

Evaluation of the effect of chamomile on salivary gland tissue in female diabetic rats

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Abstract

Chamomile is considered one of the most popular medicinal herbs that are used as an antioxidant, anti-inflammatory, and a mild astringent drug, as well as used to treat asthma and some respiratory diseases. This study was designed to evaluate the effect of chamomile extract on the histological composition of some types of salivary glands of female diabetic rats, as it was used in this experiment (40). An adult female of white rats and her average weight (200-250 gm) was divided into four groups and the groups were equal in number, as each group included (10 rats) as follows: Control group (G1) This group was given only standard diet and distilled water for the duration of the experiment. Group G2: where I dosed rats with aqueous extract of chamomile at a concentration of 10 mg / 100 ml distilled water.

Group G3: In this group, diabetes was developed by injecting alloxan at a concentration of 180 mg / kg in peritoneum. Group G4: where the rats were dosed with aqueous extract of chamomile at a concentration of 10 mg / 100 ml distilled water after diabetes was induced by injecting alloxan 180 mg / kg in periton, and after five weeks the animals were sacrificed, salivary glands extracted and preserved in formalin, then tissue sections were prepared, Histological sections taken from the salivary glands in this group are close in shape and arrangement With the control group, when examining the sections of the diabetic group, the results showed that there are many changes in their histological structure, there is a clear effect on the structure of the cells. In conclusion: chamomile has a preventive and therapeutic effect on the disorders caused by diabetes through its antioxidant and inflammatory effect.

Keywords: salivary glands, chamomile, alloxan.

Introduction:

The oral cavity is lined with the mucous membrane, where it is moistened by saliva that is secreted from the main and secondary salivary glands. Same types of cells (serous, mucinous and mixed) [1, 2 and 3].

The salivary glands play an important role in the function of the digestive system through the production of saliva, which has an important role in the digestive process, antibacterial, the function of water balance, swallowing, and preserving hard tooth tissues [4], and any defect in saliva secretion leads to dry mouth, mucosal disturbance and tooth decay [5], as for the histological composition of the salivary glands, it consists of vesicles or end-tube or spherical units connected by a series of branching channels similar to a cluster of grapes [6 and 7].

Chamomile is one of the medicinal plants that spread in many regions of the world and in Iraq it is found naturally in the northern regions, and it is considered one of the most used medicinal herbs since ancient times until the present time because it contains effective groups with broad effects as it is an antioxidant, infections, bacteria and fungi [8].and it is also used to treat gastrointestinal disorders, fever, infections, menstrual disorders, wounds and hemorrhoids [9 and 10].

it is also used in the form of a gargle to treat infections in the mucous membranes in the mouth [11] Diabetes is considered a dangerous disease, as the prolonged high blood sugar affects the body's organs, as it affects the nervous system, the kidneys, the retina of the eye, or heart disease. Among its effects on the mouth is that it causes periodontitis, tooth fall, and gingivitis [12 and 13] Diabetics suffer from dry mouth, i.e. a lack of saliva production [14].

Materials and methods:

The animals: 40 adult female rats were used and their average weight was (200-250 g). All rats were raised in the animal house of the College of Veterinary Medicine at the University of Qadisiyah and placed in standard conditions (14 hours of light and 10 hours of darkness) for the duration of the experiment and at temperature (20 - 21 ° C) and humidity (40%), where the rats were placed in clean and sterile plastic cages prepared for this purpose and provided with water and food for the duration of the experiment (which is 5 weeks).

Preparing the aqueous extract of chamomile:

After chamomile was obtained from a lawn in the local market, chamomile was ground into powder, then weighed 10 grams of chamomile powder and put it in a glass bowl and was soaked by adding 100 milliliters of boiling distilled water and left in a hot water bath for (30-60 minutes) with Stir it continuously, after which the extract is filtered using filter papers and kept in opaque and sealed glass containers until use.

Experience design: 40 adult female white rats were used and they were divided into four groups, each group includes 10 rats: - Group G1 (control): This group was given only standard diet and distilled water for the duration of the experiment. – Group(G2): where I dosed rats with aqueous extract of chamomile at a concentration of 10 mg / 100 ml distilled water. – Group(G3): In this group, diabetes was developed by

injecting alloxan at a concentration of 180 mg / kg in peritoneum. Group(G4): where I dosed rats with aqueous extract of chamomile at a concentration of 10 mg / 100 ml distilled water after diabetes was induced by injecting alloxan 180 mg / kg into peritoneum.

The histological study: After the experiment period of five weeks ended, all the animals were killed and the salivary glands extracted. They were preserved in a formalin solution at a concentration of 10%. Then the histological sections were prepared to study the changes and the tissue sections were prepared according to the method (15).

Results :

The results of the current study, and after examining the studied models, showed that there are three pairs of salivary glands in rats, which are the parotid glands, sublingual glands and submandibular glands. These glands produce serous saliva through the main output channels that connect the glandular bodies to the oral cavity. It can also be seen that rats have a duct. One that directs saliva to the oral cavity, as the results of the histological examination in the control group showed that the submandibular gland is closely related to the sublingual gland and is surrounded together by a capsule of connective tissue, where Figure [1] shows the submandibular gland that it is made up of cells and serous lining With pyramidal cells with central, round vesicular nuclei, the serous alveoli are separated by areas of connective tissue and contain a system of channels and large blood vessels. Striated ducts, granular ducts and channels divided between the dentures can also be observed. Muscle epithelial cells surrounding the denticles with the presence of multiple collagen fibers can also be observed. Figure [2] It shows the sublingual glands where the serous alveoli appear lined with cuboid cells with flat nuclei, most of which are serous alveoli, as can be observed etc. The muscular epithelial nodes surround the denticles, as can the striated ducts and blood vessels.



Figure (1): shows serous alveoli (A) surrounded by connective tissue (CT), blood vessels (BV), striated ducts (SD).

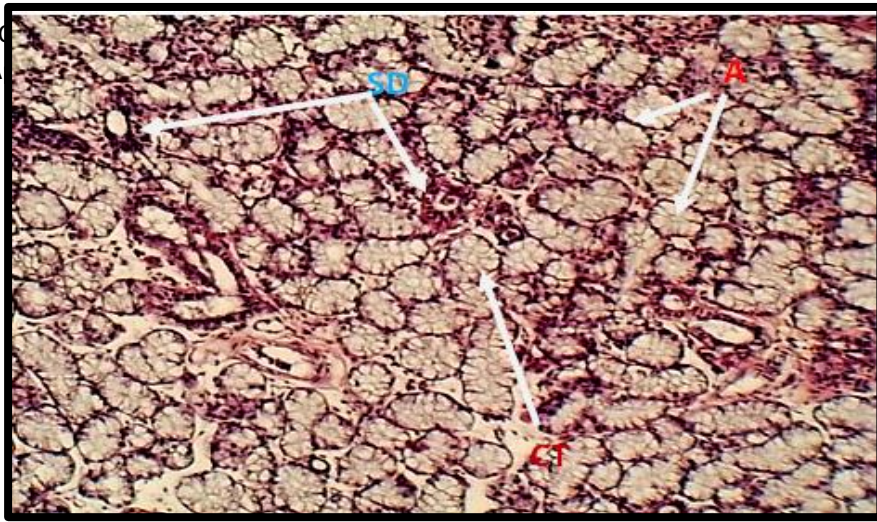


Figure (2): shows serous alveoli (A) surrounded by connective tissue (CT), striated channels (SD)

When examining the sections of the second group and treated with aqueous extract of chamomile at a concentration of 10 mg / 100 ml distilled water, no tissue abnormalities were shown with a good response to the aqueous extract of chamomile, as the histological examination of the submandibular gland and the sublingual gland of the female rats in this group showed it is made up of serous alveoli, which are visible and arranged regularly and separated by divided ducts. The channels can also be seen naturally. The cells lining the ligaments are clear and their nuclei are of different sizes with the observation of blood vessels. Thin embryonic fibers can be observed around the ducts. So through the examination it was noted that the histological structure Sections taken from the salivary glands in this group are close in shape and arranged with the control group (Fig. 3 and 4).

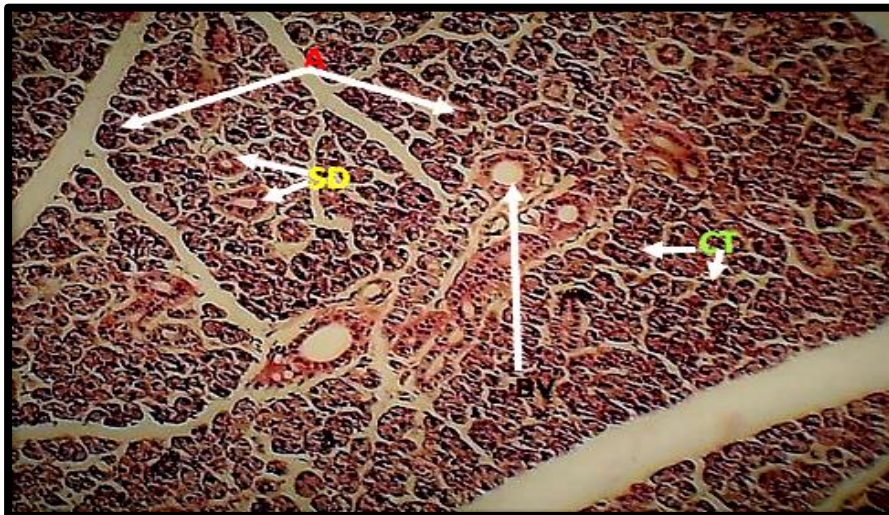


Figure (3): shows serous alveoli (A) surrounded by connective tissue (CT), blood vessels (BV), striated ducts (SD).

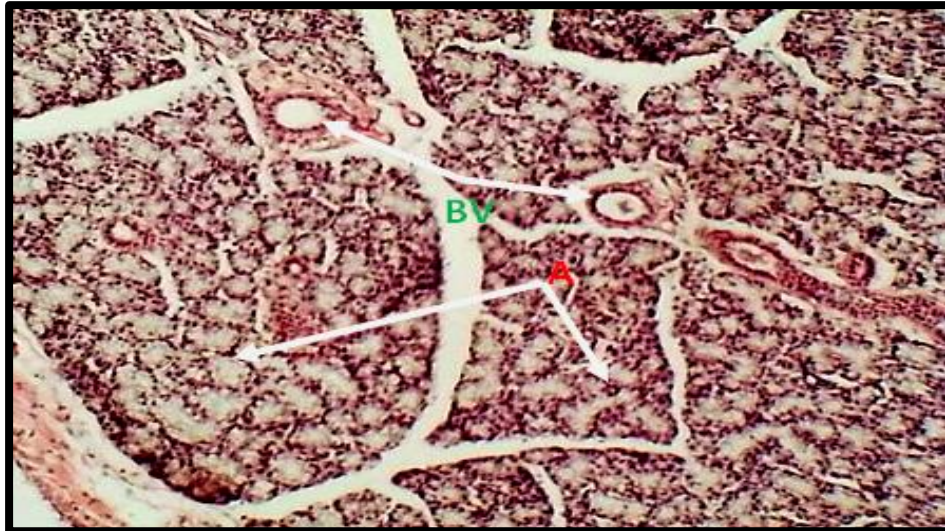


Figure (4): shows serous alveoli (A) surrounded by connective tissue (CT), blood vessels (BV).

When examining the sections of the third group, which was introduced to sugar in animals by injecting the substance of alloxan, the results showed that there are many changes in their tissue structure, there is a clear effect on the structure of the cells, secreted ducts and connective tissues surrounding them, in addition to the blood vessels, where an infiltration is observed in the connective tissue of inflammatory cells. It is also possible to notice an enlargement of the glandular cells and an increase in their size, as there are decomposing and dead cells, as well as an increase in the size of the striated ducts, while a decrease in the size of the granular ducts is observed (Figures 5 and 6).

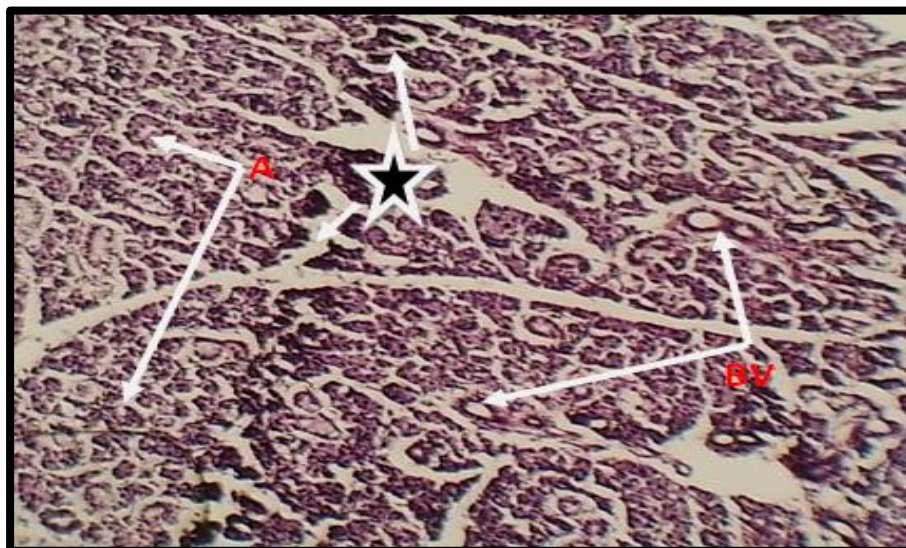


Figure (5): shows a change in the structure of the cells (A) and surrounding connective tissue, a change in blood vessels (BV), infiltration of connective tissue with inflammatory cells

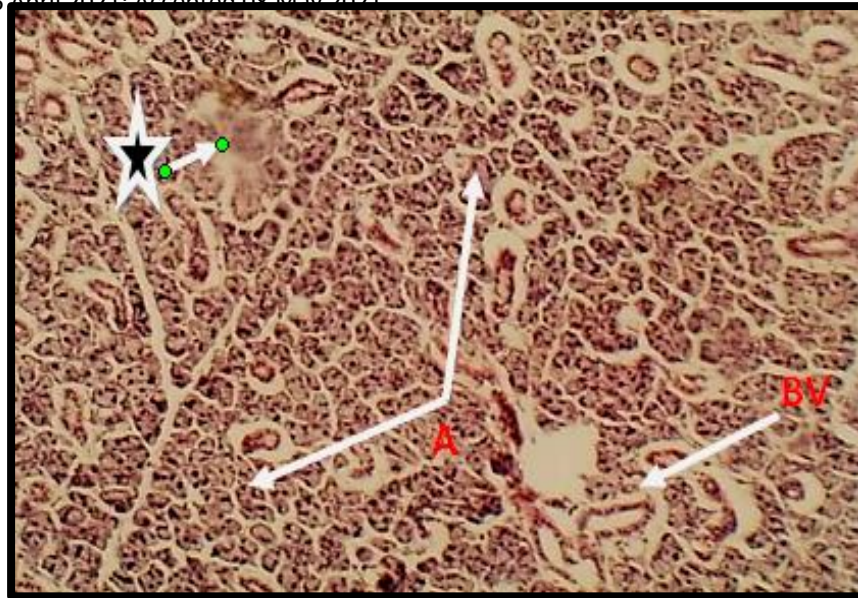


Figure (6): shows a change in the composition of the cells (A) and surrounding connective tissues, a change in blood vessels (BV), infiltration of connective tissue with inflammatory cells)

When examining the sections of the fourth group, which introduced diabetes, and then dosed with aqueous extract of chamomile at a concentration of 10 mg / 100 ml of distilled water, the results of the examination showed that despite the occurrence of many tissue changes as a result of diabetes in animals, as in the animals of the third group, the animals were dosed with aqueous chamomile extract, which It had a preventive and curative effect by viewing the Acinus serous, which are arranged and separated by divided channels. The channels can also be seen naturally, and the cells lining the ligaments are clear and their nuclei are of different sizes with observation of blood vessels (Fig. 7 and 8).

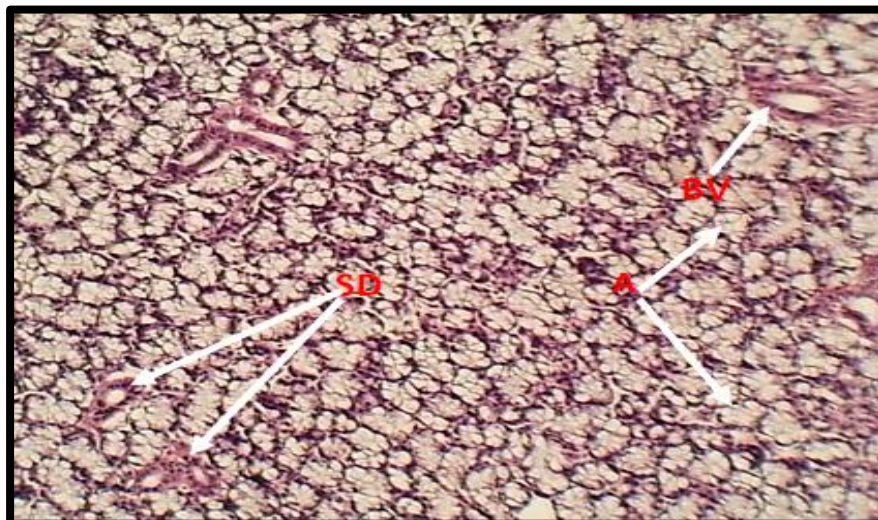


Figure (7): shows serous alveoli (A) surrounded by connective tissue (CT), vasculitis (BV), striated ducts (SD).

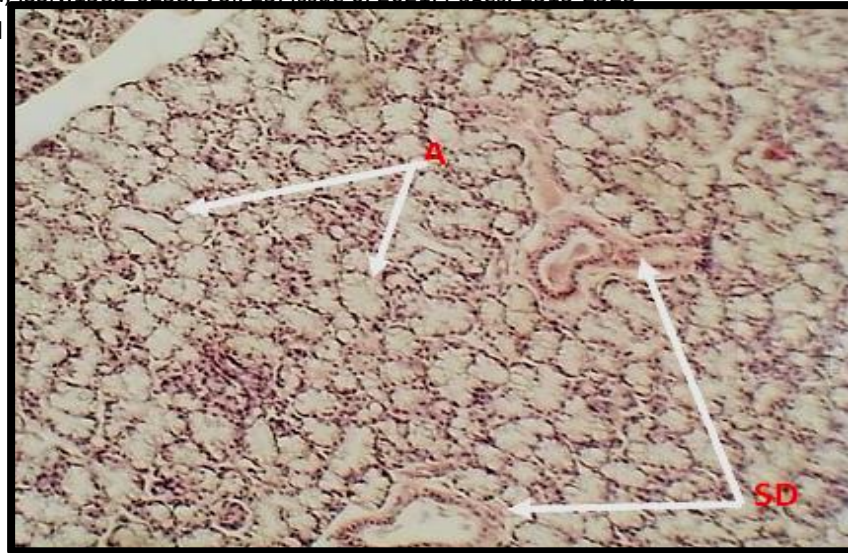


Figure (8): shows serous alveoli (A) surrounded by connective tissue (CT), striated channels (SD).

Discussion :

As a result of the close connection between the changes that occur in the salivary glands as a result of diabetes, this research was carried out to find out the changes that occur in the tissues of the salivary glands and the possibility of treating them with the use of chamomile. Digestive, gastritis, gastric colic, ulcers, and colon [8 and 10] Drinking aqueous extract of chamomile is also useful in treating kidney pain, burning urine, and cystitis [16 and 17]. As for the salivary glands, they are double glands that produce about 90% of saliva by the parotid and submandibular glands, while 10% of saliva is produced by the sublingual gland and the small salivary glands [18]. Also, saliva and salivary glands are important for oral and general health [19].

Where the current research results showed and after examining the histological sections of the salivary glands of the second group animals, which were dosed with aqueous extract of chamomile, so that there was a good response to the extract so that there were no noticeable tissue abnormalities or changes, and the reason for this is that chamomile has an antioxidant effect as it protects unsaturated fats The effect of free radicals in the cell membrane and then the cell as a whole is affected by the effect of free radicals because these compounds are related to several disease conditions, including infections, tumors and stomach ulcers [20 and 21], Chamomile also contains many active substances, including camazoline and matricin, and they have an anti-inflammatory effect, as they work to inhibit the enzyme cyclo oxygenase and lipo-oxygenins, which work on the production of leukotriene and methones (PGF2, PGD2), which work to stimulate inflammation [22], and it also contains Volatile oils, flavonoids, tannins, glycosides, and ions, which are substances that have therapeutic benefits as they are anti-bacteria and viruses, as they inhibit the growth of tumors and stimulate cells towards programmed death [23 and 24] and the current research result agrees with [25 and 26] .

When examining the tissue sections taken from the salivary glands of the third group diabetic animals, there were clear changes in the tissues of the salivary gland, which

were represented by a change in the structure of the cells, secreted ducts and connective tissues surrounding them, in addition to the blood vessels, where an infiltration of the connective tissue with inflammatory cells is observed. Glandular cells are enlarged and increased in size, and there are also decomposing and dead cells. The reason for this is that diabetes causes many changes in the salivary glands, as it affects the composition of the grapes and then affects the secretion of saliva [27] Whereas, when the blood sugar concentration increases, it causes pathological changes in the composition of the salivary glands, including the glandular cells and their secretory channels and connective tissues surrounding them in addition to the blood vessels and nerves and all these changes may cause a decrease and atrophy in the weight of the salivary gland and thus lose its effectiveness and function [28] or due to accumulation Protein substances secreted in the cytoplasm of the cell and thus cause gland enlargement and increase in size and increase of degenerative vacuoles (Vacuolar transformation) as with the emergence of these degenerations in the cell causes the death of the glandular Acinus cells and replaced by fibrous connective tissue [29]

Also, high blood sugar affects the salivary secretion, as a decrease in saliva secretion is observed, which leads to dry mouth and consequently to tooth decay and disturbances in the oral mucosa [30 and 31] and the current research results agree with [32 and 33]. When examining the histological sections taken from the salivary glands of the fourth group diabetic animals, and then they were dosed with aqueous extract of chamomile, a clear response to chamomile was observed and a clear improvement in the tissues of the salivary glands. [34]

The anti-fibrosis effect of chamomile has a relationship with antioxidants (35), and also has the ability to stimulate the regeneration of epithelial cells and relieve cell fibrosis caused by oxidative stress [36]. For bacteria and viruses, it also inhibits the growth of tumors and stimulates cells towards programmed death (23 and 24), and the current research results agree with (37 and 38).

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