبة ٣٢,١% مقارنة بالمجموعة القياسية

١٢- أدت إضافة بذور الجزر عند مستوى ١ % إلى زيادة معنوية فى نسبة تصافى الذبيحة بمقدار ٥٦,٦% مقارنة بالمجموعة القياسية

١٣- أدت إضافة بذور الجرجير أو الجزر وورق اللورا عند مستوى ٠,٥ أو ١% إلى زيادة معنوية فى وزن الكلية بنسبة ٢٩ ، ٢٩ ، ٣٥ و ٤٧% على الترتيب مقارنة بالمجموعة القياسية.

١٤- أدت إضافة بذور الجرجير أو الجزر إلى زيادة معنوية فى نسبة الأجزاء الداخلية المأكولة بمقدار (٣١,٥ و ٣٢,٨) % على الترتيب مقارنة بالمجموعة القياسية.

١٥ - أدت إضافة بذور الجرجير بنسبة ١%، ورق اللورا بنسبة ٠,٥% و بذور الجرجير بنسبة ٠,٥% إلى تحقيق أعلى قيمة للكفاءة الإقتصادية مقدارها ٢٥ ، ١٥ و ١٣% على الترتيب مقارنة بالمجموعة القياسية.