Histopathological Study of the Thyroid Gland in The Rat Treated with Nano-Extract of the Fruits of the Ginger Plant

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Abstract
The current study was conducted in the animal house of the College of Education for Girls, University of Kufa, and the study aimed to know the effect of nano-extract (zinc oxide) of the fruits of the ginger plant on the histological composition of the thyroid gland in male rats Which ranged in age (8-9) weeks and weights (150-150) mg, which were divided into three groups, each group included 8 rats.(250 mg / kg) per day for 30 and 45 days. After the end of the first experiment (30 days), half of the number was sacrificed. After the end of the second experiment (45 days), the other half was sacrificed, and tissue sections of the thyroid gland were made It showed the normal structure of the thyroid gland and histological changes.
Keywords: thyroid gland; nano-extract; ginger plant

1. Introduction

The shape of the thyroid gland resembles the shape of a butterfly. It is located at the base of the neck below the Adam's apple on both sides of the trachea. It is a gland responsible for secreting many hormones that affect the production of Energy is in most cells and different organs of the body. It also controls metabolic processes and temperature regulation, as well as affects body weight, muscle expansion, energy level, and fertility, The thyroid gland consists of clusters of circular or oval follicles of different sizes. The space between the follicles is filled with connective tissue and blood vessels, in addition to a few lymphocytes and tissue cells. The thyroid follicle is lined with epithelial tissue consisting of single cells of cuboidal or columnar cells. The thyroid gland contains 100,000 follicles that vary in size. The larger follicles are located near the periphery of the gland, while the smaller ones are located in the middle of the gland (Friedlander,J.M.S. and Bauman,E.M.Ed.,2007)

The ginger plant is one of the most important medicinal plants that have been used extensively since a long time, as ginger was used as a treatment for many different diseases, in addition to its other uses as one of the common spices for food and drinks, due to its distinctive smell and taste. Before both the Chinese and the Indians, but at the present time, the uses of ginger have increased, and this is due to the reason for that because the ginger substance has many therapeutic properties, where the ginger extract was used as an antiemetic, as well as it proved therapeutic effectiveness against allergies and infections, and ginger showed a clear effect in reducing blood sugar levels(John , 1992)

Ginger is rich in the following active ingredients zingiberene و gingerols و shogaols و zingerone و paradol و6-gingerol as the presence of these substances in the chemical composition of the ginger plant gave it clear therapeutic efficacy(Govindarajan, 1982 ; Bahandari et al., 2005).

2. Material and Methods

Preparation of the alcoholic extract of the fruits of the ginger plant The methanolic extract was prepared according to the method (Chen et al., 2012) with some modifications. Nanoparticles (zinc oxide) were synthesized from ginger extract using the method (Upadhyaya et al., 2018) with some modifications.

This study was conducted on (18) adult rats of Rattus rattus, whose weight ranged between (150-180 g). The experiment was conducted in the animal house in the College of Education for Girls - University of Kufa. The animals were placed in plastic cages and the floor was covered with sawdust. The cages were clean. The animals were placed in the experimental stages under laboratory conditions in terms of ventilation and lighting: 12 hours of light: 12 hours of darkness, and a temperature of 22-28 °m and was given water and diet freely ad libitum throughout the stages of the experiment. The animals were presented to a veterinarian to ensure the safety of the animals before the start of the experiment.

The total number of the experiment was (48) rats. The animals were divided into three groups (n = 4). Injections under the skin for a month and a half, once a day. The first group includes (8) animals fed with water and diet only and is considered as the control group The second group was given zinc oxide at a concentration of (150 mg/kg) and the third group was given an alcoholic extract of the ginger plant at a concentration of (250 mg/kg).

After the end of the first experiment (30 days), the animals were sacrificed, and then the other half were sacrificed after the end of the experiment for a period of (45) days, where they were Where they were anesthetized by mixing Xylazine 20 mg and

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Ketamine 10 mg and injected, the anesthetized animals were placed on a dissection plate (cork) and fixed with staples to conduct the autopsy process to reveal the effects of of Zinc oxide with a concentration of (150 mg / kg), nano-extract with a concentration of (20 mg / kg), and an alcoholic extract with a concentration of (250 mg / kg) on the thyroid gland.

3. Results

The results of the microscopic examination showed that the control group did not find any effect on the texture and structure normal as in (Figure 1) while the group that was dosed with zinc oxide at a concentration of (150 mg / kg) for (30 and 45 days) as in (Figure 2) and (Figure 3) shows an increase in the spaces between the vesicles and the irregularity of the vesicles. As the results showed, the group that was dosed with alcoholic ginger extract at a concentration of (250 mg / kg) for a period of (30 days) shows (Figure 4) minor damage in the vesicles, but for a period of (45 days) as in (Figure 5) shows the expansion of the spaces between The vesicles, while the group that was dosed with nano-ginger extract at a concentration of (20 mg/kg) for a period of (30 days) as in (Figure 6) shows the normal structure of the tissue and there is no damage, as well as the group that was dosed (45) days and at the same concentration as in (Figure 7) shows the normal structure of the tissue and there is no Damage .

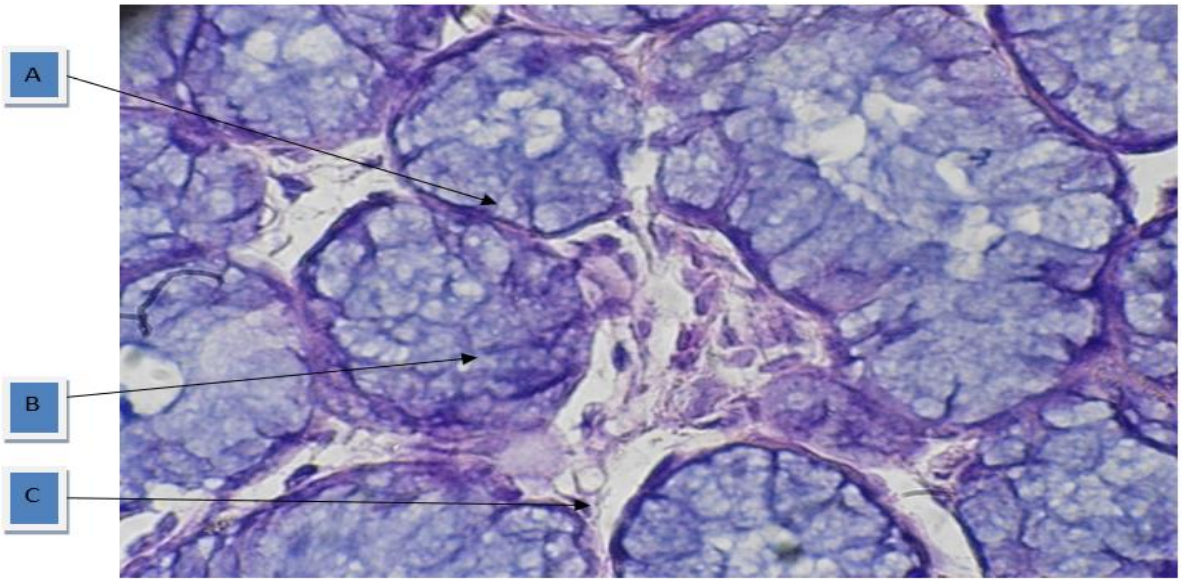

Figure (1): A cross-section of the Thyriod tissue in a white rat of a control group for 30 days showing the normal structure of the thyroid glandA- vesicle cells B- thyroid vesicle c- connective tissue (H&E stain) (400x)

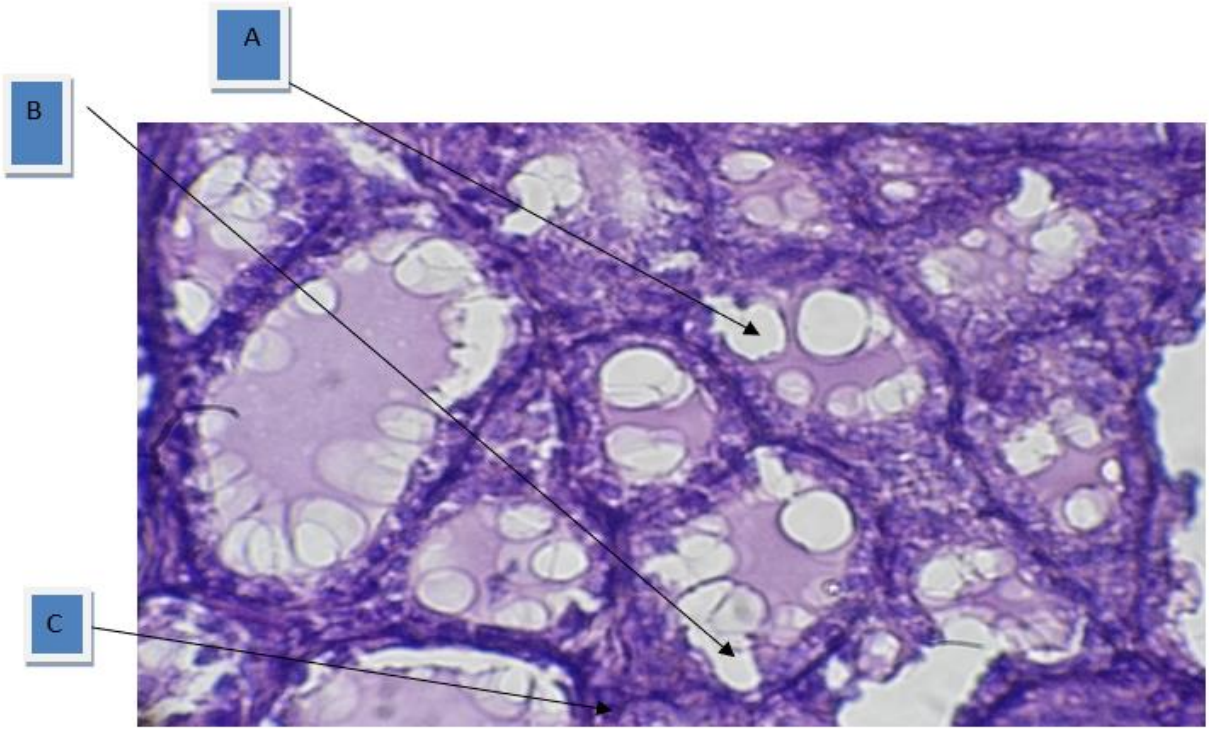

Figure (2): A cross-section of the Thyroid tissue of a rat in the group treated showing the absence of histological changesFactories with zinc oxide, at a concentration of (150 mg / kg) for a period of 30 days, showing an increase in the voids between the vesicles and the irregularity of the vesicles A- large interfollicular space B cuboidal follicular cell-C-blood vessle. (H&E stain) (400x)

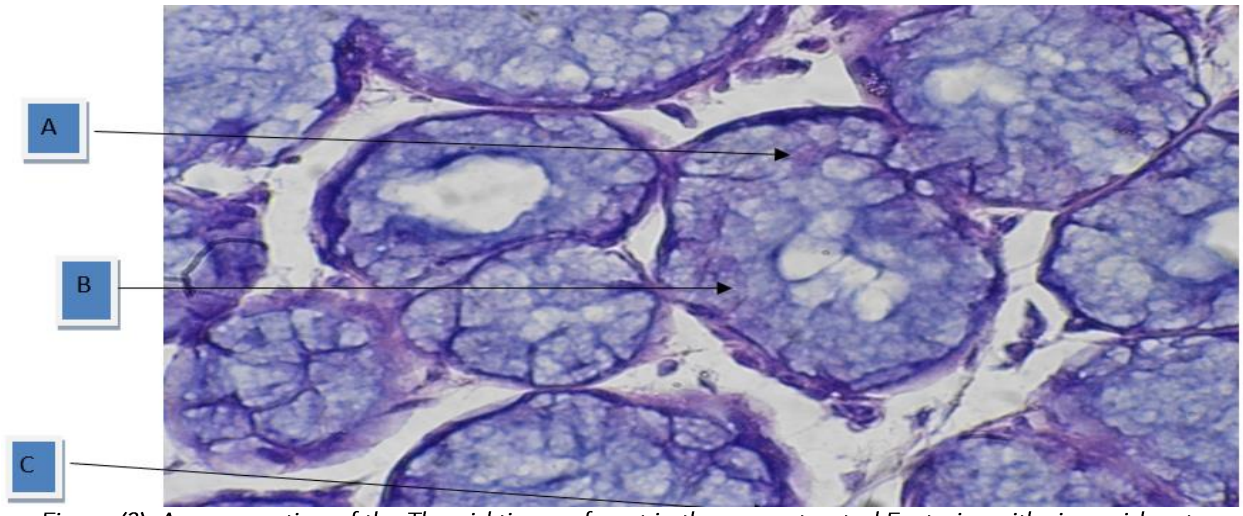

Figure (3): A cross-section of the Thyroid tissue of a rat in the group treated Factories with zinc oxide, at a concentration of (150 mg / kg) for a period of 45 days, showing an increase in the voids between the vesicles and the irregularity of the vesicles A- large interfollicular space B cuboidal follicular cell-C-blood vessle. (H&E stain) (400x)

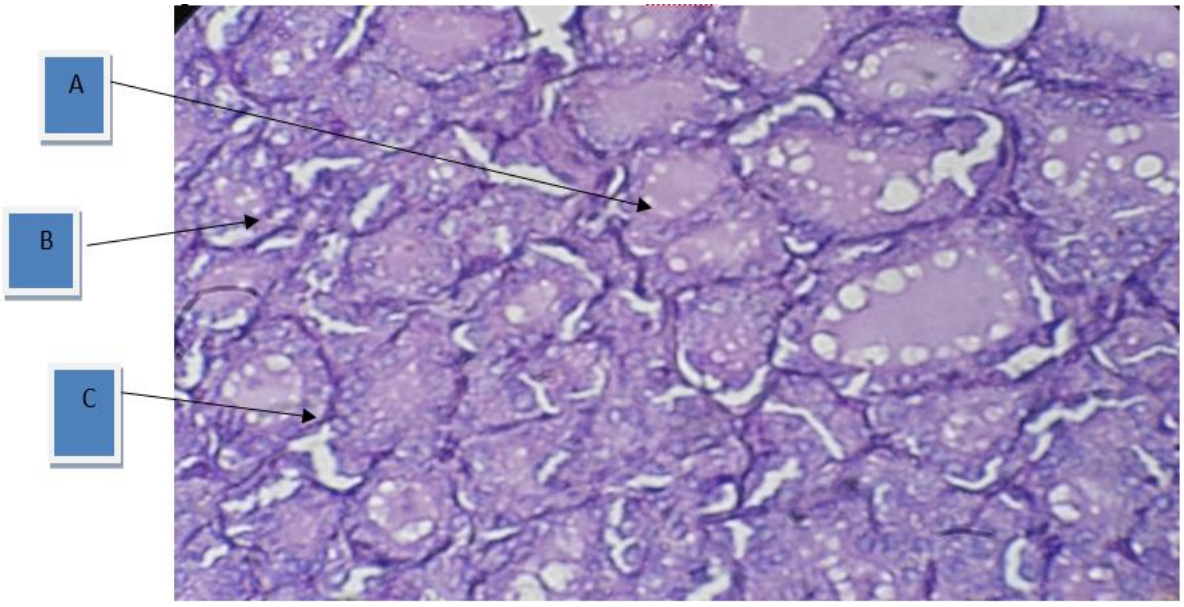

Figure (4): A cross-section of the Thyroid tissue of a rat in the group treated Factories with, alcoholic ginger extract at a concentration of (250 mg / kg) for a period of 30 days,showing minor damage in the vesicles A-vesicle cell B-connective tissue -C-blood vessle. (H&E stain) (400x)

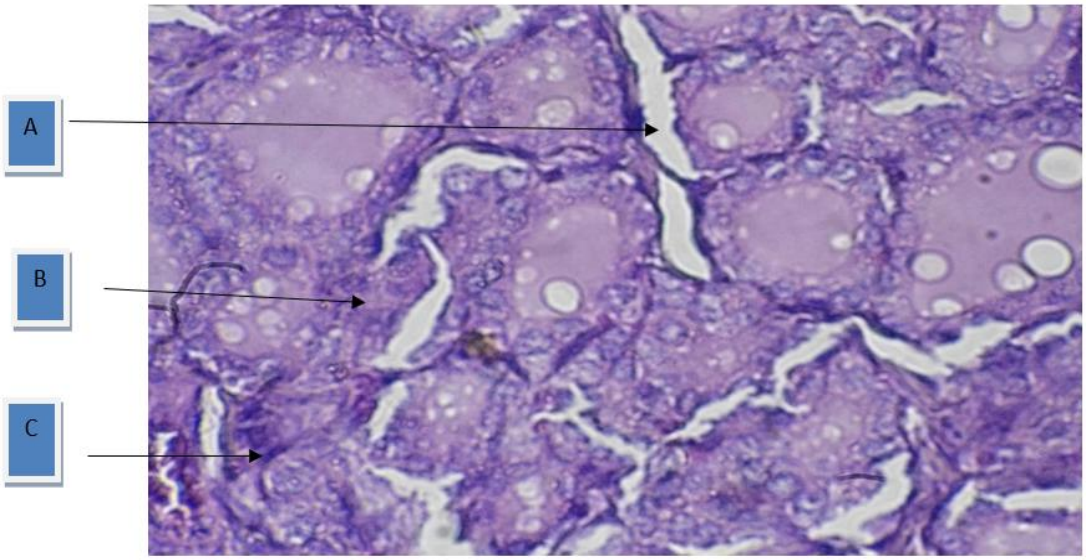

Figure (5): A cross-section of the Thyroid tissue of a rat in the group treated Factories with, alcoholic ginger extract at a concentration of (250 mg / kg) for a period of 45 days,showing shows the expansion of the spaces between The vesicles A- spaces between The vesicles B-connective tissue -C-blood vessle. (H&E stain) (400x)

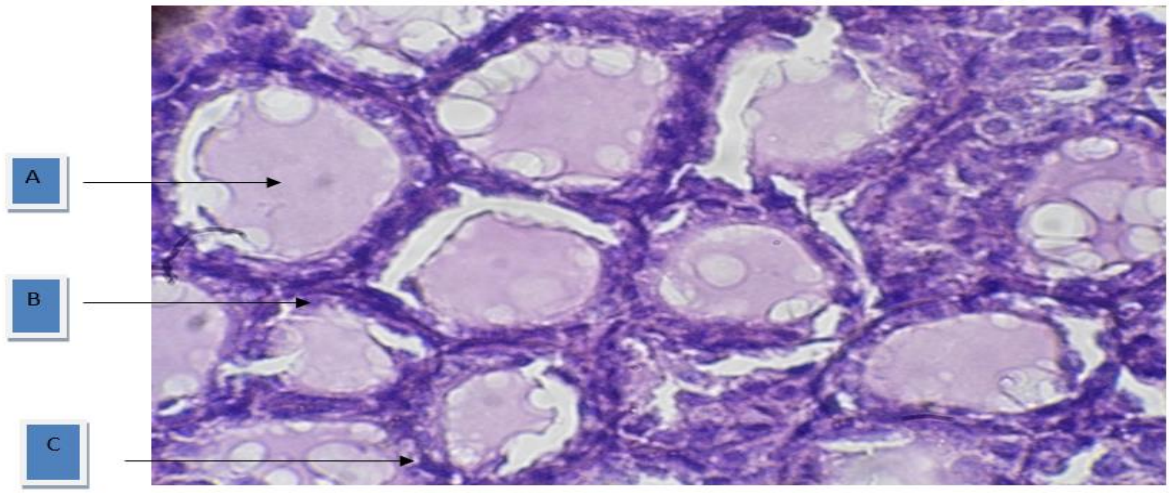

Figure (6): A cross-section of the Thyroid tissue of a rat in the group treated Factories with, nano-ginger extract at a concentration of (20 mg/kg) of (250 mg / kg) for a period of 30 days,showing The texture is natural and there are no changes A- thyroid vesicle B-connective tissue -C-blood vessle. (H&E stain) (400x).

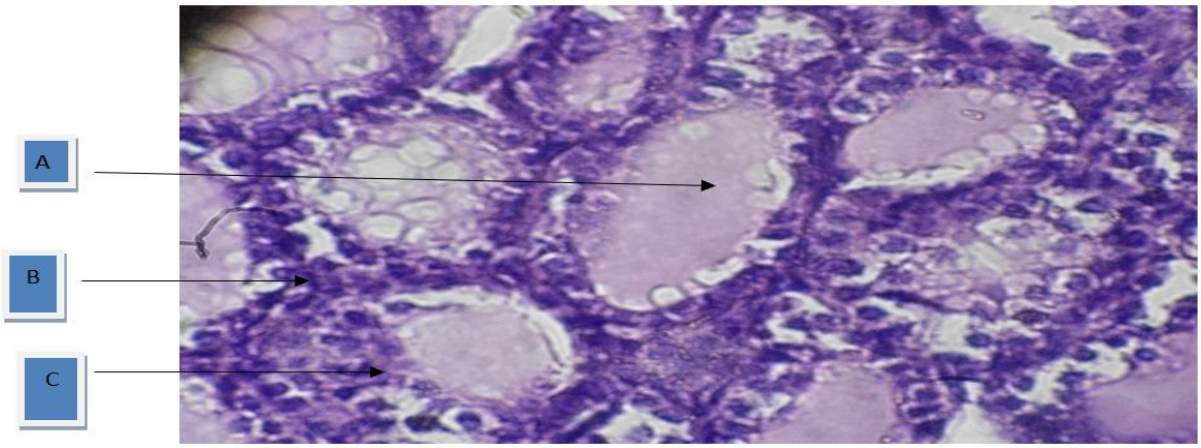

Figure (7): A cross-section of the Thyroid tissue of a rat in the group treated Factories with, nano-ginger extract at a concentration of (20 mg/kg) of (250 mg / kg) for a period of 30 days,showing The texture is natural and there are no changes A- thyroid vesicle B-connective tissue -C-blood vessle. (H&E stain) (400x).

4. Discussion

discussion of the results of the microscopic examination of the histological sections of the rat organs treated with nano-extract of the fruits of the ginger plant at a concentration of (20 mg / kg) and for the two periods (30 and 45 days). The study also showed that there was a significant decrease in body weight when the body was dosed with zinc oxide at a concentration of (150 mg / kg), and the longer the period, the greater the weight loss due to anorexia compared with the control group, and this agreed with the study (Al-Siraji 2018), where the decrease is due to poor digestion and the accumulation of particles nanoparticles within the gastrointestinal tract. The current study also agreed with the researcher Eid Mostafa and Hussein Hamid (2017) that the longer the dosage period with ginger aliho, the greater the damage to the alveoli and the expansion of the spaces between them.

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