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EFFECT OF KEFIR INTAKE ON GROWTH PERFORMANCE AND SOME BIOCHEMICAL PROFILES AMONG DOMESTIC RABBITS

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ABSTRACT

The aim of our study was to evaluate the effects of kefir intake on growth performance and some biochemical profiles among domestic rabbits. It was a case-control study experiment and was carried out on the rabbits that lived in normal condition and divided into three groups (one control & two cases 10%-20%). The sample included 24 rabbits at of 35 - 40 days. Each group have 8 rabbits, The highest growth observed in rabbits that took 20% Kefir milk and the lowest growth observed in rabbits that took 10% Kefir milk at first 4 weeks of growth period, but when compared with control group, it was non-significant. The same results were clear after 6 weeks in growth of cases. Total average daily feed intake, feed conversion ratio was showed a significant decrease among cases compared to control group. As Kefir concentration increased to 10% of water, there was significant decrease in skin weight, kidneys, spleen, lungs, internal body fats and liver. In contrast, there were significant increases in Caracas, head and viscera weights. But when increased to 20% of water there were significant decreases in internal body fats, viscera weights and liver. On the other hand there were significant decreases in fasting blood sugars (FBS), insulin growth factor1 (IGF-1), low density lipoprotein (LDL), uric acid and free thyroxin as kefir percentage increased to 20%. In contrast to these results, there were significant increases with total cholesterol, aspartate aminotransferase (AST), alanine aminotransferase (ALT) among groups.

KEYWORDS: Kefir, Rabbits, Biochemical profiles, Growth.

1. INTRODUCTION

Kefir is a natural probiotic food. A probiotic is a live microbial food supplement, that beneficially affects the host animal, by improving the microbial balance and they are used in fermented dairy products **(Otles and Cagindi, 2003).** It is fermented milk, where it was discovered in the Caucasus regions. It is prepared by putting kefir grains in cow's milk, camel or goat in room temperature **(Pogacic et al., 2013).** Kefir grains measure 1–3 cm in length, are lobed, irregularly shaped, they are white to yellow- white in color, look like small cauliflower florets and have a slimy but firm texture, figure1.1. Grains are kept viable by transferring them daily into fresh milk and allowing them to grow for approximately 20 hours **(Farnworth, 2008)**. It is the product of milk fermentation with Kefir grains, which contain a complex mixture of both bacteria (including various species of lactobacilli, lactococci, leuconostocs and acetobacteria) and yeasts (both lactose-fermenting and non-lactose-fermenting) such that beneficial yeast as well as friendly probiotic bacteria found in yogurt. It is an old world food fermented milk beverage that looks a little like yogurt. It can also be prepared from dairy alternatives such as coconut milk or soy milk **(Shavit, 2008)**. Kefir contains many vitamins, minerals, amino acids and enzymes. Particularly calcium, phosphorus, magnesium, B2 and B12, vitamin K, vitamin A, folic acid and vitamin D. Tryptophan, one of the essential amino acids abundant in kefir, is well known for its relaxing effect on the nervous system and others **(Gaware et al., 2011**). Original Kefir contains numerous bioactive ingredients that give its unique health benefits, such as, for instance, strengthening immune system **(Celso et al., 2005),** metabolism, improving anti-allergic resistance **(Liu et al., 2006a),** antitumor activity, improving intestinal immunity, antimicrobial activity, regulation of cholesterol, improving sugars digestion and antioxidant activity **(Gorsek and Tramsek, 2011).**

The microbial population of Kefir grains consists of lactic acid bacteria, acetic acid bacteria, yeasts, filamentous molds and possibly other microorganisms which develop a complex symbiotic community. These microorganisms are agglutinated with a water-soluble polysaccharide (Kefiran) **(Santos et al., 2003; pogacic et al., 2013).**

According to our knowledge, using kefir in Gaza Strip in making yogurt has not been carried out before. So, we would like to shed light on such material and investigate their impact beneficial to public health. Kefir is considered as a probiotic that protect the body against many infectious diseases and strengthen the self-immunity. The aim of this study was to

evaluate the effect of Kefir intake on growth performance, lipid profile, functions of liver, kidney, thyroid gland, and glucose level among domesticated rabbits.

2 MATERIALS AND METHOD

2.1 Animals

We used Domesticated Rabbits, which aged 35-40 days, sexual mixed and weighed average 670 ± 35g, were obtained from the local market. The study sample included 24 rabbits. They divided into three groups**,** each group has 8 rabbits. First group was a control. The case groups are the rabbits that were fed a kefir mixed with water, 10% and 20%, respectively. Cases and control matched each other in age, initial weight, food intake and all other environmental conditions.

2.2 Blood sample collection

Two rabbits from each group were selected randomly for slaughtering **(Marie-Pierre et al., 2002).** Blood sample were collected from cases groups and control. Then they were left for half an hour to coagulate at room temperature and the plasma were removed for biochemical analysis (TC), (TG), (HDL)- cholesterol levels were measured in serum samples by using enzymatic method kits (Roche Diagnostics). HDL and LDL were estimated by precipitation with sodium phosphor tungstate-magnesium chloride and sodium dodecyle sulphate reagents **(Selvin et al., 2007)**. IGF by **ELISA** ALT and AST were assayed by colorimetric methods Modified by Reitman & Frankel Method **(Hedayati & Safahieh, 2012).** Creatinine level was measured by **Thompson et al., (2007)**. Blood Urea Nitrogen & Blood Uric Acid was carried by **(Beckman Synchr- on LX20) (Jagarati, 2004).** Total thyroxin was runned by ELISA **(Alpco, 2012).** Blood glucose levels were measured by the glucose-oxidase method using an Accu-chek blood glucose meter.

2.3 Feeding procedures

Each experimental group consists of 8 rabbits. Average wt ± (SD) 670g ± 35.30 kept in a normal atmosphere**,** temperature. Animal cases were daily fed kefir for 6 weeks with 10%, 20%, respectively. Kefir was applied in drinking water. Feed and water offered *ad libitum.* All groups of rabbits (including control rabbits) received simultaneously a commercial balanced diet rabbit fodder (Anber). The fodder components were analyzed by Islamic University Food Analysis Labs. The chemical analysis of fodder diet was compared with ingredients percentage shown on the commercial label.

2.4 Kefir grains & samples

The method of making Kefir is occurred by directly adding Kefir grains to the pasteurized milk (Almazraa) generally 50g /l. After a period of fermentation, 18-24 hours at room temperature, the grains separated from the milk by filtering with a sieve for using in the next inoculation **(Otles and Cagindi, 2003).** Then the sieved milk was diluted by water to (10%) and (20%) respectively. Some actual nutrient contents of Kefir were examined in Ministry of National Economy Labs compared to documented contents in Table 1.

Table1 Nutritional &Chemical composition of milk kefir (Dominic, 1999).

Components	**Percent/100 gm**	**Minerals components**	**milligram[mg] /100 gm**
Energy Fat Protein Lactose Water	61 KCal 3.5 3.3 3.5 87.5	Calcium Phosphor Magnesium Potassium Sodium Chloride	120 100 12 150 50 100
Milk acid Pyruvic acid Hippuric acid Orotic acid Citric acid Lactic acid Ethyl alcohol Butyric acid Palmiitic acid Palmitoleic acid Oleic acid Cholesterol Phosphates	**gram [gm]** 0.8 1.00 0.9 0.005 0.013 0.04	**Vitamins** A Carotene Thiamin B2 B6 B12 Folic acid Niacin C D E	**milligram \[mg]** 0.06 0.02 0.02 0.17 0.05 0.005 0.0095 0.09 1.00 0.08 0.11
Essential Amino Acids Tryptophan Phenylalanin+tyrosin Leucine Isoleusine Threonine Methionine+cystine Lycine Valine	**gram [gm]** 0.05 0.35 0.34 0.21 0.17 0.12 0.27 0.22	**Trace Elements** Iron Copper Molybdenum Magnesium Zinc	**milligram [mg]** 0.05 0.012 0.0055 0.005 0.36
Aromatic Compounds Acetaldehyde DiacetylAcetoin			

2.5 Feed conversion and growth determination

All Rabbits were individually weighed firstly and then at weekly intervals until the end of the experiment. Feed consumption of each experimental unit was recorded daily and feed conversion ratio were calculated by dividing the average daily feed intake (g), on Average daily growth rate (g), for each study group. The study included the total body weight gain, total feed intake, average daily growth rate and feed conversion ratio. The organs from slaughtering rabbits for each group weighed individually **(Atasoglu et al., 2010).**

2.6 Data analysis.

All obtained data were analyzed by ANOVA using SPSS (V20) system. Difference between variables will be considered statistically significant if p value < 0.05.

3. RESULTS

3.1 Chemical composition of the commercial fodder diet

The chemical analysis of FRA diet was compared with ingredients percentage shown on the commercial label. There was slight increase in total protein and more than 100% increase in total fat. Also there were slight decreases in water and salt. Ash was very slightly increased compare to the commercial label.

3.2 Chemical compositions of the kefir

Table 2 shows the chemical composition of the kefir milk drink which used as partial feeding of the growing rabbits, as analyzed by Ministry of National Economy Labs. The kefir milk drink contains 2.98%, 3.00%, 3.61% proteins, fats and carbohydrates, respectively.

Table 2 Chemical compositions of the kefir

Ingredients	***%**
Water	89.81
Protein	2.98
Fat	3.00
Lactose	3.61
Energy	53.36 kcal
Calcium mg/100gm	200.00

According to results of Ministry of National Economy Labs

3.3 Growth rate of the rabbits

Table 3 shows average (± SEM) of change of body weight and growth rate of the rabbits after 6 weeks of growth. A significant decrease body weight and growth rate of T1 compared to

the control group or T2 was observed after 6 weeks of growth. There were no statistically differences between control and T2 as the same result after 4 weeks.

In Table 3, the initial body weight was the same. After four weeks of starting experiment, a significant decrease in body weight of T1 compared to control or T2 was observed accordingly, this significant decrease in body weight was reflected in growth rate ($P < 0.05$). In contrast, no significant difference was observed between T2 & Control group with respect to body weight or growth rate.

Table 3 The average (± SEM) of final body weights of the rabbits after 6 weeks.

Average body weight	**(C)**	**(T1)**	**(T2)**
Initial, g	**a** 670.00 ± 27.00	**a** 670.00 ± 40.90	a 670.00 ± 38.20
Final, g	**a** 1816.43 ± 64.40	**b** 1721.25 ± 84.54	**a** 1838.83 ± 76.48
Total, g	**a** 1132.14 ± 56.52	**b** 1094.50 ± 52.72	**a** 1198.50 ± 37.90
Growth rate, g/day	**a** 26.33 ± 1.30	**b** 25.45 ± 1.23	**a** 26.55 ± 1.51

Means with different superscripts in the same row differ significantly (p <0.05).

C: control (T1): Trial one of 10% Kefir (T2): Trial two of 20% Kefir

3.4 Feed intake and feed conversion ratio of the rabbits

The effects of Kefir on average daily feed intake FI and feed conversion ratio FCR are summarized in Table 4 Kefir supplementation seems decreasing the average daily FI and FCR. In Table 4 the lowest total feed consumption and FCR values were observed in Trial (T2). The initial feed intakes in first week, showed no statistically differences between the different groups, but at the end of experiments significant decrease was observed in the weight of fodder and average daily intake among groups. Cases consumed little feeds than control groups. As kefir % increased, the cost of feeding of rabbits decreased. Initial feed intake had no difference between Trial (T1) and Trial (T2) and both of them showed non-significant difference with the control group. The final FI, average daily FI, FCR were had a statistically significant decrease between cases and control. This decrease was more pronounced as Kefir concentration increased see Table 4 (see T2).

Table 4 The average (± SEM) feed intake and feed conversion ratio of growing rabbits fed kefir differently after 6 weeks.

	Dietary groups		
Parameters	**C**	**T1**	**T2**
Initial feed intake ,g	**a** 58.59 ± 2.02	a 56.32 ±1.63	**a** 55.47 ±1.41
Final feed intake ,g	**a** 105.99 ±2.66	**b** 100.00±1.89	**c** 84.13±.2.93
Average daily Intake ,g	**a** 87.35 ± 3.14	b 79.75±2.80	**c** 72.73± 2.04
Feed conversion	**a** 3.54 ± 0.17	**b** 3.16 ± 0.15	**c** 2.87 ± 0.17

Means with different superscripts in the same row differ significantly (p <0.05)

C: control (T1): Trial one of 10% Kefir (T2): Trial two of 20% Kefir

3.5 Organs and carcass weights.

Table 5 shows the results of some average (± SEM) organs weights of the experimental groups.

Table 5 Effect of partially kefir intake on some average (±SEM) organs weight, body fat and carcass weight of the growing rabbits.

Average organs and carcass weight, g	**C**	**T1**	**T2**
Skin	**a** 182.00 ± 7.50	**a** 187.00 ± 7.50	**b** 170.00 ± 10.00
Head	**b** 157.00 ± 2.50	**a** 170.00 ± 5.00	**a** 177.00 ± 7.50
Legs	**a** 60.00 ±.5.00	**a** 62.00 ±2.50	**a** 60 ± 5.00
Viscera	**b** 250.00 ±5.00	**C** 242.00 ±2.50	**a** 262.50 ± 2.50
Liver	**a** 60.00 ± 5.00	**C** 50.00 ± 5.00	**b** 55.00 ± 2.00
Kidney, Spleen and lungs	**a** 35.00 ± 5.00	**a** 32.5 ± 2.5	**b** 22.5 ± 2.50
Carcass	**b** 940.00 ± 10.00	**b** 937.00 ±2.50	**a** 952.00 ±2.50
Internal body fat tissue	**a** 22.00 ± 2.50	**b** 12.50 ± 0.50	**c** 9.00 ± 1.00

Means with different superscripts in the same raw differ significantly (p<0.05)

C: control (T1): Trial one of 10% Kefir (T2): Trial two of 20% Kefir

As shown in Table 5, there were significant decreases in weights of skin, kidney, spleen, lung, liver and internal body fats as Kefir concentration in water increased. In contrast, as Kefir concentration increased, Viscera and carcass weights increased. There was significant

decrease in T2 compared to C & T1, but there was not any significant difference between C & T1. The head weight showed significant increase in T1 & T2. The average of leg weight showed non-statically significant among groups (P= 0.898). The lowest average weight of Viscera was observed in T1. The liver weight was decrease in the cases groups compared to control. The weight of Kidney, Spleen and lungs was significantly decreased in T2 compared to C & T1. The highest average value of carcass was observed in T2. The Internal body fat tissue weights was decreasing as Kefir increasing, (P= 0.019).

3.6 Biochemical parameters of rabbit serum.

Table 6 summarized some biochemical parameters of rabbit serum. There was a significant decrease in FBS, IGF1, LDL, FT4 and uric acid among study population as concentration of Kefir increased. In contrast, there was a significant increase in total cholesterol, TG, ALT, AST and creatinine among study population as concentration of kefir increased.

Fast blood sugar was decrease in cases, as the kefir increases, but there was no statically difference between T1 & T2.

The IGF showed the lowest value in T2 (8.85±.6.3 Ng/ml), it decrease with kefir increase. But there was no statically difference between C & T1. There was a significant decrease between T2 & C and between T2 & T1.

The total cholesterol and Triglyceride was increased in cases, whatever kefir treatment increase, but there was no significant difference between C & T1. On the other hand, there were significant differences between T2 & C and between T2 & T1. LDL tends to decrease in response to Kefir milk increase. There was statically significant between T2 & C and between T2 & T1. In our study HDL-c wasn't had any difference between three groups (P >0.05).

Table 6 Average (± SEM) Biochemical parameters of rabbit serum

Parameters	C	T1	T2	Unit
FBS	a 102.00 ± 5.50	b 88.50± 3.50	b 89.00± 2.00	**Mg/dl**
IGF1	a 38.85± 16.20	a 43.20 ±22.30	b 8.85.00±.6.3**0**	**Ng/ml**
Total cholesterol	b 43.00 ± 1.0**0**	b 44.50± .5.00	a 56.00 ± 2.00	**Mg/dl**
Triglyceride	b 121.00± 9.00	b 118.00 ± 14**.00**	a 136.00 ± 3.50	**Mg/dl**

LDL	a 33.00± 1.00	a 32.50± 5.50	b 22.50± 9.50	**Mg/dl**
HDL	a 52.00± 4.00	a 54.00± 2.00	a 51.50± 12.50	**Mg/dl**
Urea	a 22.50± 0.5	a 23.00± 1.00	a 24.50± 0.50	**Mg/dl**
Uric Acid	a 6.55± 0.65	a 5.35± 0.15	a 5.00± 0.30	**Mg/dl**
Creatinine	b 1.25± 0.05	b 1.25±0.05	a 1.65± 0.05	**Mg/dl**
AST	C 23.5± 10.50	a 40± 0.00	b 35.5±0 .50	**u/l**
ALT	b 34.5± .5.0	b 36.5± 2.5	a 45± 15.0	**u/l**
F T4	a 1.40± 0.40	b 1.05± 0.15	b 1.10± 0 .20	**Ng/dl**

Means with different superscripts in the same raw differ significantly (p<0.05)

C: control (T1): Trial one of 10% Kefir (T2): Trial two of 20% Kefir

About kidney function parameters, Urea and Uric Acid was showed non-significant difference among all groups. Uric Acid tend to reduce in response to increasing kefir, the lowest value was in T2. Creatinine level was highest in T2 (1.65 ± .05), but there was not any significant differences between C and T1 and there were significant differences between T2 with C and T2 with T1.

The liver enzymes AST and ALT were higher in cases than control. AST is the highest value in T1. ALT is the highest value in T2. There was a difference in AST between groups but non-significant. In ALT there was not any difference between C and T1 and there were significant differences between C & T2 and T1 & T2. The FT4 decreased in cases, there was significant decrease between C&T1 and C&T2.

4. DISCUSSION

4.1 Characteristic of the study population

The present study is a case control investigation, comprised two cases groups and one control group. The experiments carried out at June and July 24 mixed sex local rabbits that aged 35–40 day were bought from local market. They were left 12 days for adaptation before the beginning of the experiment. During this period, they received tetracycline and vitamins with water. The 24 rabbits divided into the three groups, 8 rabbits for each group. The control one received water only and two cases that drinking kefir milk with water (10%- 20%), respectively. The initial average weights of controls and cases were not significantly

difference. They were fed fodder rabbits Anber (FRA) freely, and were lived in same condition.

4.2 Kefir preparation and contents

The Kefir milk prepared by adding the whole milk to kefir grains, and left it at room temperature for fermentation followed by filtration. There was a difference between tested sample (Table 2) and composition in Table 1 especially Ca value. The difference between chemical compositions of kefir might refer to the different types of milk (various species, various levels of fat) and different production methods. **(Karimi Torshizi et al., 2010)**.

4.3 Fodder analysis (Anber)

The analysis of rabbits fodder's diet was compared with ingredients percentage shown on the commercial label. There were a clear increasing in the actual concentrations of the total crude protein, and total fat. In contrast, there was a clear decrease in the actual concentration of salt and water. There was a slight increase in ash. Previously, similar findings were reported by **Zabut et al, 2007**. One can conclude that the labeled compositions differ from the actual compositions, which affect the anabolism processes on the body.

4.4 Body weight gain of the rabbits

People raise rabbits for meat production, because they require a way less food and water to produce meat greater than other animals. For example, if cows and rabbits were fed the same amount of food and water, rabbits will produce meat six times cows. Their meat is lower in cholesterol and has high protein ratio. Domestic raised rabbits are white meat, tender, juicy and mild in flavor. Rabbit meat has the least number of calories per pound and has only 8 percent bone. It is not only lean and nutritious, but it's also tasty **(Bhaskar, 2006).**

The final weight after 4 weeks was the highest in T2 and the lowest in T1. After 6 weeks the same results was obtained, the highest in T2 and the lowest in T1 compared to control. There was no significant difference in terms of body weight gain. Similar results were obtained in many previous study (**Sahin and Yardimci, 2009; Ataşoğlu et al., 2010; Kızak & Çelik, 2012; Aliakbarpour et al., 2013; Salaj et al., 2013; Piccolo et al., 2014).** In contrast, other studies reported that live weights of the study groups were significantly increased compared to that of the control group **(Cenesiz et al., 2008)**,. Moreover the Performance of broilers and rabbits in terms of body weight gain, improved when probiotic was provided via drinking water, compared to the control and feed groups **(Torshizi et al., 2010; Abdelhady and El-**

Abasy, 2015). Our finding showed the final body weight gains of the rabbits were not improved when kefir was provided via drinking water, compared to the control. This might be due to concentration and type of microorganism in probiotic food.

4.5 Feed conversion of the rabbits

The present findings showed that there were significant decreases in FI and FCR as percentage of kefir concentration increases compared to the control one. In other words, the cost of feeding rabbits decreased as Kefir concentration in water increased. This finding was consistent with **Reza et al. (2013) and Abdelhady & El-Abasy, (2015)**. As they reported beneficial effect of probiotic supplementation to broiler and rabbit diet in terms of increased feed conversion through a natural physiological way and improving digestion by balancing the resident gut microflora as they can improve the integrity of the intestinal mucosal barrier, digestive and immune functions of intestine. Improvement in digestion and absorption of intestine of nutrient transportation systems leads to immune resistance and productivity. In contrast, another studies reported that FI & FCR values were similar in all experimental groups during whole the trial period **(Sahin and Yardimci, 2009)**. However, these contradictions require large scale studies and further investigations.

4.6 Body organs weight

The present findings showed that there were significant decreases in weights of skin, Kidney, Spleen, lungs, liver, internal body fat tissue as percentage of kefir concentration increased to 20%. In contrast, there were significant increases in weights of Carcass, Viscera as percentage of kefir concentration increased. But there were no significant change between all groups. These finding were consistent with **Urdaneta et al., (2007)** and **Sahin & Yardimci (2009).** The finding that weight of Caracas increased and weights of organs decreased was very significant on human feeding. On the other hand, a gradual decrease was seen in internal body fat tissue based on the increased kefir rates which agree with previous findings **(Urdaneta et al., 2007; Sahin & Yardimci, 2009).** Increasing in weights of carcass of T3 may be refers to high protein diet in Kefir and fodder.

4.7 Biochemical blood profile

We found in our present study that, significant decreases in FBS, IGF1, LDL, FT4, as percentage of kefir concentration increased to 20%. These finding consistent with low growth rate daily FI and FCR in cases compared to the control after 4 weeks and 6 weeks of growth. In contrast, the findings showed increases in TC, TG, ALT, AST which reflect higher liver activity as kefir concentration increased. Effect of kefir on kidney function was not clear and required further investigations, because of increasing level of creatinine. Although creatinine concentration increased, urea concentration was not affected. Uric acid decreased slightly with increased kefir diet compared to control, which lowering the probability of causing gout.

FBG was reduced in response to kefir diet increase. In some studies, it was reported that kefir reduced glycemic index in diabetic patient **(Urdaneta et al., 2007; Ostadrahimi et al,. 2015; Judiono et al 2014**; **Abdelhady & El-Abasy, 2015)**.

The IGF1 is the lowest value in T2 (8.85±6.30), it is very low comparing to control and T1. The T2 group has a normal growth, normal value and normal weight. This may be refers to exist IGF in binding form (IGFBP3). If the IGF1 is low, that is not a parameter for GH deficiency. Neither IGF-I nor IGFBP-3 alone is a marker for growth hormone insufficiently. In addition, they cannot be used as an effective screening test in combination **(Mitchell et al., 1999)**. No previous study targeted IGF1 in treatment with Kefir, however this parameter need more investigation. If a decrease in IGF-1 is suspected to be due to a more general decrease in pituitary function. Also may be seen with nutritional deficiencies, chronic kidney or liver disease and stressful **(Alpco, 2012; Marcello et al., 2013).** High blood levels of IGF-1 are associated with premature aging and diseases of aging such as diabetes and cancer. IGF-1 shortens life by increasing cell DNA genetic damage, and causes cancer by blocking apoptosis that causes cancer cells to kill themselves before they destroy their host **(Bantz, 2011).**

The highest values of total cholesterol and Triglyceride were found in group T2 that received high dose of Kefir. These finding may be because of usage whole milk. **Farnworth, (2008)** reported that yogurt increased the total cholesterol. The LDL (bad lipoprotein) reduced, however increasing kefir percentage. The reduction of LDL-C must be of prime concern in the prevention of Cardio Vascular Disease. High density lipoprotein (good lipoprotein) values were approximately similar in all groups. In our study HDL-c wasn't any difference between three groups ($p = 0.971$**).** There was no significant among groups. The previous findings are in agreement with that obtained by **St-Onge et al. (2002) an**d **Ostadrahimi et al. (2015).** Other study reported that Kefir tended towards a lowering of serum triacylglycerol and total cholesterol concentrations **(Liu et al., 2006b)**. Total cholesterol serum and total lipid levels were significantly reduced compared to that of in control group in response to kefir treatment **(Cenesiz et al., 2008). Pereira et al., (2013)** reported total cholesterol, HDL-c, LDL-c and triacylglycerols in rats fed cholesterol-rich diet, fermented kefir reduced significantly the levels of VLDL, LDL-c and triacylglycerols, in addition to having increased HDL-c.

Urea level was not affected by Kefir diet. Creatinine was slightly increased in T2 compared to control and T1. There were no significant differences between three groups. **Urdaneta et al., (2007)** reported the same result about uric acid**.** That is mean Kefir milk does not affect the kidney function. Uric acid levels in all groups were higher than normal value. This result may be refer to high purine amino acid in fodder diet, however uric acid is the end product of complete catabolism of purines **(Moffatt & Ashihara, 2002**) or may be thermally stressful **(Lin & Michaelson, 2013; Al-Jubury, 2011).**

AST and ALT increased in experimental group (T1, T2), but there was no statistically significant between groups. **(Sahin and Yardimci, 2009; Cenesiz et al., 2008)** were showed that the effect of Kefir on serum AST and ALT activity in the groups did not result in any changes.

In the present study, our findings that free T4 were decreased whenever kefir treatment increase. The highest value was in control. T1 and T2 were slightly the same value. However, according to my knowledge there is not any previous study targeted free T4 in treatment with Kefir. The present study is the first to assess free T4 with kefir treatment. **Dale (2012)** reported that drinking Kefir daily will give Hypothyroidism patient's system the rebalancing it needs to absorb Synthroid correctly. Good bacteria support conversion up to 20 % of thyroxin (T4) to triodothyreonine (T3) in the intestine. Having not enough bacteria makes less active T3 hormone available causing hypothyroidism symptoms **(Rowley et al., 2015).**

5 CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

- There were significant decreases in growth performances in case T1 rabbits that treated with 10% Kefir. That was very clear after 6 weeks of growth, compared to those rabbits fed 20% Kefir and only FRA.
- There were significant decreases in average daily feed intake and feed conversion ratio among cases compared to the control.
- There were significant decrease in skin weight, kidneys, spleen, lung, liver and internal body fat as Kefir concentration increased.
- In contrast, there were significant increase in caracas and viscera weight as Kefir concentration increased.
- As Kefir percentage increased, there were significant decrease in FBS, IGF1, LDL, FT4,
- As Kefir percentage increased, there was significant increase in total cholesterol, TG, AST, ALT.

5.2 RECOMMENDATIONS

- Further studies are required for using larger rabbit's samples and other different Kefir concentration.
- Effect of Kefir on other biochemical blood profiles such as leptin, adiponectin and thyroid hormone also recommended.
- I hope usage of Kefir as a natural food to reduce the weight and internal body fats.

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