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Measurement of blood sugar and liver and kidney functions for newborns of diabetic pregnant famale mice fed therapeutic dairy

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Abstract
The study was conducted in the animal house of the College of Veterinary Medicine / Tikrit University and in the laboratories of the General Company for the Pharmaceutical Industry and Medical Appliances / Samarra for the period from October 2020 until the end of April 2021. It included the production of therapeutic yogurt with the addition of a mixture of probiotic supplements Lactobacillus Casei, Lb. planetarium, Lb. acidophilus and Bifidobacterium. Bifiduem) and a second starter of two types of probiotic (Bif. Bifiduem and Lb. casei) with some fruits (cranberry and strawberry) and therapeutic drugs (Gliclazide and Metformin), to know their effect on some physiological and biochemical parameters such as measuring blood sugar values, urea, creatinine, ALT, AST in female laboratory mice with diabetes Developed alloxan and fed on therapeutic dairy.

The results showed that diabetic female rats in their newborns caused changes in glucose values, as there was a decrease in blood sugar values for 20-day-old babies (59.4) mg/dL and an increase in blood sugar values for 30-day-old babies, which amounted to (149.25) mg/dL, In addition, the values of urea (43) mL/dL, creatinine (1) mL/dL, AST and ALT enzymes (126.3 and 90.6) IU, and bilirubin (0.92 mg/dL) were measured.

Key words: Gestational diabetes mellitus, probiotic, yoghurt, Kidney and liver disease, Bilirubin, newborns

Introduction

Gestational diabetes mellitus (GDM) is any degree of glucose intolerance that is recognized for the first time during pregnancy (Chiefari et al., 2017) and gestational diabetes is associated with many complications for fetuses or newborns of affected mothers, such as congenital malformation and fetal death (Huynh et al., 2014), and congenital dyspnea. In addition, mothers with GDM and their infants develop type 2 diabetes, neonatal metabolic dysfunction in liver and kidneys, and jaundice (Chiefari et al., 2017).

As for a probiotic, it was defined by the Food and Agriculture Organization / World Health Organization as “living microorganisms that are given in sufficient quantities to confer a health benefit to the host.” A probiotic may be attributed to the fact that it restores the intestinal flora balance, which It is linked to diabetes and other metabolic diseases. The probiotic is given with some foods such as yogurt or as a biological supplement (Asgharian et al., 2019).

Phenolic fruits such as (cranberry and strawberry) are a good source of antioxidants, such as carotonoids, flavonoids, tocopherols, ascorbic acid, and in general all phenolic compounds, which have strong antioxidant activity and are considered to have protective effects for human health (Tyagi et al., 2017).

Materials and methods

Animals were purchased from Samarra Pharmaceutical Laboratory / Pharmacology Department. In this study, (65) female and (32) male white laboratory Albino mice of (8) weeks old and weight (80-150) g for both genders were used. Males and females were placed in cages. Separately, they were examined and ensured that they were safe, healthy and free of diseases, and then they were placed in the laboratory animal house Consisting of the yoghurt that was produced according to what was mentioned by Abdullah, (2010) with a modification by adding a mixture of four types of probiotic bacteria (Bif. bifiduem, Lb. casei, Lb. planetarium, Lb. acidophilus) and a second mixture of two types of probiotic bacteria (Bif. Bifiduem and Lb.

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casei) in addition to cranberries, fresh strawberries and a mixture of drugs (70 mg Metformin + 20 mg gliclazide). Water and food were also given until they start feeding on the previous ration and conduct the required analysiss.

The births of female mice were divided into 13 groups, each group include 5 births.

T1: It is the newborns taken from the mothers of the healthy control group, which included 5 healthy mice, and they were fed on a regular diet and normal water.

T2: It is the newborns taken from the mothers of the group suffering from diabetes induced by alloxan and fed on the usual diet and normal water.

T3: It is the newborns taken from the mothers affected by gestational diabetes, fed the usual plain yogurt and normal water, and treated with (70 Metformin mg + 20 gliclazide mg).

T4, T5, T6, T7, T8: They are the newborns taken from the mothers affected by gestational diabetes and fed on a diet of therapeutic yogurt with four types of bacteria of the probiotic, which are: (Bif. Bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) if (75 mg/kg body weight) of the mentioned bacteria mixture is added to the yoghurt with cranberry or with strawberry or added to it (Metformin 70 mg + 20 gliclazide mg) with cranberry or with strawberry or with therapeutic drugs (70 Metformin mg + 20 mg gliclazide) only, respectively.

T9, T10, T11, T12, T13: They are the newborns taken from the mothers affected by gestational diabetes and fed on a ration of therapeutic yogurt with two types of probiotic which are: (Bif. Bifiduem and Lb. casei) if added (75 mg/kg body weight) of the mentioned bacteria mixture with cranberry or with strawberry or added to it (70 Metformin mg + 20 gliclazide mg) with cranberry or with strawberry or with therapeutic drugs (70 Metformin mg + 20 gliclazide mg) only, respectively.

Then start conducting the necessary tests for the newborns of female mice after waiting for the newborns until they reach the age of 20 days until blood samples are drawn through the eye (Cappilary tube from the eye) from the newborns in sufficient quantity to measure the concentration of glucose in the blood serum only, due to the insufficient blood drawn to perform all the analysis For each group of the above groups. And then wait until the newborns reach the age of 30 days until blood is drawn in sufficient quantities to conduct the required analysis for each of the groups mentioned above, knowing that the mothers were subjected to the same analysis that were conducted on their newborns.

Carry out measurements and checks

Biochemical tests of blood

Determination of serum glucose, urea and creatinine concentration

A ready-made kit (Kit) of BIOLABO (France) was used, using the equation by (Tietz, 2005).

$$\text{concentration (mg/dl)} = \frac{\text{(A) Sample}}{\text{(A) Standard}} \times \text{Standard Conc.}$$

Determination of the activity of aspartate aminotransferase (AST) and alanine transaminase (ALT) in the blood serum

The enzymatic method was used to estimate the activity of the AST And ALT enzyme in the blood serum. The method included the use of a kit (Kit) supplied by the British company Randox.

Determination of the concentration of bilirubin in the blood serum Bilirubin meter

Bilirubin is checked in the blood serum by its own Bilirubin meter, which is characterized by its quick reading and simple use.

Statistical Analysis

The statistical program sciences social package Statistical (SPSS) version 16 was used in order to analyze the primary data of the results of the current study, as the analysis of variance (ANOVA) test was used and the level of significant differences between the rates of the criteria included in the current study was extracted using the least significant difference at the statistical level. (0.05, 0.01)

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Results and discussion

Effect of diabetic mothers and those fed therapeutic yogurt on the blood sugar of newborns

Figure (1) shows the effect of diabetic mothers and those fed therapeutic yogurt on the blood sugar of newborns in laboratory mice.

The results showed a significant increase at the level of $P \leq 0.05$ in the glucose index in the newborns of mice of diabetic mothers 30 days after birth, and the results before and after 30 days were at 64 and 140 mg/dL, respectively, compared with the healthy control group, which was at 74.2 and 75.4 mg/dL.

The results also showed that there were significant differences at the level $P \leq 0.05$ in the sugar values of newborns when treating diabetic mothers with four mixed bacteria with fruits and drugs used in the treatment of diabetes compared with the group of infected animals.

The best treatment was (T6), with an arithmetic mean of (110) mg/dL

The results also showed that there were significant differences at the level $P \leq 0.05$ in the sugar values of newborns when treating diabetic mothers with mixed bacteria (Bf. Bifiduem and Lb. casei) and same fruits and drugs used in the treatment of diabetes compared to with a group of infected animals.

The best treatment was (T11), with an arithmetic mean of (111) mg/dL

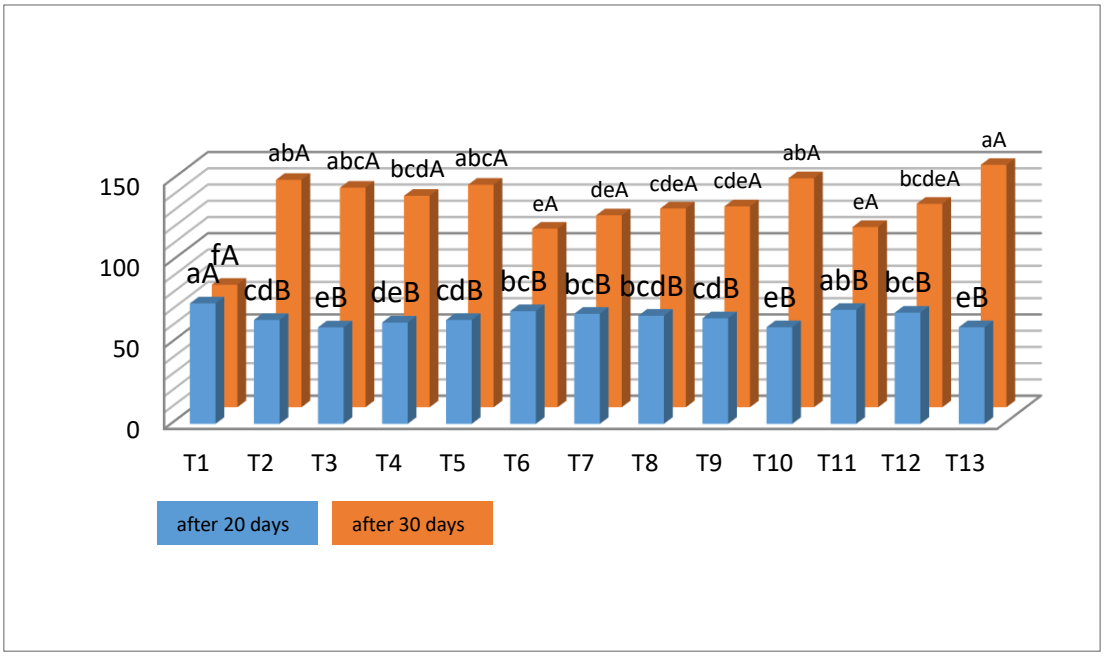

Figure (1) The effect of diabetes on mothers who were fed therapeutic yogurt on the blood sugar of newborns

Similar capital letters indicate that there are no horizontal differences between the stages
Similar lowercase letters indicate that there are no vertical differences between the coefficients

T1: healthy control group, T2: gestational diabetes control group, T3: gliclazide 20mg + Metformin 70mg group, T4: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + cranberry group, T5: group (Bif). Bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + Strawberry, T6: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + cranberry + gliclazide 20mg + Metformin 70mg, T7: group (Bif). Group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + strawberry + gliclazide 20mg + Metformin 70mg, T8: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + gliclazide 20mg + Metformin 70mg, T9 group: (Bif. bifiduem Lb. casei,) + cranberry, T10: group (Bif. bifiduem Lb. casei,) + strawberry, T11: group (Bif. bifiduem Lb. casei,) + cranberry + gliclazide 20mg + Metformin 70mg, T12 Group (Bif. bifiduem Lb. casei,) + strawberry + gliclazide 20mg + Metformin 70mg, T13: combination (Bif. bifiduem Lb. casei,) + gliclazide 20mg + Metformin 70mg

The results agreed with Semmler et al., (2013) that the development of gestational diabetes in the mothers of pregnant rats caused changes in the Langerhans islands located in the pancreas of newborns

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compared with the control group. Pancreatic cells of the alpha type and a decrease in the type of beta, in addition to the observation of gaps within the Langerhans islands. These changes are due to the fact that the mother's infection with gestational diabetes led to a decrease in insulin production, which caused the passage of large amounts of excess sugar from the mother's blood to the fetus's body through the placenta, leading to stimulation Insulin production, as the fetal pancreas begins to produce more insulin to get rid of the excess sugar in the fetus's blood. This indicates that the continuous stimulation of insulin to get rid of high concentrations of sugar in the blood, which led to the weakening and exhaustion of beta cells, or the cause may be the result of an exacerbation of the increase The level of glucose in the blood gradually causes abnormalities as a result of a condition called glucose toxicity (Badawy et al., 2006).

It is noted through the results shown in the above figure that the level of glucose in the blood did not decrease much after 20 days of birth in most of the treatments compared to the infected control group, while it is known that the newborns of mothers with diabetes suffer from a severe decrease in most of the cases in the level of glucose in the blood. The reason may be due to the use of vital enhancers for female diabetic mothers, which led to a significant decrease in the level of glucose in the blood of the mothers, which led to the absence of a significant decrease in the level of glucose in the mothers. Births as indicated by previous studies Karamali et al., (2018); Lindsay et al., (2014) indicated that newborns of mothers with gestational diabetes who were treated with probiotic supplements with a prebiotic such as cranberry and strawberry fruit in addition to therapeutic drugs led to a slight decrease in sugar levels for the aforementioned reason and then a rise in sugar levels later compared to The mothers treated with placebo and diabetes medications such as metformin, as they indicated to the reason, may be due to the transmission of the probiotics given to the mothers to the newborns, in addition to the fact that the mothers treated with probiotics did not cause a defect in the pancreatic beta cells, and thus the insulin was secreted appropriately and almost sufficiently to the glucose present this led to the failure to transfer large excess amounts of blood sugar to the fetus, and thus the need to secrete insulin was less for newborns and did not lead to a significant decrease in blood sugar in most of the treatments compared to placebo and diabetes medications.

Effect of diabetes mellitus of mothers and those fed therapeutic yogurt on urea in newborns

Figure (2) shows the effect of diabetic mothers who were fed therapeutic yogurt on the urea index of newborn laboratory mice.

The results showed a significant increase at $P \leq 0.05$ in the urea index in mice born with diabetic mothers, and the results were at 43 mL/dL, compared to the healthy control group, which was at 12.8 mL/dL.

The results also showed significant differences at $P \leq 0.05$ in the urea values of newborns when treating diabetic mothers with four mixed bacteria with fruits and drugs used in the treatment of diabete compared with the group of infected animals.

The best treatment was (T6), with an arithmetic mean of (27.2) mL/dL.

The results also showed a significant decrease at $P \leq 0.05$ in the urea values of newborns when treating diabetic mothers with mixed bacteria (Bf. bifiduem Lb. casei,) and same fruits and drugs used in the treatment of diabetes compared to with a group of infected animals.

The best treatment was (T10), with an arithmetic mean of (25.7) mL/dL.

The reason for the low level of urea when using cranberry and strawberry fruits with probiotics and drugs is that the phenols and flavonoids present in them act as antioxidants and have a beneficial health effect, which led to the adoption of these fruits as functional foods with great therapeutic benefits.

In addition to the role of probiotics that have been proven to affect urea values in mothers of rats, the reason for the low urea values in newborns may be due to the transfer of these probiotics to the fetus through the placenta, in addition to their role in improving kidney functions and thus improving the health of the newborn. Its effect through different treatments as a result of physiological changes in the body of the newborn itself, or the difference in the quality or preparation of the probiotic supplements used (Catinean, 2018; Karamali et al., 2018).

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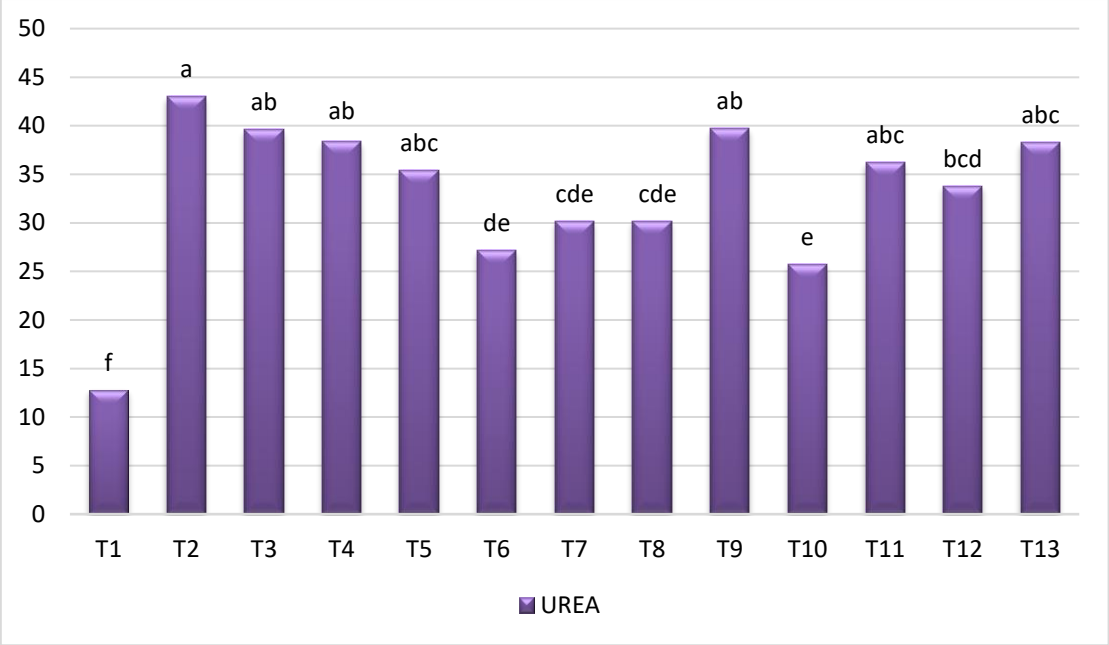

Figure (2) Effect of diabetic and fed diabetic mothers on therapeutic yogurt on the level of urea in the blood of newborns

Similar capital letters indicate that there are no horizontal differences between the stages
Similar lowercase letters indicate that there are no vertical differences between the coefficients

T1: healthy control group, T2: gestational diabetes control group, T3: gliclazide 20mg + Metformin 70mg group, T4: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + cranberry group, T5: group (Bif). Bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + Strawberry, T6: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + cranberry + gliclazide 20mg + Metformin 70mg, T7: group (Bif). Group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + strawberry + gliclazide 20mg + Metformin 70mg, T8: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + gliclazide 20mg + Metformin 70mg, T9 group: (Bif. bifiduem Lb. casei,) + cranberry, T10: group (Bif. bifiduem Lb. casei,) + strawberry, T11: group (Bif. bifiduem Lb. casei,) + cranberry + gliclazide 20mg + Metformin 70mg, T12 Group (Bif. bifiduem Lb. casei,) + strawberry + gliclazide 20mg + Metformin 70mg, T13: combination (Bif. bifiduem Lb. casei,) + gliclazide 20mg + Metformin 70mg

The reason for this may be that the placenta plays an important role in the development of gestational diabetes, while hyperglycemia, hyperinsulinemia and other metabolic imbalances in gestational diabetes patients in turn lead to structural and functional changes in the placenta and thus changes in placental gene expression in women with gestational diabetes. , It was also found that an imbalance in the nitrogen balance of proteins is associated with insulin sensitivity or hyperinsulinemia, where during the placenta disorder, in addition to protein changes in it, it will lead to a defect in the transport of amino acids and thus lead to an increase and decrease of urea (Enquobahrie et al., 2009).

The metabolic disturbances associated with gestational diabetes lead to clinically significant and dangerous morbidity for both mother and newborn. Although a number of studies have documented changes in glucose metabolism in the mother and newborn, studies of nitrogen and protein metabolism are still scarce.

It is also likely that the results of the mother will be similar or different from that of the newborn in terms of high or low urea in the body, depending on the placental transport mechanism in terms of the fetus's absorption of nitrogen and the rate of its production of urea. (Kalhan, 1998).

Effect of diabetic mothers and those fed therapeutic yogurt on creatinine of newborns:

Figure (3) shows the effect of diabetic mothers and those fed therapeutic yogurt on the creatinine index of newborn laboratory mice.

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The results showed a significant increase at P ≤ 0.05 in creatinine index in mice born with diabetic mothers, and the results were at 0.7 mL/dL, compared to the healthy control group, which was at 0.3 mL/dL.

The results also showed a significant decrease at P ≤ 0.05 in the creatinine values of newborns when treating diabetic mothers with four mixed bacteria with fruits and drugs used in the treatment of diabetes compared with the group of infected animals.

The best treatment was (T8, T7, T6), as the mean was (0.4) mL/dL.

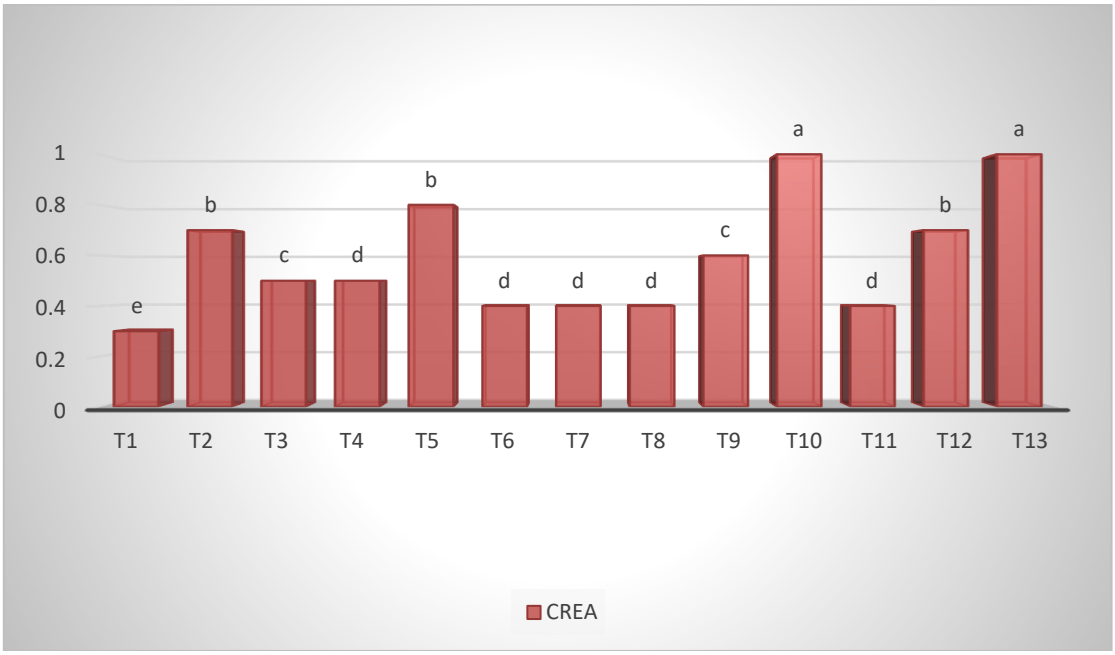

Figure (3) Effect of diabetic and fed diabetic mothers on therapeutic yogurt on the creatinine level in the blood of newborns.

Similar capital letters indicate that there are no horizontal differences between the stages

Similar lowercase letters indicate that there are no vertical differences between the coefficients

T1: healthy control group, T2: gestational diabetes control group, T3: gliclazide 20mg + Metformin 70mg group, T4: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + cranberry group, T5: group (Bif). Bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + Strawberry, T6: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + cranberry + gliclazide 20mg + Metformin 70mg, T7: group (Bif). Group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + strawberry + gliclazide 20mg + Metformin 70mg, T8: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + gliclazide 20mg + Metformin 70mg, T9 group: (Bif. bifiduem Lb. casei,) + cranberry, T10: group (Bif. bifiduem Lb. casei,) + strawberry, T11: group (Bif. bifiduem Lb. casei,) + cranberry + gliclazide 20mg + Metformin 70mg, T12 Group (Bif. bifiduem Lb. casei,) + strawberry + gliclazide 20mg + Metformin 70mg, T13: combination (Bif. bifiduem Lb. casei,) + gliclazide 20mg + Metformin 70mg

The results also showed a significant increase at the level P ≤ 0.05 in the creatinine values of newborns when treating diabetic mothers with mixed substances (Bf. bifiduem Lb. casei,) with same fruits and drugs used in the treatment of diabetes compared to with a group of infected animals.

The best treatment was (T11), with an arithmetic mean of (0.4) mL/dL.

The reason may be due to the transmission of vital enhancers that were fed by the mothers of newborn mice to the newborns, and thus these enhancers worked to protect the sufferers from diseases associated with diabetes, such as kidney and liver diseases, high creatinine level, in addition to the fact that they modify the metabolism process, and when added to foods rich in phenolic compounds such as berries Wild and strawberry probiotic bacteria increase their bioactive phenolic compounds and antioxidants that reduce oxidative stress in the cells of the body and reduce diseases in addition to their ability to filter creatinine through urine from the kidneys. It is also able to protect the kidneys from some damage and diseases and improve the functions of Kidney (Huang et al., 2018; Imtara et al., 2018).

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Also, the difference in results between treatments may be due to the physiological changes in the body of the newborn itself, or the difference in the quality or preparation of the probiotic supplements used, in addition to the effect of the therapeutic drugs used for the mother (Karamali et al., 2018).

The metabolic disorders associated with gestational diabetes lead to major and dangerous clinical diseases for both the mother and the newborn, as some previous studies indicated that the pregnant mother's exposure to diabetes makes the newborn vulnerable to kidney disease and dysfunction, as they noted during their study the high level of creatinine in the blood For newborns at the age of 40-30 days after birth, this may be due to the fact that the placenta plays an important role in the development of gestational diabetes, while hyperglycemia, hyperinsulinemia and other metabolic imbalances in gestational diabetes patients in turn lead to structural and functional changes in the placenta. Consequently, changes in placental gene expression in women with gestational diabetes affect the kidneys and their functions, and the lack of creatinine excreted through the urine results from a defect in the function of the kidneys (Dyck et al., 2011; Aisa et al., 2019).

Effect of diabetic mothers and those fed therapeutic yogurt on liver enzymes in newborns

Figure (4) shows the effect of diabetic mothers and those fed therapeutic yogurt on liver enzymes AST and ALT in newborn laboratory mice.

The results showed a significant increase at $P \leq 0.05$ in the AST and ALT index in mice born with diabetic mothers, and the results were at 119 and 70 IU, respectively, compared to the healthy control group, which was at 85.6 and 47.2 IU, respectively.

The results also showed significant differences at $P \leq 0.05$ in AST and ALT values for newborns when mothers were treated with mixed bacteria with fruits and drugs used in the treatment of diabetes compared with the group of infected animals.

The best treatment was (T3) in the AST index, as its mean was (104) IU. As for the ALT index, the best treatment was (T5), as its mean was (66) IU.

The results also showed significant differences at $P \leq 0.05$ in AST and ALT values for newborns when the mothers were treated with mixed bacteria (Bf. bifiduem and Lb. casei) with fruits and drugs used in the treatment of diabetes compared with group of infected animals.

The best treatment was (T11) in the AST and ALT index, as its mean was (94 and 56.6) IU, respectively.

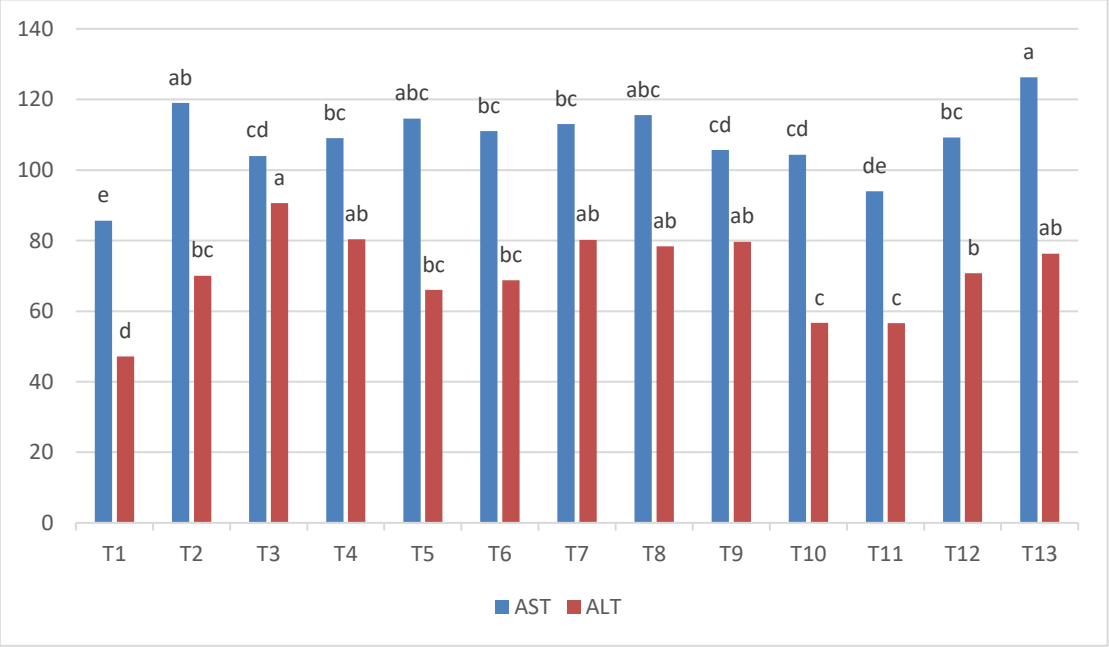

Figure (4) Effect of diabetic and fed diabetic mothers on therapeutic yogurt on the level of liver enzymes in the blood of newborns

Similar capital letters indicate that there are no horizontal differences between the stages
Similar lowercase letters indicate that there are no vertical differences between the coefficients

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T1: healthy control group, T2: gestational diabetes control group, T3: gliclazide 20mg + Metformin 70mg group, T4: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + cranberry group, T5: group (Bif). Bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + Strawberry, T6: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + cranberry + gliclazide 20mg + Metformin 70mg, T7: group (Bif). Group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + strawberry + gliclazide 20mg + Metformin 70mg, T8: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + gliclazide 20mg + Metformin 70mg, T9 group: (Bif. bifiduem Lb. casei,) + cranberry, T10: group (Bif. bifiduem Lb. casei,) + strawberry, T11: group (Bif. bifiduem Lb. casei,) + cranberry + gliclazide 20mg + Metformin 70mg, T12 Group (Bif. bifiduem Lb. casei,) + strawberry + gliclazide 20mg + Metformin 70mg, T13: combination (Bif. bifiduem Lb. casei,) + gliclazide 20mg + Metformin 70mg

The results agreed with what was indicated by Knapen et al., (1999) that AST concentrations increase in newborns more than in infants, and the reason for this is due to the release of placental AST into the fetal circulation. The results also agreed with what was stated by Elinav et al., (2005). They showed that the concentration of ALT increases with age and begins to decrease after age.

These results also agreed with Kalhan et al., (2000), who noticed during their study that the concentration of ALT was slightly low in newborns shortly after birth and then began to increase, and this can be explained from the point of view that the fetus in normal physiological conditions depends on the mother in Repeated supply of glucose without the need for glucose production via gluconeogenesis, but Le Couteur et al., (2010) indicated that there is an increase in gluconeogenesis and as a result the main enzyme in this process that converts alanine to alpha-ketoglutarate in the first step is increased.

As pointed out by Yarrington et al., (2016) ; Leng et al., (2016) indicated that the increase and decrease of ALT and AST enzymes in newborns or mothers in some groups compared to the affected control group is related to the mother's diabetes and insulin resistance in addition to obesity and weight gain. All these result lead to an increase in ALT and AST enzyme concentrations, for newborns or mothers.

Some studies have also indicated that the type, quantity and duration of mother's treatment with probiotic supplements affect the newborn, in addition to the physiological changes between one newborn and another that make the response of the newborns to probiotics different (Karamali et al., 2018).

Also, Fraser et al., (2009) found that a high concentration of glucose in the blood leads to an increase in ALT and AST enzymes

Effect of diabetic mothers and those fed therapeutic yogurt on bilirubin in newborns

Figure (5) shows the effect of diabetic mothers and those fed therapeutic yogurt on bilirubin in newborn laboratory mice.

The results showed a significant increase at the level of $P \leq 0.05$ in the bilirubin index in the newborns of mice of mothers with diabetes, and the results were at 0.875 mg/dL, compared with the healthy control group, which was at 0.334 mg/dl.

The results also showed a significant decrease at a level $P \leq 0.05$ in bilirubin values when mothers were treated with four mixed bacteria, fruits and drugs used in the treatment of diabetes compared with the group of infected animals.

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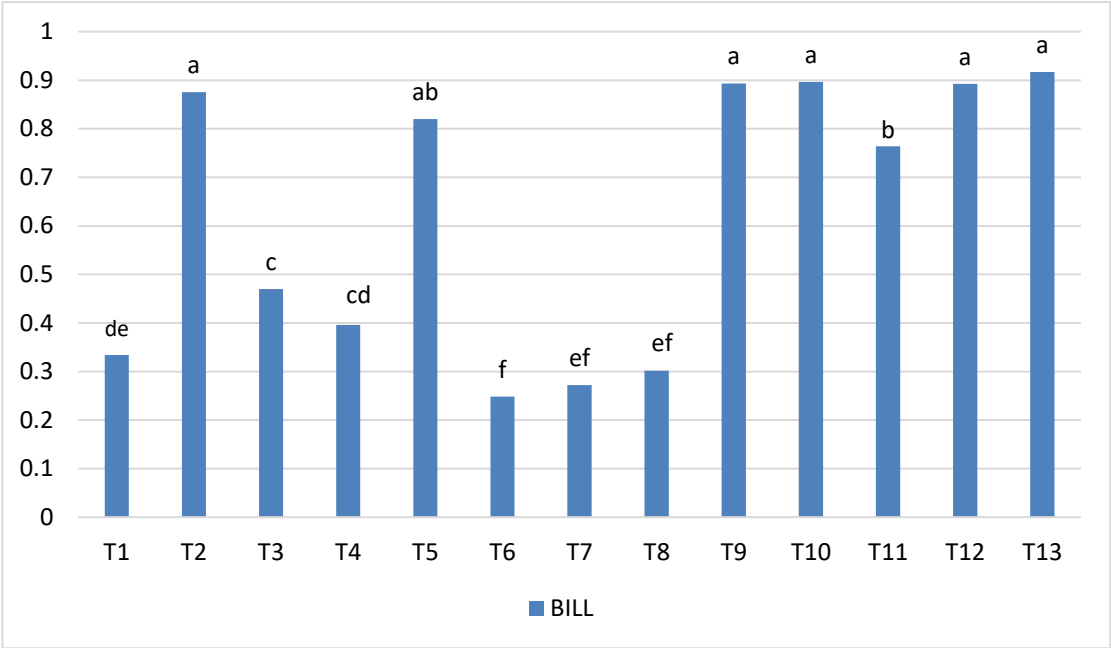

Figure (5) Effect of diabetic and fed diabetic mothers on therapeutic yogurt on the level of bilirubin in the blood of newborns

Similar capital letters indicate that there are no horizontal differences between the stages

Similar lowercase letters indicate that there are no vertical differences between the coefficients

T1: healthy control group, T2: gestational diabetes control group, T3: gliclazide 20mg + Metformin 70mg group, T4: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + cranberry group, T5: group (Bif). Bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + Strawberry, T6: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + cranberry + gliclazide 20mg + Metformin 70mg, T7: group (Bif). Group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + strawberry + gliclazide 20mg + Metformin 70mg, T8: group (Bif. bifiduem Lb. casei, Lb. planetarium, Lb. acidophilus) + gliclazide 20mg + Metformin 70mg, T9 group: (Bif. bifiduem Lb. casei,) + cranberry, T10: group (Bif. bifiduem Lb. casei,) + strawberry, T11: group (Bif. bifiduem Lb. casei,) + cranberry + gliclazide 20mg + Metformin 70mg, T12 Group (Bif. bifiduem Lb. casei,) + strawberry + gliclazide 20mg + Metformin 70mg, T13: combination (Bif. bifiduem Lb. casei,) + gliclazide 20mg + Metformin 70mg

The best treatment was (T7, T6), with an arithmetic mean of (0.248 and 0.272) mg/dL.

The results also showed a significant increase at the level $P \leq 0.05$ in the bilirubin values when treating the mothers with mixed bacteria (Bf. Bifiduem and Lb. casei) with same fruits and drugs used in the treatment of diabetes compared with the group of infected animals.

The best treatment was (T11), with an arithmetic mean of (0.764) mg/dL.

The reason may be due to the physiological changes that occur inside the body of the newborn, which leads to the inefficiency of the functions of the newborn's organs, and the reason may be due to the fact that the quantity, number, or type of probiotic supplements provided to the mother and transmitted through the placenta to the fetus is insufficient for newborns, and thus an increase in the values of bilirubin compared with previous treatments (Karamali et al., 2018).

The results are in agreement with Dugoua JJ et al., (2009) who demonstrated that the use of probiotic supplementation at a dose of 250 mg per day in mothers, can reduce serum bilirubin concentration and duration of phototherapy for newborns, by improving the health of the mother's digestive system and thus improving the health of the newborn. Newborns.

The results also agreed with what was stated by Ferrara et al., (2007), as they found during a study they conducted on healthy pregnant mothers and others with gestational diabetes that high and low blood sugar and hyperbilirubin are linked, so the newborns days after birth notice low blood sugar and then high later As a result of a defect in pancreatic cells and insulin, which affects the level of bilirubin in newborns, as they indicated during their study that the possibility of infection in newborns with hyperbilirubin from mothers

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with gestational diabetes is twice the probability of infection in newborns from healthy mothers, as these results agreed with the NDDG, (1979) ; GDM Care, (2000) that the risk of increased incidence of complications of blood sugar and hyperbilirubin increases with the increase in the numbers of glucose values in the blood set by ADM, and these results differed with what was stated by Bennett et al. (2021), where they noted that there were no significant differences in the concentration of bilirubin Among the newborns of mothers with gestational diabetes and of healthy mothers.

The reason may be that a metabolic defect led to the inability of the pancreatic beta cells to produce enough insulin to overcome the increased insulin resistance caused by hormonal changes that occur during pregnancy, which in turn leads to hyperglycemia during pregnancy and thus increasing the fetus's exposure to glucose The consequence of this is from hyperinsulinemia in the fetus to enlargement of adipose tissue and skeletal muscles, and possibly to hypoglycemia in newborns and consequently a decrease in oxygen, which may increase the fetus's absorption of oxygen, which leads to an increase in the formation of red blood cells and hyperbilirubin in the newborn (Buchanan, 2001).

Conclusion

The feeding of diabetic pregnant famale mice on therapeutic yogurt led to an improvement in the blood sugar index, urea, creatinine and liver enzymes, in addition to bilirubin, where by a decrease in the bilirubin index was observed in most of the treatments.

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الخلاصة

أجريت الدراسة في البيت الحيواني التابع الى كلية الطب البيطري/ جامعة تكريت وفي مختبرات الشركة العامة لصناعة الادوية والمستلزمات الطبية/ سامراء، أجريت هذه الدراسة للمدة من بداية شهر تشرين الأول لسنة 2020 / ولغاية نهاية شهر نيسان لسنة/ 2021. تضمنت انتاج البان علاجية مع اضافة خليط من مكملات المعززات الحيوية (*Lactobacillus. Casei, Lactobacillus. planetarium, Lactobacillus. acidophilus, Bifidobacterium. Bifiduem*) وخليط ثاني من نوعين من بكتريا المعزز الحيوي (*Lactobacillus. Casei, Bifidobacterium. Bifiduem*) مع بعض الفواكه (التوت البري والفراولة) وعقاقير علاجية Gliclazide) و Metformin)، لمعرفة تأثيرها على بعض المعايير الفسلجية والكيموحيوية كإجراء قياس قيم سكر الدم، اليوريا، الكرياتنين، أنزيم (ALT)، أنزيم (AST) لإناث الفئران المختبرية المصابة بالسكري المستحدث بالآلوكسان والمغذاة على الالبان العلاجية.

بينت النتائج ان إصابة إناث الفئران بالسكري على المواليد قد سبب تغييرات في قيم سكر الكلوكوز حيث كان هناك انخفاض في قيم السكر للمواليد بعمر 20 يوماً (59.4 ملغم/ديسيلتر) وارتفاع قيم سكر الدم للمواليد بعمر 30 يوماً اذ بلغت (149.25 ملغم/ديسيلتر)، بالإضافة الى ذلك فقد تم قياس قيم اليوريا (43 مليلتر/ديسيلتر) والكرياتنين (1 مليلتر/ديسيلتر) وأنزيمات AST وALT (126.3 و 90.6 وحدة دولية) والبيلروبين (0.92 ملغم/ديسيلتر).

الكلمات المفتاحية: سكر الحمل، المعززات الحيوية، اللبن، امراض الكلى والكبد، البيلروبين، المواليد.

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