Biological studies on the interaction between some available drugs and nutrient

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Abstract

The present study investigated the interaction between some of foods **(**beef liver, milk full cream powder and tomatoes) which rich in iron, calcium and Vit.C respectively and flumox as an antibiotic by effecting on the blood glucose level, some physiological parameters as liver functions, kidney functions, histological properties of liver and kidney in rats. Twenty five albino rats were divided into 5 groups, the first as a control negative group, the positive control group which received flumox .While, the other group fed basal diet with 10% beef liver, milk full cream powder and Fresh tomatoes with antibiotic source. At the end of experiment, body weight gain, feed intake, feed efficiency ratio were calculated. Also, Fasting blood glucose, creatinine, serum urea, (AST) and (ALT) were determined. The liver and kidney of rats were carefully removed and examined to evaluate the effects of the tested material on the organs structures. From the results, it could be noticed that, the full cream powder milk contained the higher protein, fat and ash while fresh tomatoes contained higher carbohydrate and fiber. Beef liver had 7.8mg of Iron and 25mg vit .c but It had lowest in calcium while milk had highest content of calcium 930 mg but had lowest in Iron and Vit. C 0.40mg and 10mg respectively. Body weight gain was significantly decreased in flumox group (positive group) but increased in groups fed on liver and tomato juice.

There is no significant with liver weight, kidney weight and spleen weight as compared with both controls. There were significant between G4 and G5 with the others for GPT. The resulted revealed that there is no significant changes between G4 and G5 for urea level

Key words: - beef liver, milk full cream powder , tomatoes ,blood glucose level, liver function, kidney function, flumox, antibiotic.

INTRODUCTION

Flumox(oral) is a combination of two bactericidal penicillins: amoxycilin (broadspectwm penicillin) and flucloxacillin (penicillinase-resistant penicillin), to produce a wider spectrum of ac5vity. Flucloxacillin exerts a bactericidal action on penicillinase - producing microorganism including most staphylococci.This combination exhibits bactericidal activity against a wide range of Gram-positive and Gram-negative microorganisms including penicillinase and 41 on peniciiinase - producing Staphylococci, Streptococcus pyogenes, pneumoniae, and faecalis, Corynebacterillm diphtheriae, Clostridia S pp., Bacillus anthracis; H.influenzae, Moraxella (Branhamella) catarrhalis, N.gonorrheae and meningitidis, E,coli Proteus mirabilis, Salmonella, Bordetella pertussis . and Bacteroides melaninogenicus (***Cloyd et al.,1993).***

Amoxicillin is a semisynthetic antibiotic, an analog of ampicillin, with a broad spectrum of bactericidal activity against many gram-positive and gram-negative microorganisms. Chemically it is (2S, 5R, 6R) – 6-[[3-(2-chloro-6-fluoropheny)-5-methyl 1,2-oxazole-4-carbonyl] amino]-3,3- dimethyl-7-oxo-4-thia-1-azabicyclo [3.2.0] heptane -2- carboxylic acid monohydrate for oral use and as sodium salt for parenteral use (***David, 1998).***

Tomatoes, which are actually a fruit and not avegetable, are loaded with all kinds of health benefits for the body. They are in fact, a highly versatile health product and due to their equally versatile preparation options, there's really no reason to neglect the tomato as part of a healthydiet. One of the most well-known tomato eating benefit is its' Lycopene content. Lycopene is a vital anti-oxidant that helps in the fight against cancerous cell formation as well as other kinds of health complications and diseases. Free radicals in the body can be flushed out with high levels of Lycopene, and the tomato is so amply loaded with this vital anti-oxidant that it actually derives its rich redness from the nutrient. Lycopene is not a naturally produced element within the body and the human body requires sources of Lycopene in order to make use of this powerful anti-oxidant **(*Debjit Bhowmik et al., 2012).***

Powdered milk, a dry powder reconstituted to milk using water, serves as a non-perishable milk substitute, making it a popular choice for those stocking emergency supplies. The calories in powdered milk can help you meet your daily nutritional goals.

A 1/4-cup serving of powdered milk contains 159 calories, according to the U.S. Department of Agriculture's National Nutrient Database. Based on a 2,000-calorie-per-day diet the USDA uses as a reference point, this accounts for approximately 8 percent of the calories you need daily.

Some of the calories in powdered milk come from carbohydrates and protein, nutrients the the Institute of Medicine recommends consuming daily. You should eat 130 grams of carbohydrates and 46 to 56 g of protein on a daily basis. The National Nutrient Database reveals that a 1/4-cup serving of powdered milk provides you with approximately 9.5 percent of the recommended daily amount of carbohydrates and 15 to 18.3 percent of the recommended amount of protein.

Powdered milk serves as a rich source of calcium, providing nearly 12 percent of the amount you need daily in a 1/4-cup serving. The Institute of Medicine recommends that you consume 1-1.2 g of calcium daily. Powdered milk also contains magnesium, phosphorus, potassium, vitamin C, vitamin A and vitamin D (***Anand Kumar, 2013 and Gagnon-Joseph, Nathalie , 2016).***

Gram for gram, liver is one of the most nutrient dense foods available to us. It contains a large amount of high-quality protein, an easily absorbed form of iron, all of the B vitamins (including B12 and folic acid in significant amounts), balanced quantities of vitamin A, many trace elements and minerals including copper, zinc, chromium, phosphorous and selenium, essential fatty acids EPA, DHA and AA, as well as the powerful antioxidant . One of the most common organs, liver is a great source of high quality protein and is one of the most concentrated sources of vitamin A, along with copper, folic acid and iron. It also contains Coenzyme Q10 (CoQ10), which is important for cardiovascular functions. Athletes love liver because it improves the oxygen-carrying capacity of blood cells, increasing endurance and strength and

fighting fatigue, while its B vitamins aid people with Alzheimer's and other forms of dementia. The reason why liver is one of the best superfoods and healing foods today is it's your highest source of B vitamins, iron and vitamin A. It's also a fantastic source of phosphorous and magnesium. In fact, if you compare it to spinach nutrition, carrots, an apple and some of nature's richest foods, it outperforms all of them.

The number one benefit of consuming liver is it's very high in vitamin B12, and we know vitamin B12 benefits red blood cell formation and improves cellular function; it's important for so many things.In addition to vitamin B12, liver is high in vitamin B6**,** biotin and folate. Those B vitamins especially folate, help your body with something called methylation as well as cellular function. An important folate-dependent reaction in the body is the conversion of the methylation of deoxyuridylate to thymidylate in the formation of DNA, which is required for proper cell division. When this process is impaired, this initiates megaloblastic anemia, one of the hallmarks of folate deficiency**.**With all these minerals, liver supports your body's detoxification pathways, and it makes sense that consuming liver actually helps your liver function better. In fact, consuming liver is actually an effective liver cleanse**;** it actually gives your body and your liver all the nutrients you need in order to detoxify properly (***Nährstoffe, 2017).*** This study aimed to evaluate the effect of feeding flumox as antibiotic and some nutrients sources on the weight gain, food efficiency ratio, liver functions and kidney functions.

MATERIALS AND METHODS:

Beef liver, milk full cream powder and tomatoes were obtained from local market , Fulmox(Amoxicillin,Flucloxacillin) 1000 mg capsules were obtained from Menoufia pharmacy , Sheben –El kom, Menoufia Governator. Tomatoes were cleaned from impurities washed with tap water and were added as juice to the rats diet. Lypholized liver by Freeze drying was carried out using a freeze diver type lyebold (model G.T.100).The pressure ranged from 4 to 6 torr, and the temperature ranged from -23ºC to -28ºC. The maximum heating temperature was 25ºC.The freeze

drying process was carried out under aseptic conditions.The whole time of freeze drying process was 15 hours.The moisture content of the final lypholized products was less than 2% as the average, then packed in a glass bottle under nitrogen gas.

The basal diet was prepared according to ***AIN(1993).***The vitamin mixture and the salt mixture were prepared according to ***AIN(1977).***The organ weight was taken on the day of sacrifice(final).the testicles were separated through dissection after trimming off the attached tissues and weight using volume displacement method Protein, ash, fat and fiber were determined by the methods of ***A.O.A.O (2010).***Total carbohydrates were calculated by the differences. (Protein, Ash, fat and fiber) -100.

Twenty five adult male albino rats, mean weight was 190±10g were obtained from the Food Technology Research Institute; Agricultural Research Center, Giza, Egypt.Rats were housed in polypropylene cages lined with husk in standard environmental conditions (temperature 25 ± 2°C, relative humidity 55 ± 10% and 12:12 light: dark cycle). The animal experiments conducted according to the recommendations in the Guide for the Care and Use of Laboratory Animals published by the US National Institute of Health (NIH publication No. 85-23, revised 1996). The animals were fed on a basal diet for 15 days as an adaptation period. The rats were randomly divided into 5 groups (n = 5). The experiment was carried out for 4 weeks. Daily feed intake and weekly body weight were recorded during the experimental period (4 weeks).

- All groups of rats were fed on the experimental diet for 28 days according to the following groups:

G1: Rats fed on basal diet only as the negative control .

G2: Rats fed on basal diet and 1000 mg of Flumox as the positive control.

G3: Rats fed on basal diet with 1000 mg of flumox and 10% milk powder instead of starch.

G4: Rats fed on basal diet with 1000 mg flumox and 10% Lypholized beef liver instead of starch.

G5: Rats fed on basal diet with 1000 mg flumox and 10% tomatoes juice instead of starch.

Blood was collected from portal vein in two sterile tubes one with EDTA to analyze blood picture with in 24 hours and the second tube without EDTA to sporate serum by centrifuging at 3000 rpm for 10 min.serum samples was when stored at -20ºC until analysis. Creatinine was Determined according to the method described by ***Bohmer (1971).***Urea was Determined according to the method described by***Patton and crouch(1977).*** Aspartate aminotrans ferase(AST) and Alkaline phosphate(ALT) activities were measured according to method described by ***Reitman and Frankel (1957).***

Oranges such as, liver and kidney were removed and washed with saline solution, dried and then weighted to calculate relative organs weight to body weight. Organs of all rats were kept in formalin solution (10%) for histopathoiogical examination **(** ***Price,1991)***. Relative organs weight (organ weight / total body weight)*100. Statistical analysis was carried out according to ***Snedecor and Cochran(1972)*** as the mean ± standard deviation(S.D). Statistical analyses was preformed with statistical package for social science for windows (spss, version 20.0, Chicago , DL-USA).The data were analyses by one- way analyses of vaxionce (ANOVA). TO compared the difference between groups. Post hoc listing was performed by L.S.D test.

Results and discussion

Fresh tomatoes, full cream powder milk and beef liver were analyzed for their chemical composition i.e., carbohydrates, protein, lipids, fiber and ash. The obtained results are shown in table (1) on the dry weight basis.

From the results presented in table (1) it could be noticed that the Fresh tomatoes contain 1.1 (mg), 0.3 (mg), 0.6 (mg), 0.6(mg) and 98 (mg) as protein, fat, fiber, ash and carbohydrates respectively, while in Full cream powder milk contained 26.7 (mg), 26.2 (mg), 0.0 (mg), 5.7 (mg) and 41.5 (mg) of the same content respectively. As for beef liver it was found to contains 19.5 (mg), 4, 0 (mg). 0., 1.6 (mg) and 74.9 (mg) protein, lipids, fiber, ash and carbohydrates .

From these results it could be noticed that, the full cream powder milk contained the higher protein, fat and ash while fresh tomatoes contained higher carbohydrate and fiber and this finding was in the same line of Chemically milk is a heterogeneous mixture which can be defined as a complex chemical substance in which fat is emulsified as globules (2,000–6,000 nm), major milk protein (casein, 50–300 nm), and some mineral matters in the colloidal state and lactose together with some minerals and soluble whey proteins (4–6 nm) in the form of true solution. Proteins are made up of amino acids, more precisely, L-a- minocarboxylic acids. Proteins constitute an important class of compounds that are essential to all living processes. Milk proteins represent one of the greatest contributions of milk to human nutrition, and more than 200 types of proteins have been characterized in bovine milk. About 95 % of the nitrogen in milk is in the form of proteins. When total nitrogen content is multiplied with 6.38, a Kjeldahl factor, it gives the total protein content in milk and milk products. Nonprotein nitrogen components comprising about 5 % of the total nitrogen in fresh milk are equally important (***Shivashraya ,2014)*** **.**

In table (2) found beef liver had highest content of these elements. It had 7.8mg of Iron and 25mg vit (c) but It had lowest in calcium while milk had highest content of calcium 930 mg but had lowest in Iron and Vit (c) 0.40mg and 10mg respectively.

Tomato fruit quality has been assessed by the content of different chemical compounds such as citric, ascorbic and other organic acids, sugars, minerals, antioxidants and characterized with dry matter (***Thybo et al., 2006)***. Milk is an important source of dietary calcium and its association with caseins may improve absorption in the gastrointestinal tract. Trace elements are elements of which not more than a trace is found in milk. Trace elements are natural components in milk. Some parts of the elements are likely to be associated with protein, whereas most of the other elements are dissolved. About 10 % of copper and nearly half of iron are associated with fat globule membrane **(*Morrissey and Hil ,2009).***

Table (1) Chemical composition of fresh tomatoes, full cream powder milk and beef liver.

Constituents / Material	Protein (gm)	Fat (gm)	Fiber (gm)	Ash (gm)	Total carbohydrates(gm)
tomatoes	1.1	0.3	0.6	0.6	98
milk	26.7	26.2	0.0	5.7	41.5
liver	19.5	4	0.0	1.6	74.9

Table (2): Mineral content of fresh tomatoes, milk and beef liver.

Mineral / Material	Iron (Fe) mg	Calcium(ca) mg	Vit (C) mg
tomatoes	0.50	15	21
milk	0.40	930	10
liver	7.8	10	25

Table (3) showed the effect of feeding different levels from on milk, beef liver and fresh tomatoes Feed intake (Fl), Feed efficiency ratio (FER) and Body weight gain (BWG) of rats.

Data in table (3) indicated that, the mean value of food intake in the group (G1) was 14.32 g/day for each rat, while the mean value of positive control group that is fed on basal diet was 9.67±0.03g/day.

The result of BWG in rats fed on basal diet, supplement with milk ,beef liver and tomatoes under the current investigation were shown and summarized in table (3).

BWG of the group (G5) and (G6) fed on basal diet supplement beef liver and tomatoes are showed significant increase as compared to positive diet control (G2). it could be 107.74± 5.26,86.04± 8.19 and 39.86± 7.56 for group (G5,G6)and G2 respectively .While group (G4) was fed on basal diet supplement with powder milk showed no significant compared to positive diet control (G2) its equal of (G4).

Table (3) Effect of feeding levels of milk, beef liver and fresh tomatoes in food intake, FER and BWG (%).

groups / parameter	(G1) Control (-ve)	(G2) Control (+ve)	(G3) Milk (10%)	G4 liver (10%)	G5 Tomatoes (10%)
Mean of feed intake (g/day)	14.321 [a] ± 0.21[a]	12.214 [b] ± 0.43	13.142 [a] ± 0.01	13.928 [a] ± 0.611	14.438 [a] ± 0.71
FER Mean±SD	0.191 ± 0.011[a]	0.091 ±0.020[b]	0.089 ± 0.008[c]	0.157 ± 0.022[b]	0.166 ± 0.031[a]
BWG Mean ±SD	42.27 ±21.511 [c]	39.866 ± 7.565[d]	41.486 ± 8.708[c]	107.736 ± 5.263[a]	86.038 ± 8.197[b]

In Table (4) effect of feeding basal diet supplemented with powder milk, beef liver and tomatoes relative weight of organs in rats.

It could be noticed that the liver weight 2.07± 0.35, 2.07± 0.14, 2.19 ± 0.19, 2.25± 0.13 and 2.25± 0.12 for G1, G2, G4, G5 andG6 respectively.

While kidney weight 0.56± 0.03, 0.57± 0.06, 0.55± 0.2, 0.66± 0.07 and 0.51 ±0.03 for G1, G2, G3, G4, G5 and G6 respectively. The spleen weight 0.26± 0.02, 0.24± 0.02, and 0.29± 0.02, 0.25± 0.05 and 0.23 ±0.01 for G1, G2, G3, G4, G5 and G6 respectively. From the above results, it could be no significant with liver weight, kidney weight and spleen weight compared with negative control.

Table (4) Effect of feeding levels of milk, beef liver and fresh tomatoes in liver weight, kidney weight and spleen weight.

groups / parameter	(G1) Control (-ve)	(G2) Control (+ve)	(G3) Milk (10%)	G4 (liver 10%)	G5 (tomatoes 10%)	LSD
w liver	2.07_a ±0.35	2.07_a ±0.14	2.19_a ±0.19	2.25_a ±0.13	2.25_a ±0.12	0.047
w kidney	0.56_a ±0.03	0.57_a ±0.06	0.55_a ±0.2	0.66_a ±0.07	0.51_a ±0.03	0.066
w spleen	0.26_a ±0.02	0.24_a ±0.02	0.29_a ±0.02	0.25_a ±0.05	0.23_a ±0.01	0.189

Table (5) Hemoglobin level was 13.90±0.96 g/L for rats fed control diet. Hemoglobin levels were 13.10±1.88, 13.90±0.27, 14.93± 0.35and 14.70± 0.72g/L for G2, G4, G5and G6 respectively of Rats fed diet supplemented with milk, liver and tomatoes respectively.

Lymph level was 4.40± 3.54 g/L for rats fed control diet.

Lymph level were 4.2± 2.6,4.00± 2.79,4.57± 4.97and 2.83 ±0.046g/L at G2, G4, G5and G6 of. Rats fed diet supplemented with milk, liver and tomatoes respectively.

White blood cells level was 8.83 ±1.94 g/L for rats fed control diet

White blood cells level were7.5± 1.51, 8.6± 0.61,10.6± 1.32and 8.63± 0.81g/L at G2, G4, G5and G6 of. Rats fed diet supplemented with milk, liver and tomatoes respectively.

Red blood cells was 3.62± 0.11 g/L for rats fed control diet

Red blood cells were 3.73± 0.32, 3.73± 0.41, 4.33± 0.32and 4.00 ±0.048g/L at G2, G4, G5and G6 of. Rats fed diet supplemented with milk, liver and tomatoes respectively.

Platelets were 177.0± 30.32,186.0± 26.67,205.67± 81.86,224.33± 117.05 and235.33± 78.14g/L at G2, G4, G5and G6 of. Rats fed diet supplemented with milk, liver and tomatoes respectively. From the above results, it could be no significant White blood cells level, Red blood cells level and Platelets level with compared with negative control. And it was significant for hemoglubin for groups 4 and 5 as compared the others and this matched with ***Debjit Bhowmik et al., 2012*** who found that tomato rich with V.C which enhanced the absorption of iron and also ***Nährstoffe, 2017*** who reported that animal liver had high content of iron which prevent from iron anemia and decrease of hemoglubin level.

Table (5) Effect of feeding levels of milk, beef liver and fresh tomatoes in Hemoglobin level, White blood cells level, Red blood cells level and Platelets level

groups / parameter	(G1) Control (-ve)	(G2) Control (+ve)	(G3) Milk (10%)	G4 (liver 10%)	G5 (tomatoes 10%)	LSD
Hemoglobin %	13.90_b ±0.96	13.10_b ±1.88	13.90_b ±0.27	14.93_a ±0.35	14.70_a ±0.72	0.424
Lymph%	4.40_a ±3.54	186.00_b ±26.67	4.00_a ±2.79	4.57_a ±4.97	2.83_a ±0.46	0.975
White blood cells%	8.83_a ±1.94	7.50_a ±1.51	8.60_a ±0.61	10.60_a ±1.32	8.63_a ±0.81	0.153
Red blood cells%	3.62_a ± 0.11	3.73_a ±0.32	3.73_a ±0.41	4.33_a ±0.32	4.00_a ±0.04	0.059
Platelets%	177.00_a ±30.32	186.00_a ±26.67	205.67_a ±81.86	224.33_a ±117.05	235.33_a ±78.14	0.855

Table (6) shows the effect of feeding milk, beef liver and fresh tomatoes, on liver functions in rats.

Liver functions of group (G1) positive control equal group (G3, G4, G5 and G6). It could be no significant with liver (GOT) compared with negative control and positive control. While , there were significant between G4 and G5 and the others for GPT.

Table (6) effect of feeding milk, beef liver and fresh tomatoes on liver functions in rats.

groups / parameter	(G1) Control (-ve)	(G2) Control (+ve)	(G3) Milk (10%)	G4 (liver 10%)	G5 (tomatoes 10%)	LSD
GOT (U/ml)	7.00_a ±0.00	7.00_a ±0.00	7.00_a ±0.00	7.00_a ±0.00	7.00_a ±0.00	0.552
GPT (U/ml)	5.33_b ±2.31	6.67_a ±2.31	5.33_b ±1.33	4.00_c ±0.00	4.00_c ±0.00	0.382

. It shows the kidney functions (creatinine) 0.17± 0.20,0.43± 0.15, 0.63± 0.12,0.63± 0.12, and 0.63± 0.12 on G1,G2,G3,G4,G5 and G6 respectively. There is no

significantly changes as compared with group positive control . Urea shows 59.67±2.52,58.67±11.24,23.00±1.00,15.67±3.79 and 18.67±1.53for G1,G2,G3,G4 and G5 respectively . The resulted revealed that there is no significant changes between G4 and G5 .

Table (7) Effect of feeding milk ,liver and tomatoes, in kidney functions in rats.

groups / parameter	(G1) Control (-ve)	(G2) Control (+ve)	(G3) Milk (10%)	G4 liver (10%)	G5 (tomatoes 10%)	LSD
Creatinine (mg/dl)	0.47_{b} ±0.20	0.43_{b} ±0.15	0.63_{a} ±0.12	0.63_{a} ±0.12	0.63_{a} ±0.12	0.010
Urea(mg/dl)	29.67_{b} ±2.52	58.67_{a} ±11.24	23.00_{c} ±1.00	15.67_{d} ±3.79	18.67_{d} ±1.53	3.50

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دراسات بيولوجية على التداخل بين العناصر الغذائية والأدوية الشائعة الاستعمال

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قسم الاغذية الخاصة والتغذية معهد بحوث تكنولوجيا الاغذية بمركز البحوث الزراعية

الملخص العربي

هذة الدراسة تقوم علي التفاعل بين بعض الاطعمة مثل (الكبد البقري – مسحوق الحليب كامل الدسم – الطماطم) وهى غنية بالحديد – الكالسيوم – فيتامين (ج) علي التوالي مع الفلوموكس كمضاد حيوي وتأثيره علي مستوي جلوكوز الدم وبعض الوظائف الفسيولوجية مثل وظائف الكبد والكلي وعمل هستولوجى علي الكبد والكلي في الفئران .تم تقسيم الفئران وعددها 25 فأر الي خمس مجموعات المجموعة الأولي الضابطة السالبة والمجموعة الثانية الضابطة الموجبةوالتى تم تغذيتهاعلى الفلوموكس . وباقي المجموعات تم تغذيتهم علي الكبد البقري – مسحوق الحليب كامل الدسم – الطماطم بنسبة 10% مع مصدر المضاد الحيوي (الفلوموكس). وفي نهاية التجربة تم حساب الوزن المكتسب والمأخوذ من الطعام ونسبة كفاءة الطعام المتناول وايضا مستوى سكر الدم والكريايتين واليوريا في الدم . ثم أخذ أعضاء الكلي والكبد بعناية وفحصها لتقيم أثار المواد التي تم إختبارها ومن النتائج تم ملاحظة ان مجموعة الحليب كامل الدسم تحتوي علي أعلي محتوي من البروتين والدهون والرماد بينما الطماطم الطازجة كانت أعلي في محتوى الكربوهيدرات والألياف . بينما الكبد البقري يحتوي علي 7.8 ملجم من الحديد & 25 ملجم من فيتامين (ج) بينما كان اقل في محتواه من الكالسيوم . كان مسحوق الحليب كامل الدسم أعلي في محتواه من الكالسيوم 930 ملجم ولكن أقل في مستوي الحديد وفيتامين (ج) 4. ملجم و10 ملجم علي التوالي .وهناك إنخفاض معنوي في الوزن المكتسب في مجموعة الفلوموكس (المجموعة الضابطة الموجبة) بينما يوجد زياده في المجموعات التي تم تغذيتها علي الكبد البقرى والطماطم الطازجة ولايوجد إختلاف معنوي في أوزان الأعضاء (الكبد – الكلي – الطحال) مقارنة بكل من المجموعة الضابطة الموجبة والسالبة ويوجد أختلاف معنوي في وظائف الكبد بين المجموعة الرابعة والخامسة بينما أظهرت النتائج عدم وجود اختلاف معنوي بين المجموعة الرابعة والخامسة في مستوي اليوريا.

الكلمات الكاشفة :– الكبدالبقري – مسحوق الحليب كامل الدسم – الطماطم – مستوي السكر في الدم – وظائف الكبد – وظائف الكلي – فلوموكس – مضاد