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Effect of Olive (*Olea europaea* L.) Residues on Histological Structure of Some Organs in Awassi Sheep Lambs

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Abstract :

The study was carried out in postgraduates labs of Agriculture college/ Al-Muthanna University from 20 / 8 / 2022 to 20 / 1 / 2023 to investigated the effect of Olive (*Olea europaea* L.) Residues on the Histological alteration of Liver , Kidney and Heart structure and development in Awassi Sheep Lambs , in study were used 16 Awassi Lambs in 4 months age were brought from local farms and markets and placed in Agricultural experiments and researches station in animal field (3×4×2) meters pens for each group , the study lambs were divided for 4 groups (T1 control group , T2 5% Olive residues , T3 10% Olive residues and T4 15% Olive residues) and these lambs were submitted to hygienic examination and placed 2 weeks as preliminary Period before the experiment begin . The results were showed the normal appearance of Liver , Kidney and Heart structure in T1 , while in T2 , the results revealed mild pathological alterations in Liver , Kidney and Heart histological structure affected by toxic and knurled effect of Olive residues , while in T3 and T4 , the results revealed the Renovation and repair and regeneration effect of Olive residues and return the normal histological structure of Liver , Kidney and Heart . **The study concluded** that the Renovation , repair , regeneration and antioxidant effect of Olive residues in vital and sensitive organs of body .

Key Words : Olive , Residues , Histological , Awassi .

Introduction :

The Using of Medicinal plants are increasingly recognized worldwide as an alternative source of efficacious and inexpensive medications to Several synthetic chemotherapeutic compound and high proportion of the world's population rely on plants for their primary Health care (Al-Yasery *et al.*,2017) . The most important active substances in these plants are alkaloids, tannins, terpernoids, glycosides, phenolics, saponins, flavonoids, quinines, lectins and polypeptides (Cai *et al*., 2015) (Isidori *et al*., 2013) . An interesting trend has emerged in pharmaceutical development since the late

1990s , namely a return tonature as a source of potential drugs (Xiao *et al*., 2017). The olive (*Olea europaea* L.) belongs to the plant family Oleaceae and is anevergreen shrub that produces the olive fruit . The olive shrub can grow up to 15 m tall and matures slowly but can live for hundreds of years (Habibi *et al*., 2015) . The olive (*Olea europaea* L.) is a widely-distributed plant that originated in the Mediterranean region . Its fruit is commonly used to produce olive oil, table olives, and other by-products (Petersen *et al*., 2018) . The main nutrient of the olive fruit is fat, predominantly mono-unsaturated fatty acids (MUFA) as described by (Shariati *et al*., 2015) . Olives are also rich in carbohydrates, vitamins, and minerals. Increasing numbers of investigations show that the health benefits of the 'Mediterranean diet' are associated with lower incidences of chronic degenerative diseases and higher life expectancy (Vijaimohan *et al*., 2012) . The Olive benefits have been attributed to dietary consumption of olive . Furthermore, epidemiological data suggest that phenolic components and other antioxidants in olive are responsible for some of these benefits (Ward *et al*., 2016) . Minor components play significant roles in reducing the incidences of atherosclerosis, cardiovascular disease, neurodegenerative diseases and types of cancer (Omogbad *et al*., 2016) . We reviewed the main olive products and the nutritional composition of olive oil focusing on fatty acids, phenolic compounds, and other antioxidants (Esson *et al*., 2013) . We also discuss the chief chemical constituents relevant to the biological activity of olive , the metabolism and bioavailability of olive oil phenolic compounds, and the antioxidant activity of metabolites. Finally, we outline recent advances, potential applications, and limitations of developments in the olive oil industry, aiming to provide a theoretical basis for further research and to broaden the prospect of its application to healthy diets (Aizam *et al*., 2018) . The Olive residue were considers as a non-benefit residues of oil industry and can be used in the farm animals nutrition in ration due to containing the high level of energy and several nutritional requirements for maintenance and growth (Al- Gubory *et al*., 2011) .

Materials and Methods :

The animals and samples :

The study was carried out in postgraduates labs of Agriculture college/ Al-Muthanna University from 20 / 8 / 2022 to 20 / 1 / 2023 to investigated the effect of Olive (*Olea europaea* L.) Residues on the Histological alteration of Liver , Kidney and Heart structure and development in Awassi Sheep Lambs , in study were used 16 Awassi weaning Lambs in 4 months age were brought from local farms and markets and placed in Agricultural experiments and researches station in animal field (3×4×2) meters adjacent and separated clans or pens for each group , the study lambs were divided for 4 groups (T1

control group , T2 5% Olive residues , T3 10% Olive residues and T4 15% Olive residues as 4 lambs for each group) and these lambs were submitted to hygienic examination and placed 2 weeks as preliminary Period before the experiment begin . The study lambs were fed on a mixture of concentrated feed unified for all treatments consisting of a group of feed materials (barley groats + wheat bran + salt). The lambs were fed collectively according to the groups on the available green alfalfa fodder. The sheds were equipped with metal salt molds for the duration of the experiment, and the water was provided freely depending on the tap water . After the experiment period ended , the lambs were slaughtered and the organs Liver , Kidney and Heart were extracted and cleared from adhesions and impurities , the samples (1 cm) were taken from the studied organs , then were saved in fixative formalin 10 % until the histological technique begins .

The Histological technique :

In histological technique , the saved and fixed 1 cm samples in formalin 10 % were washed for 5 minutes in tap water to remove the fixative effect , then making the steps of routine histological technique which include dehydration by serial of progressive concentrations of ethanol (50% - 100%) , the clearing by using zaylene , infiltration by using paraffin wax path embedding by paraffin wax blocks , sectioning by using Rotary Microtome to thin 6-7 micrometer plates which placed in water path and then placed in glass slides to become ready to staining by using the (Hematoxline - Eosine stain for general structure , PAS stain for connective tissue in liver) then slides become ready to examined by microscope by making Calibration curve for each focus by using Ocular and Stag micrometer and photographed by digital camera Genex (Luna , 1968 ; Bancroft and Gamble , 2008).

Results and Discussion :

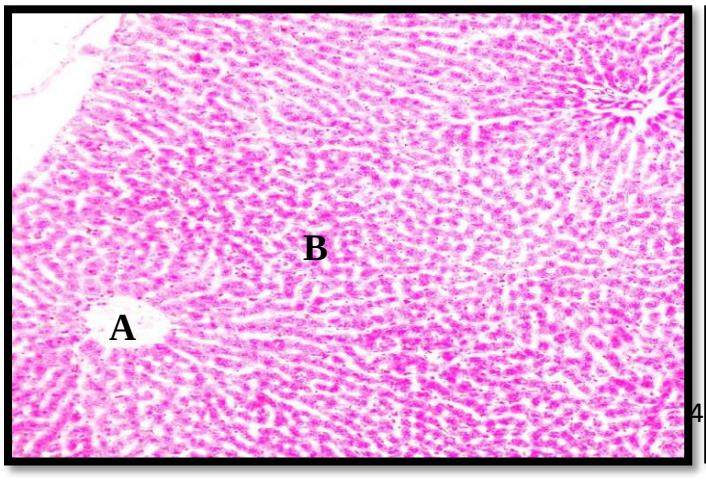
The Histological Structure of Liver , Kidney and Heart in T1:

Histological results of these study showed that fine structure of liver in T1 (Control group) in Fig (1) which consist from connective tissue of liver parenchyma divided the liver into thousands of small liver lobules which are structural and functional units of liver. Lobule is surrounded by portal tracts . Portal vein ramifications in portal tracts give off series of branches between adjacent portal tracts which in turn give rise to sinusoids draining blood towards center of lobule . The hepatocyte is polygonal cell with central nucleus and arranged in plates one cell thick with sinusoid on either side with radial arrangement in the center of lobule. Fenestrated endothelial cells line sinusoids. Kupffer cells which are mononuclear phagocyte system, bulge out on luminal side of sinusoids. The portal tracts at lobulary

periphery are composed of connective tissue, encases branches of hepatic artery, portal vein, bile duct and lymphatics .

While the results showed histological structure of kidney Fig (2) which consider highly vascularized tubular glands . Each kidney is surrounded by capsule of connective tissue which contain distinct layer of smooth muscle . Both cortex and medullary regions of kidney are formed principally of numerous, closely packed, uriniferous tubules . Cortex and medulla are arranged into renal pyramids which have in apex a renal papilla. Cortex contain groups of radially tubules form pars radiata (cortical or medullary rays) consisting of collecting tubules and straight portions of nephrons. The nephrons consist of glomerulus , renal corpuscle , loop of Henle , ascending and descending numerous proximal and distal convoluted tubules. The proximal convoluted tubules are longer than the distal and comprise the major portion of cortex. Proximal convoluted tubules are distinguished by the brush borders of their epithelial cells . The epithelial cells of collecting tubules are cuboidal in distal tubules to columnar in papilla.

While the results showed histological structure of heart Fig (3) which is muscular organ whose wall is composed of an endocardium, myocardium, and epicardium . The thickness and composition of the wall vary, being thickest in ventricles and thinnest in atria. The middle layer of cardiac muscle, the myocardium, predominates . Valves of connective tissue covered by endothelium, are extensions of the endocardium. Regions of the heart, including the base of aorta and pulmonary trunk, as well as the atrioventricular orifices and septum are supported by cardiac skeleton which consist form dense irregular connective tissue, fibrocartilage, hyaline cartilage or bone . A small amount of fluid occurs in the pericardial cavity between the epicardium (visceral pericardium) and parietal pericardium . The histological description of the Liver , Kidney and Heart tissues in our study were similar to the normal structure of these organ which described by (Al–Samarrae *et al*., 2000) in camel and (Banks , 2005) and (Marty et al., 2016) and (Mclaughlin et al., 2014)



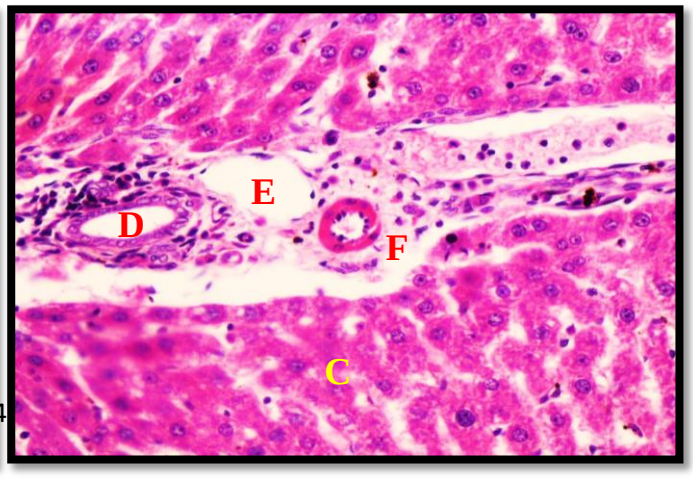
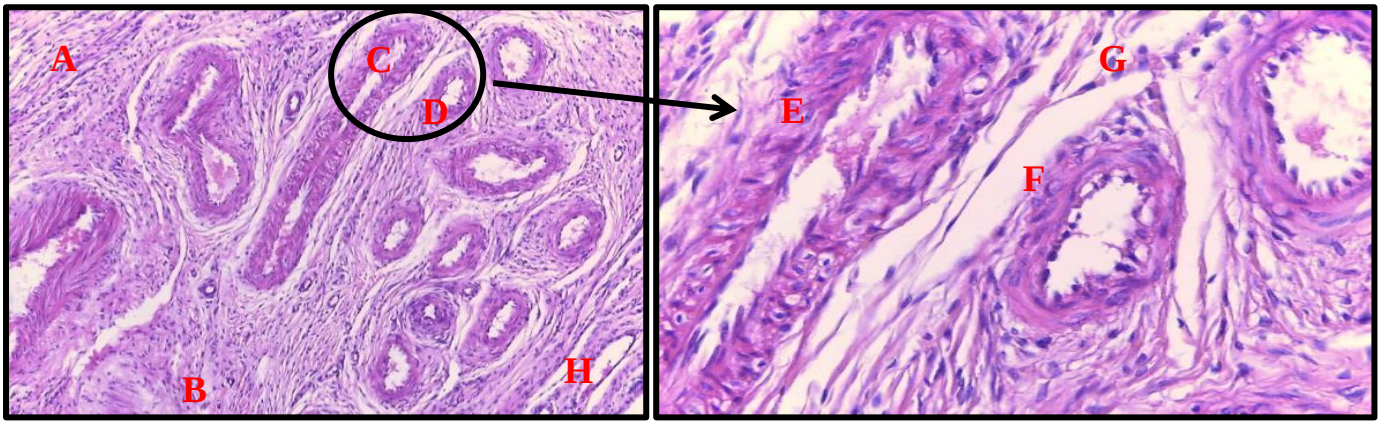


Figure (1) cross section of Lambs liver of Control group show : A) portal area , B) Hepatic Sinusoids , C) hepatocytes , D) Bile duct , E) portal vein F) hepatic artery. H & E stain, 400X.



Figure(2) cross section of Lambs Kidney of Control group show : A) Cortex , B) Medulla , C) Proximal Convoluted Tubule , D) Distal Convoluted Tubule , E) brush borders , F) Cuboidal Epithelium , G) Mesengial , H) Collecting Tubules . H & E stain, 400X.

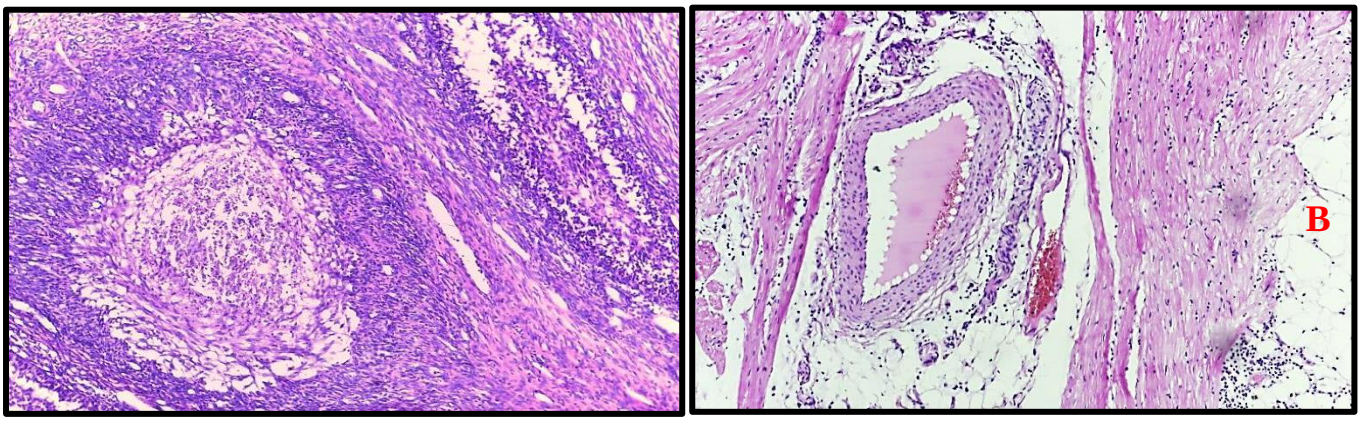


Figure (3) cross section of Lambs Heart of Control group show : A- portal B- hepatocytes C- Hepatic Sinusoids D- central vein E- portal vein F- hepatic artery. H & E stain, 400X.

The Histological Structure of Liver , Kidney and Heart in T2 , T3 and T4 :

The Histological results of these study **in T2 (5% Olive residues)** in liver tissue appeared some mild pathological alterations such as Polar parenchyma , Portal triad is heavily infiltrated by inflammatory cells and dilated central vein , inflammatory cells and dilated central vein , Edema of hepatic parenchyma , while the histological structure of kidneys revealed mild pathological alterations such as extensive infiltration of lymphatic cells and edema and congestion and fibrosis , while the histological structure of heart appeared mild increase in myocardium thickness and irregular tunica intima and tunica media Fig (4) , the appearance of mild pathological alterations in tissues of liver , kidney and heart in T2 due to the toxic and knurled effect of Olive residues on sensitive tissues as described by (Pennisi *et al.*, 2017) or to the Immunological and phagocytic role of vital organs in body to Olive residues effect as described by (Rohan *et al.*, 2020) or the sensitive and fine structure of vital liver , kidney and heart organs in body and affected by any active substances in Olive residues as described by (Brandiz *et al.*, 2019) .

While the histological results in **T3 (10% Olive residues)** and **T4 (15% Olive residues)** in liver structure showed the improving the radiation and arrangement of hepatocytes and sinusoids , regeneration in liver parenchyma and lobules and portal area and lymphatics . From other hand , kidney structure revealed disappear of infiltration and congestion and fibrosis and regeneration of glomerulus and convoluted tubules appearance . while the Heart structure revealed returned the myocardium thickness , tunica intima and tunica media to normal form and regeneration in heart structure Fig (4) , the appearance of return of normal composition and regeneration in liver , kidney and heart structure may belong to protective effect of Olive residues in vital organs as described by (Steerd *et al.*, 2017) or the effect of medicinal plants for Renovation and repair of sensitive and affected tissues as described by (Al-Yasery *et al.*, 2016) and (Al-Yasery *et al.*, 2019) or the evidence is combine to demonstrate that olive residue is remarkably rich in effective phenolic antioxidants that could provide protection by inhibiting oxidative damage as described by (Owen *et al.*, 2017)

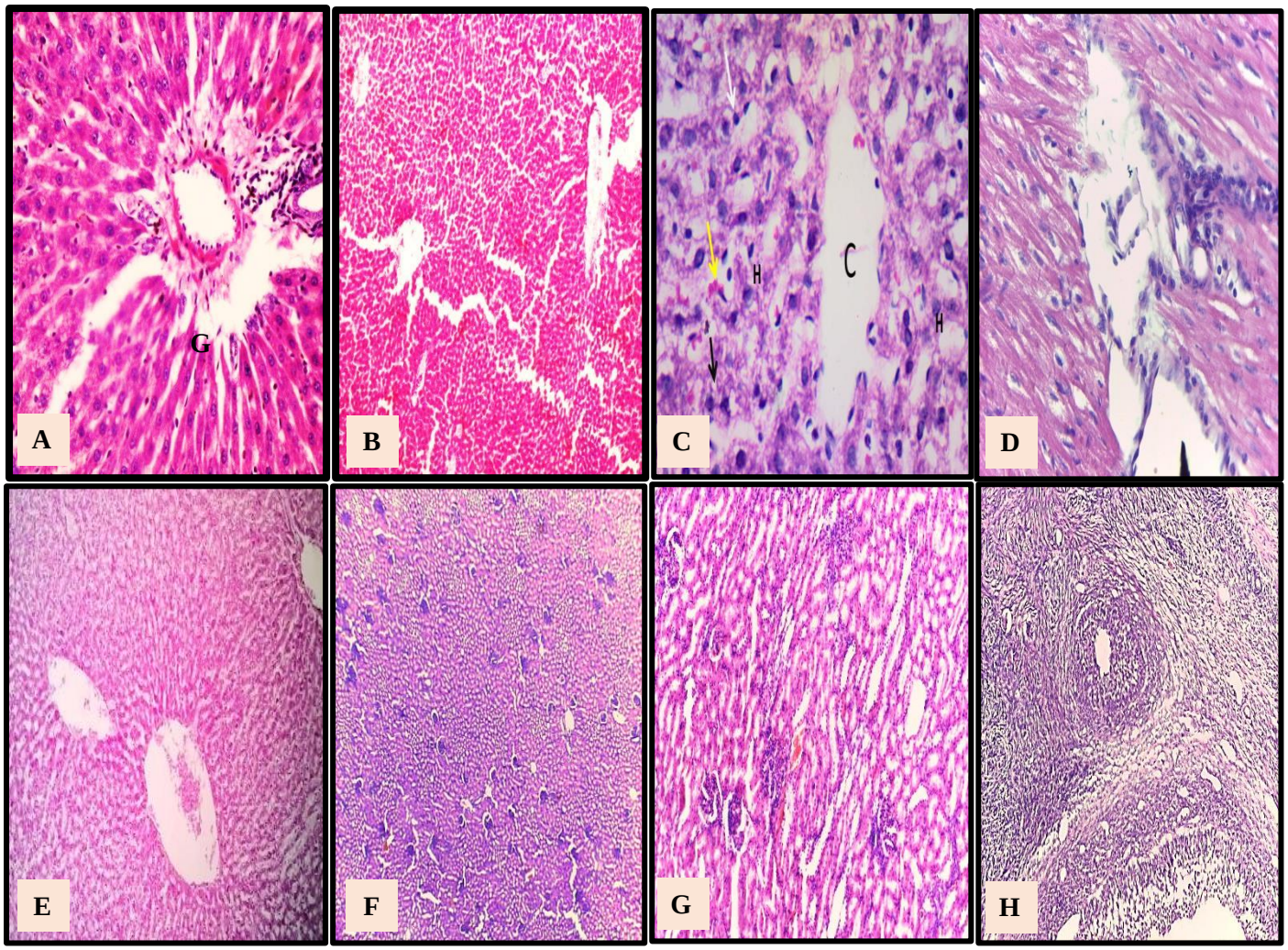


Figure (4) cross section of Lambs Liver , Kidney and Heart of Treated groups show : A) and B) Liver tissue of T2 , C) Kidney tissue of T2 , D) Heart tissue of T2 , E) Liver tissue of T3 and T4 , F) and G)Kidney Tissue of T3 and T4 , H) Heart tissue of T3 and T4 . H & E stain, 400X.

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