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# The effect of Alcoholic extract of *Aloe vera* leaves on the level of glucose sugar and some biochemical components in the blood of rabbits

JABBAR T. A. AL- ALI[1]
College of Health and Medical Technology in Basra
Southern Technical University, Iraq
ABDUL WAHAB ABDUL RAZAK SULTAN
Southern Technical University, Iraq
IQBAL I. S. AL-HASSANI
Technical Institute of Basra
Southern Technical University, Iraq
NARJUS FARIS
Southern Technical University, Iraq

**Abstract:**

*Since the Diabetes Mellitus became a global healthy problem diffuse widely among different society strata and began to threaten the lives of many persons, it's a chronic disease can be caused by a genetic factor, and can be by functional or environmental caused, this disease associate with the many functional disturbances of body members, is observed that one of the complications of diabetes, is the liver function weakness and what associate with it of enzymtic changes relating to the work of the liver, such as high efficiency of GOT and GPT enzymes in diabetes patients , and the diabetics suffer from different vascular complexities, such as coronary heart disease, as well as suffering from the nervous disorders, also from the complications of diabetes, disruption of thyroid gland function .*

*After knowing of the main causes of the disease, the scientists in various countries around the world begin conducting researches*

[1] corresponding author: alalijabbar@gmail.com

*and many studies to find drugs and treatment methods to control on this disease. So the attention was tended to the use of plants and medicinal herbs.*

*Therefore we conducted this study to estimate the effect of the Alcoholic extract of Aloe vera leaves in the Glucose level and activity of Glutamic Oxaloacetic Transaminase (GOT), Glotamic Pyruvic Transaminase (GPT) and Concentration of thyroid hormones T3 and T4 in blood serum of rabbits.*

*The results have showed the existence of a significant decrease ($P < 0.05$) in the level of glucose sugar in the blood serum of treatment animals $T_2$ (healthy rabbits, and dosage with Alcoholic extract of Aloe vera leaves) and in the blood serum of treatment animals $T_5$ (alloxan induced diabetic rabbits that dosage with Alcoholic extract of Aloe vera leaves), and in the blood serum of treatment animals $T_4$ (alloxan induced diabetic rabbits and dosage with Insulin), compared with the level of glucose sugar in the blood serum in animals of control treatment and in the blood serum in animals of treatment $T_3$ ( alloxan induced diabetic rabbits and left without treatment of Alcoholic extract of Aloe vera leaves or the insulin).*

*Also the results have showed significant decrease in the effectiveness of the enzymes (GOT ,GPT) in the blood serum of treatment animals $T_2$, and in the blood serum of treatment animals $T_5$. and the animals of treatment $T_4$ ,compared with effectiveness of the**se** enzymes in the blood serum of treated animals T3 .*

*The results in this study indicated to the existence of significant increase ($P < 0.05$) in concentration of hormones T3 and T4 in the blood serum of healthy rabbits in treatment ($T_2$) compared with their concentration in the blood serum of control treatment. Also we found a significant increase ($P<0.05$) in the concentration of hormones T3 and T4 in the blood serum of treatments animals ($T_4$) and treatments animals ($T_5$) compared with concentration of these hormones **in** blood serum of treatments animals ($T_3$).*

**Key words**: *Aloe vera*, glucose, biochemical components, rabbits

## INTRODUCTION:-

As a result of changes in lifestyle and the habits dietary change and lack of activities resulted of what provided by the modern life to the individual from equipment and tools have limited his movement , which is reflected in the performance of the vital functions of the organs and tissues of the body, resulting for it many diseases such as obesity, high blood pressure and high level cholesterol in blood, heart disease, diabetes and other **[38].** The Diabetes Mellitus is one of these diseases, where this disease has become a global healthy problem that spreads widely among the various of society strata and begins is to threaten the lives of many persons, regardless of age of the person child has been infected at the age of ten and can be infected by a person appellant age, it's the chronic disease that can be caused by a genetic factor, and can be by functional or environmental, accompanied this disease associate many imbalances function of the body members, also it is observed that one of the complications of diabetes is an impaired the liver function and what associate with it of enzymatic changes relating to the work of the liver, such as high efficiency of GOT and GPT enzymes in diabetic patients, **[16]** he said an increase in the effectiveness of the GOT and GPT enzymes in diabetes patients. **[45]** He points that people with diabetes they suffer from different vascular complexities, such as coronary heart disease, as well as suffering from the nervous disorders, also the complications of diabetes, disruption in the function of the thyroid gland. The study of **[50]** points to the effect of the process of metabolism of carbohydrates, protein and fatty acids in the case of diabetes as a result of the presence of a physiological relationship between the insulin hormone and thyroid hormones T3 and T4, which play an important role in the metabolism the nutrients, as the increase or decrease one of them has affects on the other's work. The researchers begin to

conduct research and studies on the disease for a long time and enable from distinguishing two types of diabetes, according to their causes, Insulin Dependent Diabetes Mellitus (IDDM) Type 1 and Non Insulin Dependent Diabetes Mellitus (NIDDM) type 2, and both types cause high the levels of blood sugar, and attributed the high level of blood sugar in both types to the shortfall in the secretion of the insulin hormone or the presence of anti-insulin action factors causing an imbalance in the metabolism process of nutrients, that resulting in an increase in the level of blood sugar for a normal rate **[43 ; 4].** And after knowing the main causes of the disease, the scientists begin in various countries around the world to conduct researches and studies to find drugs and methods of treatment to control on this disease. So the attention was tended to the use of plants and medicinal herbs. The studies have shown that there are many plants used in the treatment of diabetes **[22].** And the call that refer to the use of natural resources (air, water, pure food and medicine that extracted from medicinal plants and herbs) is not an invitation to backwardness, but the purpose of it is to detecting the bounties of nature and avail of them to maintain the integrity of our bodies and increase the immunity against diseases and reduce the use of chemicals as drugs, and the side effects that result from them.

The father of medicine (Hippocrates) says let your food your medicine and treated each patient by flora of land and Ibn al-Nafis says your health is in the organization of your diet, and you have to beware of resorting to drugs only when absolutely necessary, and after the human have known the effective materials in plant and extract this materials and for making tablets and drugs that use with natural condition in the treatment as my populace medicine , From this point it is necessary to know the plants and medicinal herbs which are used in traditional therapy and reveal its secrets, so the interest started to be increased by doctors and pharmacists in

these medicinal plants and established centers and institutes and specialist institutions to study the effective medicinal plant components and the production of drug and these plants were used in the production and industry of the medicament. The cactuses plant and specially the *Aloe vera* is one of the plants in *Liliacea* family and it's a perennial plant abound grown in arid areas and semi arid areas, However the original locality of it is the continent of Africa and the Arabian Peninsula **[3].** as well as growing in southern Europe, Mexico, the United States of America and the tropics **[52] .**

The cacti was recorded in the historical records of ancient civilizations there is a mention to the presence in Iraq, Egypt, India and Greece , and now growing on a large scale all over the world, being from the plants which tolerant the harsh and difficult environmental circumstances that the other plants can't grow in it **[53].** The Cactus has therapeutic properties and mention that the human has known this therapeutic properties since several centuries, where that the Sumerians have recorded the medical uses of the cactus on the clay boards since 2100 BC. Also an evidences were found about the therapeutic uses through the graphics in the Pharaohs monument, and on the papyrus boards in ancient Egypt, also it was found in ancient manuscripts in India, all these evidences have pointed to the widespread use of this plants in the ancient folk medicine [**42 ; 46].** Recently, interest start increasing in the use of *Aloe vera* in the pharmaceutical industry and many researches have been made about it by the pharmacists and the doctors in various countries around the world to stand on the rumors which hesitate in popular circles about the great benefits of the cactus in the treatment of some diseases, and existed the results of their research for the benefit of cactus, where researchers have identified more than 75 different food items and 20 types of minerals and 12 type of vitamins in addition to more than 200 chemical effectively have extracted

from the inner layer of aloe vera cactus leaves (gel ) have a good therapeutic properties, such as saponins, terpenoids, flavonoids, phenols, Aloin, Barbaloin and Aloe -emedin which is one of the main compound in *Aloe vera*, also it contains polysaccharides, enzymes, Organic acids and Lecithin. **[23].** what makes it in the treatment of many diseases, such as the treatment of stomach ulcers **[53].**

Herbal Medicine books mention that the Indians used the cactus as one of the recipes that is useful in the treatment of diabetes **[11].** The study of **[25],** has shown that the Aloin compound which exists in leaves gel useful in the treatment of diarrhea cases and in the treatment of wrinkles in the skin through its work to activate and accelerate the production of collagen which exists in the skin and thus works to remove wrinkles and reduce the appearance of other wrinkles. **[34; 14]** They points that the active compounds which exist in the leaf gel of the Aloe *vera* have activity selectively against cancer tumors and found that these compounds effective in lowering blood pressure **[44].** Also it is found that the Indians in America they are using *Aloe vera* to treat digestive disorders and the treatment of burns **[8; 29].** As it is explained **[54]** that material aloes in and aloemannan which existed in the Cactus has important role and effective in the treatment of heart diseases. the **[36 ; 48 ; 27]** they point out that the *Aloe vera* as a good drug against many bacterial and viral diseases and anti-diabetic, and the extract of cactus has important role in activating the immune system in the body. Study of **[33]** shows the effect of methanol extract of the seeds of the *Aloe vera* on body weight and reproductive organ in albino mice females, they found that seed extract was improved the body weight rate, and work as hindrance to the pregnancy in mice. In another study conducted by researcher **[40]** knows the effect of alcoholic extract of seeds of the Aloe vera on the hormonal effectiveness in females of white rats, has found that this

extract has estrogenic and Broujstirenyh effectiveness, where worked on creation of disorder in erotica session in rats. Cactus is also used in many industries, including the food industry, especially the juices industry **[10].** And used the Aloe vera in industry of many cosmetics that protect skin from the sun's rays **[24].**

## MATERIALS AND METHODS: -

### Preparation of alcoholic extract of aloe vera leaves:

The researchers have attended a group of fresh leaves of Aloe vera and removed the existent thorns at the edges of the leaves were then washed with distilled water for several times and then dried with pieces of clean cloths, the cactus leaves were cut into small pieces and then placed in wide metal pots outdoors until they were completely dried, then grinded the dried leaves by using (electrical grinder) for the conversion into soft powder, and for the purpose of preparation of alcoholic extract of this powder, used the method of **[6]** by taking 100 grams of leaves powder and put in Baker at (1000 ml) and added to it 500 ml ethyl alcohol 70% and put the mixture in water bath at 37° C for 24 hours and then placed in an electric motor for an hour and then nominated the solution by using a piece of gauze and then take the filtrate and distributed in the tubes of centrifuge device and run the device at the speed of 3000 cycles / minute for a period of 15 minutes, then take the serene and put a glass petri dishes and placed in a drying oven at a temperature of 37° and after completion of the drying process and skimming the extract and save in sealed glass bottles at a temperature of 4° until use.

### Experience animals:

The study was conducted for the period from 4 / 8 /2014 up to 4 /10 /2014 (20) locally rabbits in ages ranged between 8 - 9 weeks

and the weight ranged between 1130-1200 grams are used in this study, the animals were placed in a room is Containing on cages prepared for this purpose ,and left the animals for (4) weeks for the purpose of Adaptation they to the Conditions of the experiment that has been pre-configured and the feed provides a fixed dates per day, and the water was submitted them freely throughout the day and the lighting 16 hours per day. Randomly distributed to five treatments with four animals in each treatment , where the T1 Control treatment ( healthy rabbits), Treatment 2 (healthy rabbits and dosage with Alcoholic extract of *Aloe vera* leaves by 1000 mg / kg of body weight). Treatment 3 (alloxan induced diabetic rabbits dosage with 150 mg / kg of body weight of alloxan). Treatment 4 (alloxan induced diabetic rabbits and dosage with Insulin by 5 IU / kg of body weight). Treatment 5 (alloxan induced diabetic rabbits and dosage with 1000 mg / kg of body weight from Alcoholic extract of *Aloe vera* leaves) .

**The diabetes events:-**

The diabetes events by using Alloxan. The animals have been starving for 24 hours before being injected and then injected by the concentration of 150 mg / kg of body weight [**43]** the alloxan has been dissolved in the physiological normal saline before use, and then use with Single dose under the peritoneal membrane **[21]**. And then directly, provided the animals after injection with food and glucose solution 5% to prevent a sharp decline in the level of blood glucose which resulted from destruction the beta cells in the pancreas. And to confirm the occurrence of diabetes used Urine test with using a glucose reagent strip (Uriscan) The examination once every two days for a period ten days, where the animals that have the level of glucose more than (200 mg / 100 ml) consider afflicted by diabetes.

**Preparation of serum:**

At the end of the trial period and before providing fodder for rabbits was withdrawn 5 ml of blood samples from intravenous of edge the ear from all the rabbits and put this blood in the free anticoagulant tubes and left this tubes at room temperature for 20 minutes to isolate the on the speed of 3000 rpm for a period of 15 minutes where they were isolated the blood serum and put it in an airtight plastic tubes and preserved under the temperature (- 20) for conducting the required tests.

**Measurement of glucose concentration:**

The level of sugar in the blood serum was measured by using equipment of ready- appreciation (Kit) which equipped from the French company BIOLABO SA. According to the method **[49]** the principle of work in this method is based on the basis of glucose oxidation by the Oxidase enzyme, Glucoronic acid was produced and consists hydrogen peroxide H2O2 and then reacts the hydrogen peroxide with 4-a mino antipyrine with the presence the enzyme of Peroxidase.

$$\text{Glucose} + O_2 \xrightarrow[\text{CHO}]{\text{Glucose Oxidase}} \text{Glucoronic acid} + H_2O_2$$

$$2H_2O_2 + \text{4-amino antipyrin} \xrightarrow{\text{Peroxidase}} \text{Quinoemine} + 4H_2O$$

The level of Glucose was measured by taking three test tubes and placed in each of them in 1000 microliter of the directory, and then was added 10 microliter of standard solution in the Standard tube and 10 microliter of serum in the Test tube and shock the tubes by calm and leave this tubes for 30 minutes at room temperature and then Spectrophotometer is used to measure the absorbency of samples on the wavelength

(505 nm).and estimated the concentration of glucose according to the following equation:

$$\text{Glucose concentration (mg / 100 ml)} = \frac{\text{Absorbency sample}}{\text{Absorbency standard solution}} \times 100$$

**Measure the effectiveness of enzymatically GOT, GPT: -**

The effectiveness of enzyme Glutamic Oxaloacetic Transaminase (GOT) which is Asparatate amino Transferase (AST) and enzyme Glutamic Pyruvic Trasaminase (GPT) which is Alanine amino Transferase (ALT) in serum is measured by using equipment of ready- appreciation (Kit) which equipped from the French company BIOLABO SA, with following the instructions that supplied with appreciation equipment, where the principle of work depends on the following interactions.

$$\text{L- Aspartate} + \alpha - \text{Ketoglutarate} \xrightarrow{\textbf{AST}} \text{oxaloacetate} + \text{L- glutamate}$$

$$\text{L- Alanine} + \alpha - \text{Ketoglutarate} \xrightarrow{\textbf{ALT}} \text{pyruvate} + \text{L- glutamate}$$

**[41]**

Then measured the pyruvate and oxaloacetate that formed on derivative form called 2,4 dinitrophenylhydrazine , and the method completion as follows, The researchers attended two tubes and put in the first tube (1 ml) of GOT Substeare Reagent 1 and put in the second tube (1 ml) of GPT Substeare Reagent 2 , and then placed the tubes in the incubator at 37 ° C for 5 minutes then add to the tubes (0.2 ml) of blood serum and begins to shock the pipes for the purpose of mixing their contents well and returned the pipes to the incubator at 37 ° C for one hour to the tube containing GOT and for a period of half hour to the tube which container on a GPT, after the end of the lap time was added to each tube (1 ml) of Dinitrophenylhydrazine Reagent 3, and then shock each the

tube for the purpose of mixing their contents and then placed in the pipe holder for 20 minutes and at room temperature , then added to each tube (10 ml) NaoH normality 0.4 ,and shock the tubes well and then left for 15 minutes at room temperature, then was measured the absorption a contents of tube GOT and GPT by spectrophotometer at the wavelength 505 nm, after the reset the device on the Blank tube , and then compare the reading of device with a standard curve found with (Kit), the horizontal axis abscissas in this curve represents the number of units and the vertical axis represents the absorption or the percentage of transmission and when compare, we obtain the activity of enzymes which measured in IU / L.

**Measure the concentration of thyroid hormones T3 and T4**

Measuring the hormone T4: we measured the concentration of hormone T4 in serum samples by using equipment of ready-appreciation (Kit) is equipped from the French company BIOLABO SA, and using the ELISA technique, which adopted the Direct Sandwich principle to conduct this examination according to the following steps:

1-. Used the microtiter wells ELISA within the equipment (kit), has been used three groups of wells, which was coated with Anti T4 – antibody
2-. It's placed on the holder and learned and then divided into three groups ( group of Serum samples and a control group and standard samples ).
3- Added 50 cm3 from each of the test samples and 50 cm3 of control and 50 cm3 of Article standard for each set of wells.
4-. Added 100 cm3 of an associated detector enzyme in every well and mix the material for 10 seconds.
5-. Then incubated at a temperature of 25ºc for an hour.

6-. Then was emptying the contents of wells and washed five times with Distilled water. And dried well ,to get rid of the water droplets.
7-. Then added 200 cm3 of the standard solution in every well and moved quietly for mixing the contents
8-. Incubated at a temperature of 25ºc for 20 minutes.
9-.the interaction was stopped by adding 2N Hcl to each well
10- And then read the density at the wavelength 450 nm in a microtiter reader wells.
11-. After reading the results of absorption in the ELISA reader device was painted the standard curve on graph paper so that it uses the X- axis of the concentrations and the y-axis of the absorption

**Measuring hormone T3:**
It was measured hormone T3 level in the blood serum by following the steps which attached with equipment of ready-appreciation (Kit) for hormone T3, is equipped from the Biochech - Inc Company, and followed the same steps that used to measure the hormone T4, but the test strips was a special to hormone T3 and wells of dish ELISA was coated with Anti T3 - antibody.

**Statistical analysis :-**
Use statistical analysis program (SPSS) in the analysis of the results by using (One -Way ANOVA) and used **[12]** to test the significant differences.

## RESULTS AND DISCUSSION:-

**The level of glucose sugar:**
The results in Table (1) shows the existence of a significant decrease ($P < 0.05$) in the level of glucose sugar in blood serum of healthy rabbits, which treated with Alcoholic extract of Aloe

vera leaves (T2) compared with the level of glucose sugar in blood serum in animals of control treatment, where reaching the level of glucose sugar in blood serum of treated animals (T2) 73.75 mg / 100 ml, while the level of glucose sugar in blood serum of control animals (T1) 116 mg / 100 ml, and the result of this study agrees with the result of **[31]** which indicates to the effective impact of the Alcoholic extract of Aloe vera leaves in reducing the level of glucose sugar in the treated rats with this extract . the work of this extract can be explains as reducing the absorption of glucose in the intestines because it contains the Saponine which compound the slimy solution with water inside intestine and this delays the absorption of glucose by the intestines . and can also be caused as a result of containing the Alcoholic extract of *Aloe vera* leaves on the antioxidants, which stimulate the pancreas to secrete the insulin ,which resulting of it lowers the level of blood sugar in treated animals in this extract **[37] .**

Or through facilitating the entry process of glucose sugar to the cells in the peripheral tissues (muscle and fatty) **[15].**

Also the table, existence of significant decrease ($P < 0.05$) in the level of glucose sugar in blood of treatment animals (T5) (alloxan induced diabetic rabbits) and dosage with Alcoholic extract of *Aloe vera* leaves). and the animals of treatment (T4) (alloxan induced diabetic rabbits) and dosage with Insulin) comparison with the level of glucose sugar in the blood of treated animals (T3) infected by alloxan induced diabetic and left without treatment of Alcoholic extract of *Aloe vera* leaves or the insulin, and the result of this study have agrees with the study result of **[2].** Where mention in their study that the extract of cactus plant prevent the increase the level of blood sugar in rabbits which dosage with alloxan. Also the result of this study have agree with the study result of **[28]** where indicates to significant decrease in the level of glucose

sugar in blood plasma of diabetic rats which dosage with Alcoholic extract of *Aloe vera* leaves.

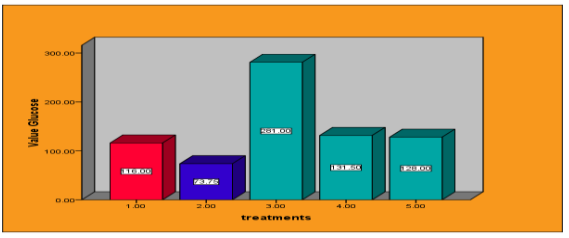
It can be attributed the reason for the low level of glucose sugar in blood of animals infected in diabetes who dosage with Alcoholic extract of Aloe vera leaves to contain the alcoholic extract on the anti oxidants materials such as (vitamin C, Flavonoids, Polyphenols, Vitamin E), also the extract contains on a group of inorganic elements such as ( Zn, Mn, Cr ), which operates as anti-oxidants materials where all these materials prevent the formation of free radicals and then reduce the damage was caused by Alloxan on the beta cells in the pancreas which is responsible for producing the insulin, which works to reduce blood sugar **[32; 9 ; 26].** and maybe the reason for the role of alkaloids which existent in Alcoholic extract of *Aloe vera* leaves, that have an important role in the inhibition of the process of transformation of glycogen into glucose sugar and this leads to reduction of the level of glucose sugar in blood of animal which treated with Alcoholic extract **[55].** while the reason for the low level of glucose sugar in blood of animal which treated with insulin , fact being that the insulin works to increase the rate of glucose entry into cells, through increasing the number of vectors of glucose in the plasma membrane and thus decrease its level in the blood **[20].** Also, the researchers explain the reason that the insulin works to increase the formation the enzymes which is responsible for the solution process to the glycogen , it's the (Pyruvate, Kinase and Phospho Fructo Kinase) as well as the inhibition of the enzymes which is responsible for the formation of glucose, and these (Pyruvate Carboxylase, Fructo-1,6-diphosphatase, Glucose -6- phosphatase) , [**30 ; 15].**

**Table (1) The effect of Alcoholic extract of *Aloe vera* leaves on the level of glucose In blood serum of rabbit (mg / 100 ml)**

| Treatments | The concentration of glucose sugar ± standard error |
|---|---|
| $T_1$ | 116.00 ± 3.62 c |
| $T_2$ | 73.75 ± 2.46 d |
| $T_3$ | 281.00 ± 5.50 a |
| $T_4$ | 131.50 ± 4.03 b |
| $T_5$ | 128.00 ± 4.43 b c |

The vertically different letters indicate a significant difference P <0.05)) between the averages of treatments $T_1$ (control treatment). $T_2$ (healthy rabbits and dosage with Alcoholic extract of *Aloe vera* leaves). $T_3$ (alloxan induced diabetic rabbits). $T_4$ (alloxan induced diabetic rabbits and dosage with Insulin). Treatment 5 (alloxan induced diabetic rabbits and dosage with Alcoholic extract of *Aloe vera* leave.

The scheme explain level of glucose in blood serum




## The level of the enzyme GOT and GPT:

The results of table (2) showed that the dosage of healthy rabbits with Alcoholic extract of *Aloe vera* leaves ( the rabbits in treatment T2) led to a significant decrease P <0.05 in the level of enzyme GOT and GPT in blood serum of this rabbit, where reach their levels into (21.69 ± 1.55) (18.92 ± 0.044) units / liter for both enzymes respectively, comparison with the level of these enzymes in blood serum of the rabbits in the control treatment (T1), which amounted to (27.62 ± 0.40) (23.38 ± 0.54) units / liter of both enzymes respectively. and can be attributed the reason for the decline in the effectiveness of enzymes GOT and GPT in blood serum to these rabbits to the

presence some of the antioxidants materials such as (Filavonat, vitamin E and vitamin C), these antioxidants work to reduce the damages which resulted from the severe oxidative, by raising the level of anti-oxidation glutathione (GSH), which affects the level of enzymes GOT and GPT and works to reduce it [19]. While the results in the table (2) show the existence of a significant increase( $P < 0.05$)) in the level of enzymes of GOT and GPT in blood serum of the rabbits in treatment T3 (alloxan induced diabetic rabbits) comparison with the level of these enzymes in blood serum of remnant rabbits of treatments, including treatment of the control, where the level of these enzymes in blood serum of the rabbits in this treatment it reached to (76.82 ± 1.78) (44.28 ± 0.53) units / liter for each of the enzymes GOT and GPT respectively. This result agrees with the result of [39] where he pointed to the existence the clear relationship between the level of the enzymes GOT and GPT and the level of sugar in blood, whenever rise the level of sugar in blood occur a rise in the effectiveness of these enzymes. May be the reason of increasing the level of effectiveness of these enzymes to the disruption of the process of metabolism to the nutrients because of create the alloxan diabetic, where the alloxan works to increase the metabolism process of liver cells and the resultant increase of the effectiveness of liver enzymes (GOT and GPT). can be attributed the reason of increase the level of effectiveness of these enzymes to enlarge the liver cells and stimulate the endoplasmic reticulum to produce larger quantities of enzymes commensurate with the size of the cell **[13].** The cause may be the result of oxidative severe and be free radicals and what resultant for it necrosis and crash the liver cells, causing leakage of enzymes into the bloodstream and sometimes result from the forming of free radical, damage the liver tissue and this leads to the loss of the receptor the enzymes on the epithelial cells lining the bile duct , and around the central pot,

which resulting of it increased liberation of enzymes to outside the cells **[19].**

While the results have showed in the table (2) obtain a significant decrease P <0.05)) in the effectiveness of the enzymes GOT and GPT in blood serum of the rabbits in treatment T4 (alloxan induced diabetic rabbits and dosage with Insulin), and also in blood serum of the rabbits in treatment T5 (alloxan induced diabetic rabbits that dosage with Alcoholic extract of Aloe vera leaves). As the levels of this enzymes reaches into (28.28 ± 0.61 ) and (23.51 ± 0.38) units / liter in the blood serum of animals in T4 treatment , and that the levels of the enzymes GPT and GOT in the blood serum of animals in T5 treatment reaches into (27.83 ± 0.50) and (23.46 ± 0.53) units / liter for each GPT, GOT) respectively, comparison with the levels of this enzymes in the blood serum of the animals in T3 treatment (alloxan induced diabetic rabbits ), where the level of these enzymes in these treatment is (76.82 ± 1.78) and ( 44.28 ± 0.53) units / liter for each of the enzymes GPT, GOT respectively. can be attributed the reason for the low level of effectiveness of these enzymes in the blood serum of rabbits in T4 treatment to the role of insulin, as the insulin works to reduce the level of blood sugar and stimulate the liver and muscle cells to absorb more of sugar and reduces the secretion of sugar from the liver into the blood and enhances fat build through the energy expend process of grease, thus reducing the damage caused by high sugar on the liver and this makes the liver is functioning normally, leading to reduced levels of these enzymes in the blood **[5].**

Perhaps the reason for the low level of enzymatically GPT, GOT in the blood serum of rabbits in T5 treatment (alloxan induced diabetic rabbits that dosage with Alcoholic extract of Aloe vera leaves). to the role of some antioxidant materials which found in the extract such as Filavonat and vitamin E which consider one of the antioxidants which found

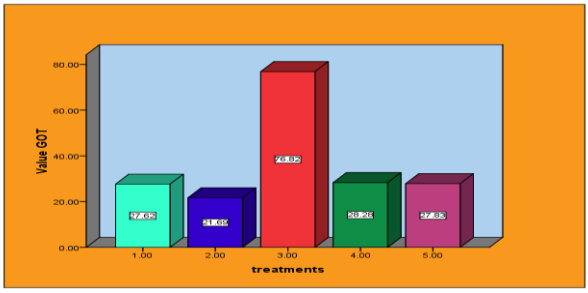
in the cell membranes and it has an important role in fat protection in the cell wall from damage of the peroxides because is locality in the lipophilic parts within the cell membranes and fatty proteins, and because the enzymes GPT, GOT spread in abundance in the tissue so the walls crash of the tissue and cells, particularly the rich organs in these enzymes such as liver may lead to increase the effectiveness of these enzymes in blood serum or plasma **[1].** Therefore this extract, leads to an increased level of antioxidants in the blood and then into the cell membranes, which maintains on the integrity from the damage of peroxides that cause a change in the composition and function of this membranes and thus reduce the infiltration of this Enzymes outside cells and result the reducing levels in the blood serum.

**Table (2) The effect of Alcoholic extract of *Aloe vera* leaves at the level of GOT and GPT enzymes In blood serum of rabbits**

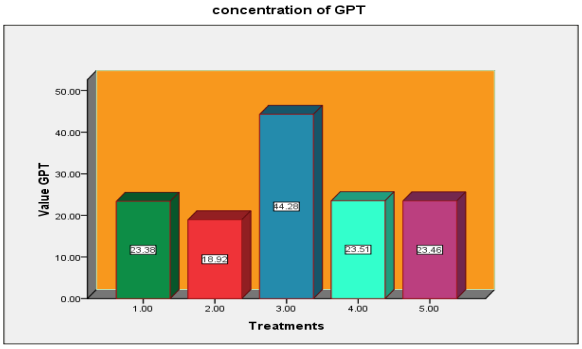
| **Treatments** | **The concentration of enzyme GOT and GPT ± standard error** | |
|---|---|---|
| | GPT IU/ L | GOT IU / L |
| **$T_1$** | 23.38 ± 0.054 $^b$ | 27.62 ± 0.40 $^b$ |
| **$T_2$** | 18.92 ± 0.044 $^c$ | 21.69 ± 0.15 $^c$ |
| **$T_3$** | 44.28 ± 0.053 $^a$ | 76.82 ± 0.17 $^a$ |
| **$T_4$** | 23.51 ± 0.038 $^b$ | 28.28 ± 0.06 $^b$ |
| **$T_5$** | 23.46 ± 0.053 $^b$ | 27.83 ± 0.05 $^b$ |

The vertically different letters indicate a significant difference P <0.05)) between the averages of treatments. $T_1$ (control treatment). $T_2$ ( healthy rabbits and dosage with Alcoholic extract of *Aloe vera* leaves). $T_3$ (alloxan induced diabetic rabbits). $T_4$ (alloxan induced diabetic rabbits and dosage with Insulin). Treatment 5 (alloxan induced diabetic rabbits and dosage with Alcoholic extract of *Aloe vera* leaves).

The scheme explain concentration of GOT in blood serum




The scheme explain concentration of GPT in blood serum




**The concentration of thyroid hormones (T3 and T4):**

The results of current study show significant decrease ($P < 0.05$) in hormonal concentration of T3 and T4 in the blood serum of the rabbits in treatment T3 (alloxan induced diabetic rabbits) compared with their concentration in the blood serum in rest the treatments, including the control treatment , and this result is consistent with the result of **[7].** That has been mentioned in occurrence of a significant decrease in the concentration of hormones T3 and T4 in blood serum of afflicted rats by diabetes that induced at alloxan. The cause of this decline has attributed to oxidation potential caused by alloxan which resulted in activation the epithelial cells of thyroid gland to produce hydrogen peroxide (H2O2) in the path of the bio-manufacturing of thyroid hormones, and

which depend on it as donor to the thyroperoxidase enzyme (TPO) ,where this enzyme is an important factor in the oxidation of ion iodide, which causes the high poison to hydrogen peroxide, therefore should be remain sufficient level to complete the process of making the thyroid hormones, which works through of containing the thyroid on the enzymes that working as anti-oxidation, such as Catalase enzyme and dismutase enzyme. But when there is a diseases infection resulted in a rise in the Oxidation potential such as diabetes, which leads to an increase the Roots Free, which lies outside the control of anti-oxidant enzymes which causes a stop of the oxidation process of ion iodide by preventing the formation of Thyroperoxidase, and thereby disrupting the manufacturing process of thyroid hormones and decrease the levels of these hormones in blood **[35].** The reason for the decrease the concentration of hormones can be attributed T3 and T4 to the presence the inhibitors to the hormones receptors correlation process or due to the dysfunction of the cells of the hypothalamus, which is reflected on the function of the thyroid in the case of increase the level of glucose sugar in the blood **[47].**

The results in table (3) indicate the existence of significant increase ($P < 0.05$) in the concentration of hormones T3 and T4 in the blood serum of healthy rabbits in treatment (T2) ( (healthy rabbits and dosage with Alcoholic extract of Aloe vera leaves), where reached their concentration ($1.74 \pm 0.71$) and ($79.18 \pm 0.52$) nmol / L for each of the enzymes T3 and T4, respectively, compared with their concentration in blood serum of the rabbits of the control treatment (T1 ), which amounted to ($1.42 \pm 0.12$) and ($77.24 \pm 0.23$) nmol / L respectively. And can explain the reason for the high concentration of these hormones to the presence of some active compounds in extract of Aloe vera leaves, such as the Saponin and Filavonat which play an important role in regulating the

secretion of the thyroid gland, the **[17]** they point to the substance Saponin which is existed in some medicinal plants working on inhibition of fat oxidation process which leads to stimulate the work of the thyroid in the excretion of hormones, as the Filavonat it works to reduce the Oxidation potential and helps to produce the glutathione ( GSH) , who works on the reduction of free radicals and thus their increase in the thyroid, where providing adequate iodine to the thyroid's work **[51].**

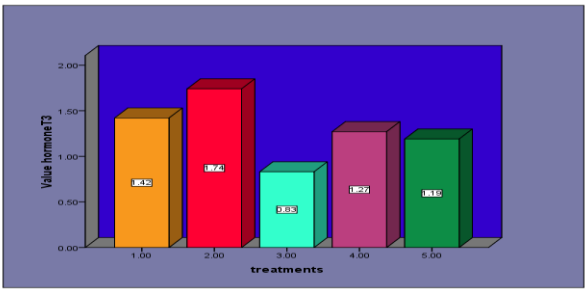
The results in table (3) also indicate the occurrence of significant increase ($P < 0.05$) in hormones concentration of T3 and T4 in blood serum of the treatments animals (T4) ((alloxan induced diabetic rabbits and dosage with Insulin) and treatments animals (T5)(alloxan induced diabetic rabbits and dosage with Alcoholic extract of Aloe vera leaves). Where the concentrations of these hormones recorded the following values (1.27 ± 0.49) and (70.88 ± 0.34) nmol / L in the treatment (T4) to hormones T3 and T4, respectively, and recorded (1.19 ± 0.13) and (70.91 ± 0.55) nmol / L in the treatment (T5) to hormones T3 and T4 respectively, compared with their concentrations in blood serum of treatments animals ( T3 ) (alloxan induced diabetic rabbits ), which amounted to 0.83 ± .0.12)) and (63.82 ± 0.34) for both hormones T3 and T4 respectively. And the reason for increase their concentration in the rabbits blood serum of the fourth and fifth treatment perhaps attributed to the role of active substances in alcoholic extract of cactus leaves in reducing the level of glucose sugar in the blood of these animals by stimulating the beta pancreatic cells on the secretion of insulin, as well as to the role of insulin, which dosage by it the animals in the fourth treatment (T4), the study of **[18]** pointes to the treating the patients that infected with diabetes by using insulin, lead to rise in the concentration of thyroid hormones T3 and T4 comparison with a concentration of these hormones before treating with insulin.

**Table (3) The effect of Alcoholic extract of *Aloe vera* leaves at the concentrationof $T_3$ and $T_4$ in blood serum of rabbits**

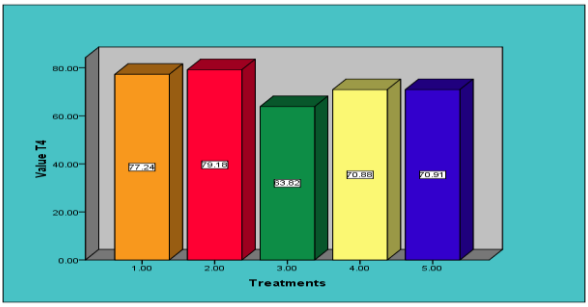
| Treatments | The concentration of hormones T3 and ± T4 standard error | |
|---|---|---|
| | $T_4$ nm /L | $T_3$ nm/ L |
| $T_1$ | 77.24 ± 0.22 b | 1.42 ± 0.12b |
| $T_2$ | 79.18 ± 0.52a | 1.74 ± 0.71 a |
| $T_3$ | 63.82 ± 0.34d | 0.83 ± 0.13 d |
| $T_4$ | 70.88 ± 0.35c | 1.27 ± 0.49 c |
| $T_5$ | 70.91 ± 0.54c | 1.19 ± 0.12 c |

Vertically different letters indicate a significant difference P <0.05)) between the averages of treatments $T_1$ (control treatment). $T_2$ (healthy rabbits and dosage with Alcoholic extract of *Aloe vera* leaves). $T_3$ (alloxan induced diabetic rabbits). $T_4$ (alloxan induced diabetic rabbits and dosage with Insulin). Treatment 5 (alloxan induced diabetic rabbits and dosage with Alcoholic extract of *Aloe vera* leaves) .

The scheme explain hormone concentration( $T_3$) in blood serum




The scheme explain hormone concentration( $T_4$) in blood serum



## REFERENCES :

1- Al- Darraji, H. J.; Hayani W. K. and Al-Hassani, A. S.. (2008). Blood physiology of birds, the Ministry of Higher Education and Scientific Research, the University of Baghdad, College of Agriculture.
2- Akinmoladun, A.C., O. Akinloye, 2007. Prevention of the onset of Hyperglycaemia by extracts of Aloe barbadensis in rabbits treated with alloxan. AJB., 6(8): 102.
3- Akinyele BO, Odiyi AC (2007). Comparative study of the vegetative morpholoREgy and the existing taxonomic status of *Aloe vera L.* J .Plant Sci. 2(5):558–563.
4- AL- Salmani, M.H. (2007) Study of metabolic effect of some drugs and medicinal Plants of Patients with diabetes mellitus. M. Sc thesis, college of Medicine, Al- Nahrain University .
5- Amin .A.; Lotfy, M and Adeghate, E (2007). The protective effect of *Tribulus terrestrs* in diabetes Aun. N. Y. Acad . Sc. 1084: 931- 940.
6- Anessiny, C. and Perez, C. (1993). Screening of Plants used in argentine folk medicine for antimicrobial activity. J. Ethno Pharmacol. 39(2): 199- 128.
7- Badyes,B.;Karagoz, S. and Meral, I.(2002) Effect of oral zinc and magnesium supplementation on Serum thyroid hormone and lipid levels in experimental induced diabetic rats. Biological Trace Element research. 88(3): 247- 253.
8- Biswas, T.K and Mukherjee, B. (2003) Plants medicines of Indian origin for wound healing activity. A review. Int. J. Low extreme – Wounds. 2(1):25-39.
9- Botes, L., H.F. Francois van der, H. Westhuizen, D.T. Loots, 2008. Phytochemical Contents and Antioxidant Capacities of Two Aloe great head ii var. davyana Extracts. Molecules, 13: 2169-2180.
10- Bruce, E.H (1992)Whole-leaf *Aloe vera*, almost a panacea. An overview of one of the most accepted, yet

misunderstood, Medicinal plants in history, aloevera @ wholeleaf.com.

11- Bunyapraphatsara, N.; Yongchaiyudha, S and Rungpitarangsi, V. (1996). Antidiabetic activity of *Aloe vera* juice, 11 Clinical trial in diabete mellitus patients in combination with glibenclamide phytomedicine, 3(3): 245 – 248.

12- Duncan, D.B. (1955). Multiple range and multiple F-test. Biometric, 11:1- 42 .

13- Ene, A.C.; Milala, M.A. and Nwankuo, E.A.(2006) The effect of different doses of black carway (*Carum carri* L.) oil on different liver enzymes of Alloxan- Induced diabetic rats. J. Med. Sc.6: 994- 998.

14- Grover ,J.; Yadav, S and Vats , V.(2002).Medicinal plants of India with anti- Diabetic potential. J. Ethnopharmacol. 8 (1): 81-100.

15- Hassan ,F. H ; Rahim ,S. M and Mohammed, A. K.amal (2006), the effect of some plant extracts in the level of blood sugar in healthy male rats and in diabetic rats. Kirkuk University magazine. Scientific studies. Volume (1). Number (1): 13-23.

16- Henderson, J.; Neithercut, W.D.; Spooner, R .J and Frier, B.M.(1988). Glycemic control and raised alanine aminotranferase activity in treated diabetes mellitus clin. Biochem , 21 (4): 245-257.

17- Ishii,Y. and Tanizawa, H.(2006) Effect of saponin on lipid peroxidation secretion of thyroid hormones. Biol. Pharma. Bulletin. 29(8): 1759-1763.

18- Islam, S.; Yesmine, S.; Khan, S.A. and Alam, N.H. (2008). A comparative study of thyroid hormone levels in diabetic and non diabetic patients . Clin diabetes .39(5): 913 -916.

19- Jagadeesan, G. and Kavitha, A.V. (2006) Recovery of Phosphatase and Transominase activity of mercury in toxicated *Mus musculus* L. Liver tissue by *Tribulus*

*terrestris* L. (Zygohyllaceae) extract. Tropical Biomed. 23(1): 45-51.

20- Kasuga, M.; Karlsson, F and Kahn, C. (1982). Insulin stimulates the phosphrylation of the 95000 dalton subunit of its own receptor . Science . 2(5): 185-187.

21- Khadke, V.V. and Mohotkar, A.L. (2001). Efficacy of Prazosin, enalapril and amlodipine in alloxan induced diabetic rabbits. Ind MED. 98(3): 91-103.

22- Kim, J. M.; Chung, J. Y.; lee, S.Y.; choi, E.W.; kim, M. K.; Hwang, C.Y. and Young, H.Y.(2006) Hypoglycemic effect of vanadium on alloxan monohydrate induced diabetic dogs. J.Vet. Sci.; 7:391-395.

23- Lakshmi,P.M.; Shanmugapriva, M. and Kornalies, J. (2013) The study on medical applications of *Aloe vera* and *Ficus benghalensis*. International Journal of Biopharmaceuties . 4 (2):123 -130.

24- Lee, CK, Han, SS, Mo, YK, Kim, RS, Chung, MH, Park, YI,Lee, SK and Kim, YS (1997). Prevention of ultraviolet radiation-induced suppression of accessory cell function of Langerhans cells by Aloe vera gel components. *Immunopharmacology* 37, pp. 153-162.

25- Lee, KY, Weinstraub, ST and Yu, BP (2000) Isolation and identification of a phenolic antioxidant from Aloe barbadensis..*Free Radic Biol Med* 28 , pp. 261-265.

26- Moghaddasi ,S.M and Verm , S.K.(2011) *Aloe vera* their chemicals composition and applications. Inter. J. of Biological and Medical Research. 2(1): 466 – 471.

27- Mohamed, A.E., A.F. Abdel-Aziz, E.M. El-Sherbiny, R.M. Mors, 2009. Anti- diabetic effect of aloe vera juice and evaluation of thyroid function in female diabetic rats. Bioscience Research, 6(1): 28-34.

28- Mohamed,E. A.K (2011) Antidiabetic antihypercholestermic and antioxidative effect of Aloe vera gel extract in alloxan

induced diabetic rats . Asutralian Journal of Basic and Applied Sciences, 5(1):1321 – 1327.

29- Muller, I.S.; Graw ,W. J.; Vangerwe, W. H.; Bartel, M.L.; Vandehoogen ,H.J. and Rutten, G.E. (2002) Foot ulceration and lower limb amputation in type 2 diabetes Patients induct Primary health care Diabetes care,25(3):570-574.

30- Murray, R.; Granner, D.; Mayes, P. and Rodwell, V. (2000) Harper's Biochemistry. 25 th ed. Appleton and longe Stamford, New York. PP: 863.

31- Noor, A., S. Gunasekaran, A.S. Manickam, M.A. Vijayalakshmi, (2008). Antidiabetic activity of Aloe vera and histology of organs in streptozotocin induced diabetic rats. Curr. Sci., 94(8): 25.

32- Nwaoguikpe, R.N., W. Braide, T.I.N. Ezejiofor,( 2010). The effect of *Aloe vera* plant (aloe barbadensis) extracts on sickle cell blood. African Journal of Food Science and Technology, 1(3): 058-063.

33- Okoko ,I.E.; Oluyemi, K.A and Okanlawon,A.A(2008)Effects of methanolic extract of *Aloe vera* seeds on estrous cycle, ovulation and body weight of adult cyclic in female albino mice. Inter. J. of Endocrinology. 7 : 3-6 .

34- Pecere, T., Gazzola, MV, Mucignat, C., Parolin, C., Vecchia, FD, Cavaggioni, A., Basso, G., Diaspro, A., Salvato, B., Carli, M. and Palu, G. (2000) Aloe-emodin is a new type of anticancer agent with Selective activity against neuroectodermal tumors. *Cancer Res* 60 , pp.2800-2804.

35- Poncin,S.; Gerand,A.; C. and Colin, I.M.(2007) Oxidative stress in the thyroid gland from harmless to hazard depending on the iodine content. Endocrinol. (1):424- 433.

36- Rabe, C., Musch, A., Schirmacher, P., Kruis, W. and Hoffmann, R. (2005) Acute hepatitis induced by an Aloe vera preparation: A case Report *World J Gastroenterol* 11 , pp. 303-304.

37- Rajasekaran, S.; Sivagnanam, K and Subramanian .(2005) Modulatory effect of *Aloe vera* leaf gelextract on oxidative stress in rats treated with streptozotocin J. pharm. pharmacal.

38- Rajagopal, K. and Sasikala,K.(2008)Antihyperglycemic and antihyper- lipidemic effects of *Nymphaea stellata* in alloxan induced diabetic rats .Singapore .Med. J.49:137-141.

39- Rao, G.M. ; Morghom, L.O. ; Kabur, M.N. ; Mohmud, B.M. and Ashibani, K. (1989) Serum glutamic oxaloacetic transaminase (GOT) and glutamic pyruvic Transaminase (GPT) levels in diabetes mellitus. Indian J. Med. Sci. 43(5):118- 121.

40- Rao. (2009). Antifertility effects of alcoholic seed extract of *Aloe vera* in female albino rats ; Acta– Eur- Fertil . 18 : 219 – 222.

41- Reitman, S., and S.Frankel, 1957. A colorimetric method for the determination of Serum glutamic oxaloacetic and glutamic pyruvic transaminases. Am. J. Clin. Path. 28: 56-63.

42- Rupali, A.M.; Shashikant, R.P.; Patil, R.Y.; Amruta, M.V.; Pallavi, S.P.; Utakarsh, D.G.; Jadhar, R.S. and Baheti, D.G. (2011). Need and scope of development of Aloe vera as remedy medicine for skin diseases. pharmacologynline , 1 : 602 – 616.

43- Saikat, D.; Sekahar, B.; Ranabir, S. and Subhash, M. (2008) Antidiabetic effect of matured fruits of *Diospyros peregrine* in alloxan induced diabetic rats. International journal of green pharmacy.2(2):95-99.

44- Saleem, R., Faizi, S., Siddiqui, BS, Ahmed, M., Hussain, SA, Qazi, A., Dar, A., Ahmad, SI, Qazi, MH, Akhtar, S. andHasnain, SN (2001). Hypotensive effect of chemical constituents from Aloe barbadensis. *Planta Med* 67 , pp. 757-760..

45- Sheetz, M.J., 2002. Molecular understanding of hyperglycemia as adverse effects for diabetic complications, J. Am. Med. Assoc., 288: 2579-2588.

46- Spencer. 1998. Aloe vera facts and fiction chronology of references ancient to present day. *copyright© 1998 GNI Commerce, Inc.*

47- Suzuki, Y.; Nanno, M.; Gemma, R.; Tanaka, I.; Taminato, T.and Yoshimi ,T.(1994)The mechanism of thyroid hormone abnormalities in patients with diabetes mellitus. Nippon Naibunpi Gakkai Zqsshi..70(4): 465 – 470.

48- Tessema, D.; Belete, Y and Shilashi, B.(2014).Investigation of anti-bacterial and anti- oxidant activities of Aloe vera plant at Arba Minch ,Sothern Ethiopia. World Journal of pharmacy and pharmaceutical sciences. volume (4), Issue (01). 185-195.

49- Trinder, P.(1969) Determination of glucose by oxidase enzyme method Ann.Clin.Bioch. 6: 24-27.

50- Udiong,C.E.; Judoh,A.E. and Etukudoh, M.E. (2007) Evaluation of thyroid function in diabetes mellitus in calabar,Nigeria. Ind. J. Clin. Biochem. 22(2):74-78.

51- Upadhya,S.;Shanbhgg,K.K.;Suneetha,G.;Balachandra,N.M. and Upadhya ,S.(2004) A study of hypoglycemic and antioxidant activity of *Aegle marmelos* in alloxan induced diabetic rats. Indian J. Physiol. Pharmacol.48(4): 476-480.

52- Vahedi, G.; Taghavi ,M.; Maleki, A.K and Habibian ,R.(2011) The effect of *Aloe vera* extract on humoral and cellular immune response in rabbit. African Journal of Biotechnology Vol. 10(26): pp. 5225 – 5228.

53- Van Wyk, B-E, Van Oudtshoorn, B. and Gericke, N. (1997) Medicinal plants of South Africa p.40. Briza Publications, Pretoria.

54- Yakugaku, Z.(2003) Antiinflammatory constituents, aloesin and aloemannan in *Aloe* species and effects of tanshinon VI

in Salvia miltiorrhiza on heart. Article in Japanese. 123(7): 51732.

55- Zhang, S.J.; Qu, W.J. and Zhong, S.Y. (2006) Inhibitory effects of saponins from *Tribulus terrestris* on alpha-glucosidase in small intestine of rats .Zhongguo Zhong Yao. Za.Zhi.31 (11): 910-923.