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As JOBAH Editorial Office, we are deeply saddened by the devastating earthquakes happened in Kahramanmaraş on 6 February. We wish mercy from Allah for those who lost their lives in this disaster that affected a wide area, and we wish a quick recovery to the injuries. We extend our best wishes to all citizens of the region.

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Health Services Vocational Collage

Investigation of The Effect of Electron Irradiation on Al-Omic/Graphene (F3O4) Device

Yılmaz Sahin[1]

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Abstract

This study reports the electrical properties of Al-omic/Graphene (F3O4) devices due to electron radiation. The sample was exposed to 9, 12 and 15 MeV electron irradiations. The sample was exposed to the same radiation dose at different energies. It was observed that the experimental ideality factor also increased with increasing energy levels. It was observed that the I-V curves were distorted. Here, the distortion of the I-V curves is attributed to the change in the device's surface or interface state distribution. Some basic diode parameters such as ideality factor (n), barrier height (Fb) and series resistance (Rs) were calculated from I-V measurements using of Thermionic Emission and Cheung function. The increase in series resistance by electron radiation irradiation was attributed to the decrease in active doping densities.

Keywords: Electron, irradiation, diode, electronic, properties

Introduction

F. Braun first detected the rectification property of metal-semiconductor contacts in 1874. The first metal-semiconductor diodes made were point contact diodes. These structures were first used as frequency converters and microwave detectors. These diodes were not mechanically reliable and could not be reproduced. Therefore, it has left its place to diodes formed by coating a thin metal film layer on a semiconductor surface. Since the metal layer formed on the semiconductor creates an obstacle at its interface, some metal/semiconductor structures show rectifying properties. Metal-semiconductor contacts are also called "Schottky contacts" since Schottky was the first to develop the model for this barrier formed between metal-semiconductors. Mott, on the other hand, proposed a different model for this obstacle. According to this model, In the metal neighborhood of the semiconductor, there is a thin layer devoid of emitters. In this layer, the electric field will remain constant, and the potential will change linearly. Studies on metal-semiconductor contacts gained intensity, especially in the 1960s. In these years, the construction of Schottky diodes has been the subject of many applications. Current conduction mechanisms and basic properties of metal-semiconductor and metal-insulator-semiconductor structures; (Sze 1969; Sharma 1980). A different method was developed by Cheung and Cheung (1986), which allows for obtaining the diode parameters in both ideal and non-ideal cases from the graphs drawn with the help of linear functions of current density. The ease of construction of Schottky contacts and the significant determinability of their characteristics make them widely used in the electronics industry. To make a circuit element suitable for the area in which it is used, the characteristic parameters of the semiconductor must be measured. The current transition mechanism depends on the ideality of the metal-semiconductor, and the current-voltage characteristic determines the ideality. An ideal diode has an ideality factor of 1. Changes in electronic characteristics cause devices to operate in different states. When such power devices work in aerospace, they will not always be directly exposed to cosmic rays, so the energy of the ions penetrating the machines will be variable. Therefore, examining changes in function when devices are under low-

energy irradiation is essential (Wang et al., 2021)

Experimental

The current-voltage measurements of the Al-omic/Graphene (F_3O_4) junction devices have been carried out using KEITHLEY 487 Picoammeter/Voltage Source. The I–V characteristics of Al-omic/Graphene (F_3O_4) junction devices were measured in the temperature range of 80 K to 460 K.

The ideality factor (n) and the barrier height (*Φb*) from the *I–V* characteristics were calculated.

Calculation of ideality factor of diode used to experimental I-V measurement with Thermoionic Emission (TE) theory.

$$I = I_0\left[\exp\left(\frac{eV}{kT}\right)-1\right] \qquad (1)$$

Where, saturation current (I_0) is given by;

$$I_0 = AA^*T^2\exp\left(-\frac{e\Phi_b}{kT}\right) \qquad (2)$$

where *k* is Boltzmann constant, *n* is the ideality factor, which is a measure of the consistency of the diode to pure thermionic emission, e is the electron charge, *T* is the temperature in Kelvin, k is the Boltzmann constant, A^* is effective Richardson constant (112 A/K^2cm^2 for n-Si), *A* is effective diode area (*A*=0,00785 cm^2), and *Φb* is barrier height at zero bias, V is the bias voltage. The ideality factor is calculated according to the current transmission mechanism in the thermionic emission theory.

$$n = \frac{e}{kT}\frac{dV}{d(\ln I)} \qquad (3)$$

The ideality factor is a dimensionless parameter that indicates the deviation from the properties of the diode. This approximate value should be ‘1’ for an ideal diode. Value of the barrier height (BH) is determined as follows:

$$e\Phi_b = kT\ln\left(AA^*T^2/I_0\right) \qquad (4)$$

The I-V graph of the sample is shown in Figure 2.

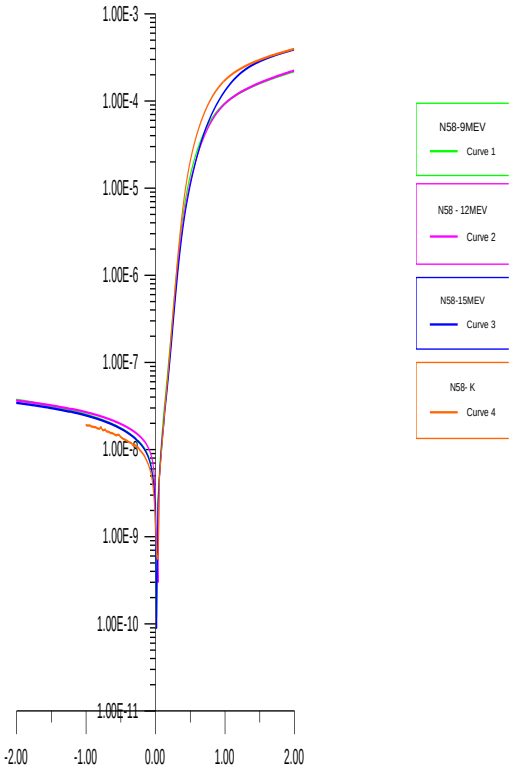

Figure 1 The current-voltage plots of Al-omic/Graphene (F_3O_4)

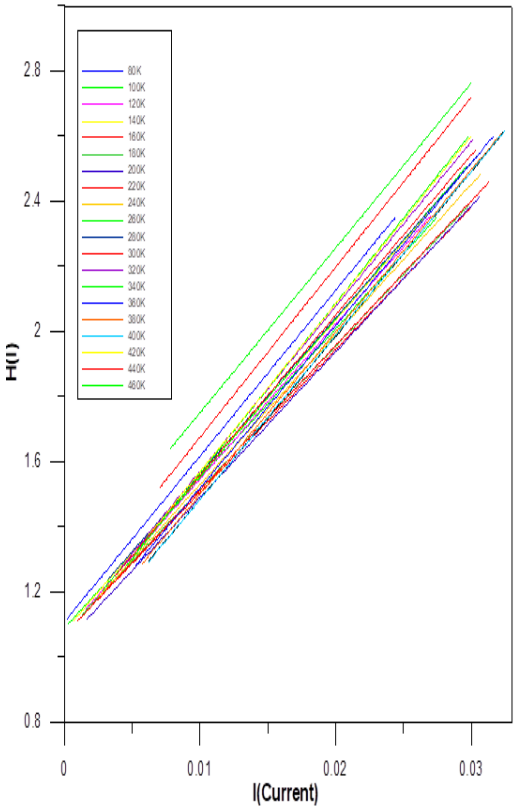

Figure 2 The plots of HI/(I) versus I obtained from forward bias currente voltage characteristics of the Al-omic/Graphene (F_3O_4) diode

The increase in series resistance can be explained by this decrease in carrier concentration (Aydoğan et al., 2011) (Vieira et al., 2021). It is seen that the Φb values obtained from the H(I)- (I) graphs first decrease and then increase depending on the irradiation in accordance with the values obtained from the I-V graphs.

Result and Discussion

The effect of electron radiation on the current-voltage characteristics of the Al-omic/Graphene (F_3O_4) device was investigated between varying energies of 9,12,15 MeV. It was found that the coupling parameters changed as a function of the irradiation dose. In general, the defects caused by electron radiation irradiation and the redistribution of organic layer interfaces have been considered as the reason why the junction parameters are dependent on irradiation. As a result, it has been seen that electron irradiation has a significant effect on the electronic properties and performance of Al-omic/Graphene (F_3O_4) device.

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Health Services Vocational Collage

Olive leaf extract (Olea europaea L.) Restores Liver Functions From Cadmium Induced Liver Injury

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Abstract

Cadmium (Cd) is a toxicant metal derived from horticultural and industrial sources. In recent work, we reported that olive leaf extract (Olea europaea L.) (OLE) restores liver functions from cadmium induced liver injury. Rats were pretreated with OLE and consecutively injected with CdCl2 (6.5 mg/kg) for 5 days. To evaluate liver function, alanine aminotransferase (ALT), aspartate aminotrans-ferase (AST) and γ-glutamyl transferase (GGT) were detected in the serum, total antioxidant (TAS) and total oxidative stress (TOS) statuses were established in the liver and expression of caspase 3 were determined for the antioxidative and anti-apoptotic effects of OLE. Tissue sections were also evaluated histopathologically. The results demonstrated that Cd exposure could induce release of reactive oxygen species generation, increase levels of TOS and decrease levels of TAS, upregulate mRNA levels of Caspase-3, and induce cell apoptosis. The extracts also prevented the Cd induced increase in AST and GGT levels. Furthermore, the changes of these indicators in OLE treated group was remarkable. The results indicated that exposure to Cd could induce oxidative stress and apoptosis.

Keywords

Cadmium, Olea europaea leaf extract, Caspase

Introduction

Heavy metals occur naturally in the environment but can be elevated through anthropogenic activities such as waste disposal, mining and sludge application (Lucia et al., 2010). Cadmium (Cd) is a pollutant for most human foods because it has a high soil-plant transmission rate, making diet a main source of contact (Satarug et al., 2005). Cadmium can have adverse effects on biota even at environmentally low concentrations (Sinkakarimi et al., 2015). Cd can markedly cause liver injury along its hepatoxic effects (Deniz and Geyikoglu, 2019).

Recently, natural foods and food-derived antioxidants, such as phenolic phytochemicals and vitamins have received considerable attention because they are known to function as chemopreventive agents against oxidative damages (Pérez-Bonilla et al., 2006).

Previous studies have shown that natural antioxidants such as curcumin (Yang et al., 2019), Punica granatum flowers extract (Deniz and Geyikoglu, 2019), grape seed extract (Long et al., 2016), and Pyracantha fortuneana extracts (Ke et al., 2019) can reduce the toxicity of Cd and tissue damage. Like several natural herbs, olive leaves have always drawn much attention, especially for folk medicine. It has a variety of pharmacological properties, including vascular protective effect (Vezza et al., 2019), antioxidant effects (Ayoub et al., 2019) and anti-atherosclerotic effects (Lockyer et al., 2017). Apoptosis represents the physiologic route to eliminate damaged or infected cells in order to maintain tissue homeostasis while avoiding inflammation and damage to the surrounding cells (McIlwain et al., 2013). Death receptor induced apoptosis is mediated by increased both mitochondrial lysosomal permeability and generation of ROS, thus promotes hepatocytes apoptosis in response to toxic materials. Nevertheless, hepatocyte apoptosis, necrosis, formation of ROS and mitochondrial dysfunction occur also in liver toxicity (Guicciardi et al., 2013).

This study aims to investigate the potential protective effects of olive leaf extract (Olea europaea L.) (OLE) administration on acute hepatotoxicity in a rat model of cadmium exposure.

Material and methods

Chemicals

CdCl2 and other chemicals for histological, biochemical analysis were obtained from Sigma (St Louis, MO, USA).

Extraction of O. europaea leaves

Fresh leaves of olive (O. europaea) were directly collected from the olive tree plantation farms from Aljouf region of Saudi Arabia. The leaves were scientifically defined by the herbarium of Biological Sciences Department, Faculty of Sciences,

King Abdulaziz University, Jeddah, Saudi Arabia. The leaves were thoroughly washed and dried at room temperature. The fine quality of dried leaves was kept in dry plastic container until use for extract processes. The method of Al-Attar and Abu Zeid (2013) was used to prepare the extract with some modifications. The aqueous extract of leaves was prepared every two weeks. The dried olive leaves (200 g) were powdered and added to 7 L of hot water. After 3 h, the mixture was slowly boiled for 30 min. After boiling period, the mixture was cooled at room temperature and it was gently subjected to an electric mixer for 20 min. Thereafter the solutions of olive leaves were filtered. Finally, the filtrates were evaporated in an oven at 40 °C to produce dried residues (active principles). With references to the powdered samples, the yield means of leaves extract were 20.3%. Additionally, the extract was stored in a refrigerator for subsequent experiments (Al-Attar et al., 2013).

Experimental animals

Water soluble Cadmium chloride (CdCl2) was used as a source of Cadmium (Cd). In this study, 28 female Wistar Albino rats weighing 280–300 g were used. The rats were obtained from Ataturk University Experimental Research and Application Center. Animals were housed in standard cages under well-regulated conditions (relative humidity range: 45 ± 5%, temperature: 24 ± 1°C and a 12-h light/12-h dark cycle). During the experiment, rats were fed with standard rat diet and water ad libitum. Standard Rat pellets were purchased from Bayramoglu Yem (Erzurum, Turkey, 3.5 % fat, 7.5 % carbohydrates, 23 % protein, 1–2% vitamins and minerals; 3% trace elements, iron, selenium, manganese, zinc, cobalt, iodide, 270 kcal 100 g−1). The experiments were designed and conducted according to ethical norms approved by the Local Animal Care Committee of Ataturk University, Erzurum, Turkey (12.05.2014/54826478-217).

28 rats were randomly divided into 4 groups;

Group 1 (Control): Rats were injected with saline for 5 days

Group 2 (OLE): Rats were injected with 200 mg / kg OLE for 5 days (Atef et al., 2019).

Group 3 (Cd): Rats were injected with 6.5 mg/kg cd for 5 days

Group 4 (Cd + OLE): Rats were injected with 6.5 mg/kg cd + 200 mg / kg OLE for 5 days (Ke et al., 2019).

Blood Sampling

At the end of the experiment, rats were anesthetized, then blood samples were directly collected by cardiac puncture and serum was separated and stored frozen until the biochemical assays. Serum aminotransferases ALT, AST and GGT

activities were determined according to the method of Erel, 2005.

Preparation of tissue homogenates

The tissue samples from each rat were first perfused with phosphate-buffered saline (PBS)/heparin and frozen tissues were homogenized in a TissueLyser II grinding Jar Set (Qiagen, Hilden, Germany). Approximately 100 mg of ground tissue was homogenized in 1 ml PBS homogenate buffer in an eppendorf tube with TissueLyser II, and the samples were then centrifuged.

Measurement of tissue total antioxidant status and total oxidant status levels

TOS and TAS from each sample supernatant was measured via colorimetric methods by using commercially available kits (Rel Assay Diagnostics, Gaziantep, Turkey). The results of the TAS (Erel 2004) and TOS (Erel 2005) in the tissues were expressed as mmol/mg protein, μmol/mg protein, respectively

Histological Analysis

Liver tissues were fixed in 10% neutral formalin and routinely processed in paraffin. Liver tissues were also trimmed into cassettes, dehydrated in graded ethanol solutions, cleared in xylene, and embedded in paraffin wax. Sections of 5 μm for hematoxylin and eosin (H&E) staining were prepared prior to microscopic analysis.

Statistical Analysis

The differences in variance were analyzed statistically using a one-way analysis of variance (ANOVA) test by Graphpad prism 5.0 statistics software (GraphPad, La Jolla, CA, USA). Tukey's test was used as a post hoc.

Results

Differences of liver parameters

The mean values of ALT and AST were significantly higher in Cd treated rats than the control group ($P < 0.001$) as shown in Figure 1 and 2. The GGT level of the control group and Cd treated rat was not associated significantly (Data not shown).

rat was not associated significantly (Data not shown).

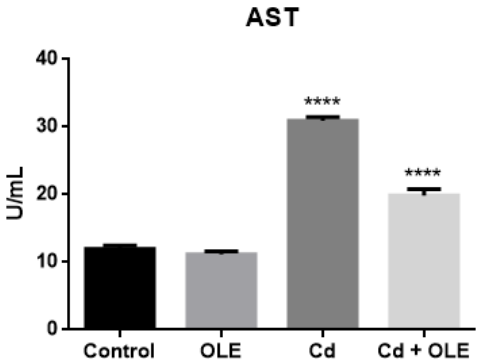

Figure 1. Modulatory effect of OLE on serum AST levels in rats exposed to cadmium chloride. Data are presented as mean ± Standard Error of Mean (SEM) (n = 7). * denotes significant differences between other studied groups and control (*: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$, ****:

$p < 0.0001$),) by Tukey's multiple range tests.

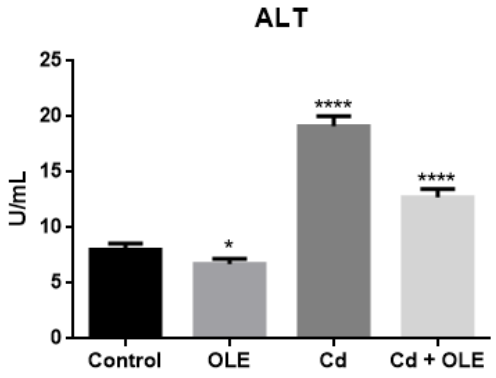

Figure 2. Modulatory effect of OLE on serum ALT levels in rats exposed to cadmium chloride. Data are presented as mean ± Standard Error of Mean (SEM) (n = 7). * denotes significant differences between other studied groups and control (*: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$, ****: $p < 0.0001$),) by Tukey's multiple range tests.

In Figure 3 and Figure 4, the levels of TAS and TOS are shown as quantified in serum. The level of TAS diminished significantly due to the administration of Cd (6.5 mg/kg) compared with the control and OLE group (200 mg/kg) ($p < 0.0001$) (Figure 3). Liver TOS levels were significantly raised in Cd treated group compared to control and OLE groups ($p < 0.0001$) (Figure 4).

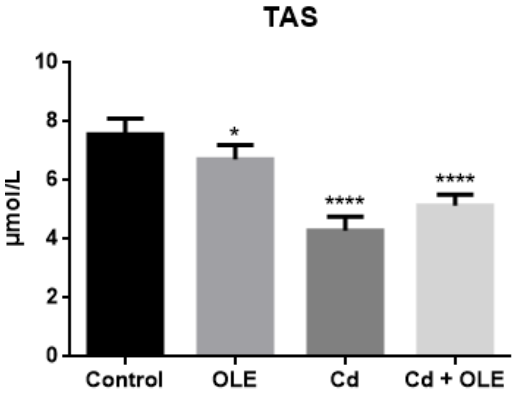

Figure 3. Modulatory effect of OLE on liver TAS levels in rats exposed to cadmium chloride. Data are presented as mean ± Standard Error of Mean (SEM) (n = 7). * denotes significant differences between other studied groups and control (*: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$, ****: $p < 0.0001$),) by Tukey's multiple range tests.

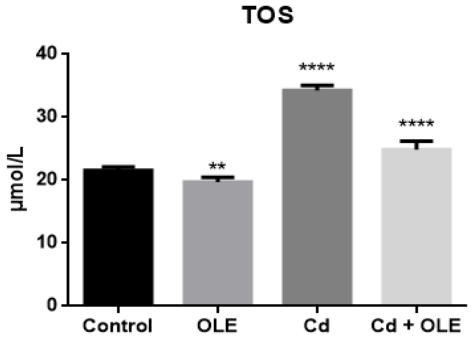

Figure 4. Modulatory effect of OLE on liver TOS levels in rats exposed to cadmium chloride. Data are presented as mean ± Standard Error of Mean (SEM) (n = 7). * denotes significant differences between other studied groups and control (*: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$, ****: $p < 0.0001$),) by Tukey's multiple range tests.

Hepatic injury induced by Cd

As shown in Figure 5C, the typical pathological changes were observed in the liver of the rat treated with Cd. The hepatic parenchyma close to the lesions was progressively invaded by fibrous connective tissue septa, and solitary islands of hepatic tissue were observed. At the same time points, no hepatic injury was observed in the rats of the control group and OLE group (Figure 5A and 5B). OLE partially cured liver damage caused by Cd (Figure 5D).

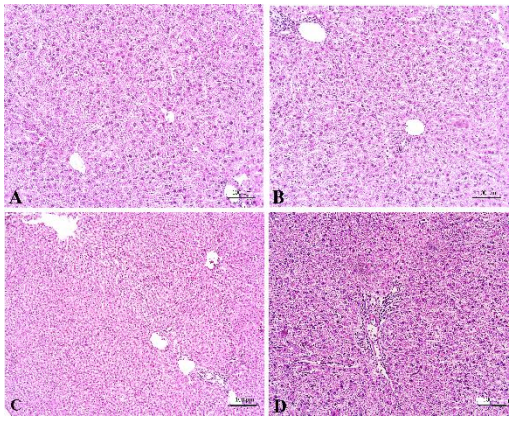

Figure 5. Illustrative photographs from the liver showing the protective effect of OLE on cadmium-induced hepatotoxicity in rats. (A) Control rat liver and (B) OLE treatment rat liver (H&E × 10 eyepiece magnification,) sections displaying normal hepatic parenchyma. (C) Cadmium (6.5 mg/kg) treated rat liver (H&E × 10 aeyepiece magnification) section showing extensive degeneration of hepatocytes with focal necrosis, vacuolated cytoplasm, inflammatory cell infiltration, and damaged central vein. (D) Cadmium (6.5 mg/kg) + OLE (200 mg/kg)-treated rat liver (H&E × 10 eyepiece magnification, respectively) section exhibiting normal appearance of hepatocytes with mild sinusoidal dilation. H&E hematoxylin and eosin staining, scale bar = 100 μm

Caspase 3 activation, a marker of the apoptotic protease cascade, was measured by immunohistochemistry. There was weakly caspase 3 expression in the control and OLE group rat livers (Figure 6A and 6B), whereas Cd treated group showed increased caspase 3 expression (Figure 6C). OLE decreased caspase 3 expression compared to Cd group (Figure 6D). There was a significant difference between only Cd treated and Cd + OLE treated rats.

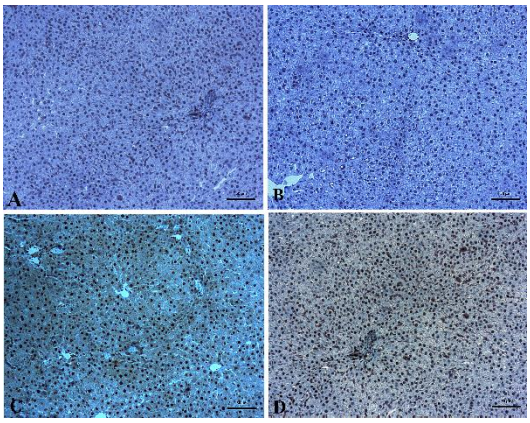

Figure 6. Caspase 3 immunohistochemistry expression among the examined groups. (A) Control rat liver and (B) OLE treated rat liver showing very occasional weak nuclear and cytoplasmic foci expressing. (C) Cadmium (6.5 mg/kg) treated rat section showing apoptotic hepatocytes condensation with plenty of nuclear and patchy cytoplasmic. (D) Cadmium (6.5 mg/kg) + OLE (200 mg/kg)-treated rat liver section exhibiting caspase 3 expression in infiltrating lymphocytes and in hepatic cells.

Discussion

Environmental contamination by Cd is a worldwide problem. Cd is a highly toxic heavy metal and its toxicity occurred by

ingestion and inhalation (Satarug et al., 2010). In this study, OLE experimented for overcoming the Cd toxicity in liver of rats. Serum ALT levels were elevated significantly in Cd group. Similarly, our results come in the same line with in a study conducted on Cd toxicity in rats (Toppo et al., 2015). The data of the present study pointed out that; there was marked an increase in AST and ALT, this might be due to Cd-induced oxidative stress leading to high level of H_2O_2 which in turn causing impairment in lipid metabolism and lipid peroxidation which is correlated with Cd toxicity. The rats treated with OLE alone showed no significant effect in liver functions. Significant restoration of hepatic enzymes was observed, so OLE contributing hepato-protection against Cd toxicity. However, the obtained results confirmed that the OLE was very active against the ROS. The result of current study showed that the elevation of the liver enzyme test (ALT and AST) was significantly associated with Cd compared with the control group. Therefore, liver enzyme tests have a positive role in the management of Cd toxicity.

In addition, to understand the effect of Cd on liver oxidative stress in rat and the antioxidant effect of OLE on Cd-induced oxidative stress, total antioxidant (TAS) and total oxidative stress (TOS) statuses were established in the liver. In our study, Cd on the hepatic tissue of normal rats showed a significant increase ($p < 0.001$) in the level of TOS associated with a noticeable decrease ($p < 0.001$) of TAS level, compared with their respective values in the liver of control rats (Figure 4 and 5). Likewise, a recent study demonstrated that TAS and TOS levels were significantly altered by Cd administration in rats (Bahri et al., 2019).

In this paper, this study was conducted to observe the composition changes of liver tissues after rat were injected with cadmium. No cases of death or abnormal pathological signs were observed in either Cd or OLE groups during the experiments. Histopathologic findings of OLE administration did not show obvious differences between the control group (Figure 5B). However, significant changes were observed in Cd group (Figure 5C). Treatment of rats with 6.5 mg/kg of Cd caused changes in the liver including extensive degeneration of hepatocytes with focal necrosis, vacuolated cytoplasm, inflammatory cell infiltration, and damaged central vein (Figure 5C). According to this study, Cd

+ OLE administration significantly alleviated tissue damage in comparison with the Cd group (Figure 5D) and this is similar to that in Ağır and Eraslan (Ağır et al., 2019).

Cd increased the mRNA expression of apoptosis executioner caspase 3 and initiated the apoptosis in rats. Compared with the control group, the caspase 3 expresion were significantly increased in Cd group (Figure 6C). Compared with the Cd group, the expresion of caspase 3 was decreased in the Cd + OLE group (Figure 6D). This result was consistent with our previous study (Deniz and Geyikoglu, 2019).

It is concluded that OLE therapy had beneficial effect on the normal hepatic tissues. In turn, Cd-treated liver showed a negative modulation in the metals and redox state. In addition, OLE exhibited a pronounced therapeutic effect in mitigating the histological changes in the studied tissues. Thereby, OLE could be used as an adjuvant treatment post-exposure to Cd.

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Health Services Vocational Collage

Basic Parameters and Spermatological Values for Evaluating Reproductive Potential in Farm Animals

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Abstract

Periodic and accurate analysis is essential for successful reproductive performance. By interpreting the obtained data, an effective management system related to reproductive performance can be designed. In particular, the determination of spermatological parameters in terms of male effect is also important regarding fertility.

Keywords: Farm animals, spermatological parameters, reproduction

Introduction

Reproductive Parameters

- Insemination index (1)
- Pregnancy rate at first insemination (1)
- Interval between calving and first insemination (2)
- Age of use in breeding (3)
- First calving age (3)
- Insemination time (4)
- Ratio per insemination (6)
- First insemination age (8)
- Insemination rate per cow (12)
- Incidence of metabolic disease (13)

The Factors Affecting Reproductive Efficiency

- Season (5)
- Pregnancy loss (7)
- Body condition (9)
- Nutrition (10)
- Race (10)
- Metabolic diseases (13)
- Body condition loss and negative energy balance (13)
- Estrus detection errors (13)
- Uterine pathology (13)
- Genetic factors (13)

Interpretation of basic spermatological tests in terms of fertilization success

Macroscopic Examinations

Semen volume: Having the semen volume within the normal limits is always a sought-after feature, which shows that the semen of the male breeders we use is at a normal level. However, even if a normal amount of ejaculation is obtained from a male breeder with a very low spermatozoa density, semen cannot be used in artificial insemination applications.

Semen color: While normal semen is cream-colored depending on the breed and species of the different animal, its color can vary from light cream to dark cream. If it is pink, dirty yellow, brown or greenish, the cause should be investigated. Such cases usually indicate that there is an abnormal condition or that a substance is mixed with the semen.

Semen viscosity: As a result of the examination, low viscosity indicates low semen density, and high viscosity indicates high semen density.

Apparent fusion movement in the semen: The macroscopic visualization of the fusion movement in the semen is an indication of the high density and motility rate of a large number of spermatozoa in the semen.

Semen smell: The semen taken from fertile animals has a distinctive odor reminiscent of egg yolk.

Macroscopic Examination

Mass movement: Sperm motility at the time of collection is used as a measure to assess the fertilizing capacity of the semen. It shows both sperm concentration and viability. All motile sperm are alive, but all immobile sperm are not dead. Contamination by excessive heat, chemicals and uncleaned equipment reduces motility.

Determination of spermatozoa density: The rapid decrease in spermatozoa concentration after consecutive ejaculates is indicative of poor spermatozoa reserve.

Determination of abnormal spermatozoon ratio: There is wide variation in the case of different values of sperm abnormalities. However, more than 30-35% of total abnormalities are not suitable for achieving good fertility. Most studies agree that semen from fertile bulls should be no more than 4% head abnormalities, 4-10% midpiece abnormalities, 5% tail abnormalities, 6% free heads, and no more than 20% of total sperm abnormalities.

Determination of spermatozoon motility: It is the evaluation of the movement types of sperm cells and their rates. Thus, the rate of semen collection and movement types or the presence of immobile sperm are determined.

Determination of the ratio of damaged and undamaged sperm cells: The high rate of spermatozoa with membrane damage negatively affects fertility. With the staining method used, the damaging status of the spermatozoa heads that have lost their membrane integrity can be detected (10,11).

Conclusion

There are many external and internal factors related to sustainability reproductive activities in farm animals. In terms of reproductive management, researchers should focus on improvement of the farm conditions and routine examination of reproductive parameters.

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Health Services Vocational Collage

The importance of surviving vulnerable groups in natural disasters: A review article

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Abstract

Disasters and emergencies have been increasing all over the world. Natural disasters are extreme events generally caused by abrupt climate change and other environmental factors. Turkey has repeatedly suffered from natural disasters. Due to its natural characteristics, socio-economic and cultural structure, Turkey is a country where earthquakes, floods and flood disasters are seen frequently and widely. Earthquakes are a devastating phenomena of nature, causing significant destruction and extensive damage. Based on the lessons learned from the experience, the problems faced by vulnerable groups in natural disasters were reviewed.

Keywords: Disasters, Earthquakes, Vulnerable groups.

Introduction

Disasters also affect the general level of morbidity in a district because of either interruption of normal health care services or of spraying or other disease control measures. It has been reported that 510,837 deaths and 3.9 billion people were affected by 6,681 natural disasters in the world between 2000 and 2019 (Kharb et al., 2022). Turkey ranks 45th among 191 countries in the Global Risk Index. It is among the countries in the "high risk" group with an index score of 5.0. Since 1900, 77 major earthquakes have occurred in our country. For this reason, it ranks fourth among countries in terms of earthquakes. In our country, 21,841 deaths occurred in the major disasters that occurred between 1990 and 2017. When evaluated according to disaster types, death due to earthquake is 19,998. This is the disaster earthquakes that cause the most deaths in our country (AFAD, 2020). Recently, there have been two devastating earthquakes in Turkey. In two earthquakes with magnitudes of 7.8 Mw (± 0.1) and 7.5 Mw, which occurred on February 6, 2023, nine hours apart,with epicenters in Pazarcık and Ekinözü districts of Kahramanmaraş, respectively; According to official figures, at least 50,096 people in Turkey (AFAD, 2023) and at least 8,476[people in Syria] (UN, 2023). lost their lives and more than 122 thousand people were injured in total. A total of 20 people lost their lives due to the floods, which were effective in the southeast of Turkey on March 15, 2023, and especially affected Adıyaman and Şanlıurfa as a result of heavy rainfall. It was reported that 1 person in Adıyaman and 1 person in Şanlıurfa were missing and 3,154 people's residences, workplaces, vehicles and miscellaneous household goods were damaged (DHA, 2023; NTV, 2023). Children, infants, disabled individuals, chronically ill individuals and animals are vulnerable in a disaster (Weiner et al., 2006). They need to rely on others to take care of their needs, both during and after the disaster. Moreover, pediatric disaster victims often require special care differing from the needs of adult disaster victims (Gnauck et al., 2007).

We have included the impressive news of a few of the vulnerable groups rescued in the Kahramanmaraş earthquakes and flood disasters. The first of these is the baby Mohammed. Two-month-old baby Muhammed was seen sucking his hand while being pulled out of debris (Kocalar 2023). On the other hand, in

Kahramanmaraş, a 13-year-old boy was rescued from the rubble 55 hours after the earthquake, holding a budgie (Mazi and Çalı, 2023). 41-year-old mother Neslihan Karadeniz and her children Fatma (21), Münire (15) and Ramazan (7) were brought out from the rubble after 108 hours by firefighters in Hatay (AAS, 2023). 12 Year Old Osman was rescued fromt wreck after 260 hours In Hatay (Nagihan, 2023). Veterinarians from all over Türkiye rushed to treat rescued animals. Over 400 cats and dogs rescued after the Feb. 6 deadly earthquakes were treated at animal shelters by veterinarians from all over the country in Kahramanmaraş (Daily Sabah and DHA, 2023). This paper provides an overview of vulnerable victims in the 2023 Kahramanmaraş earthquakes and flood disasters and our aid efforts and the issues raised.

The disabled and natural disasters

More than one billion people, or 15% of the total population, are considered disabled (WHO, 2011). People with disabilities are four times more likely to die in disasters than people without disabilities (UNESCAP, 2017). The disabled are among those who are significantly disadvantaged and therefore disproportionately affected by natural disasters. In addition, they are disadvantaged in accessing resources before, during, and after natural disasters (Ton & Adamson, 2021). The social, economic, and institutional challenges that they face in their daily lives are at the root of their high vulnerability and inadequate preparedness for emergency situations (Calgaro, Villeneuve, & Roberts, 2020; Organization, 2011). Disruptions in basic support services for those with disabilities and deficiencies in emergency registration systems make it difficult to meet their needs during and after disasters and to access external support. This exacerbates the precarious situation in which they find themselves after natural disasters (Hay & Pascoe, 2019; Smith, Simard, Twigg, Kett, & Cole, 2017). In disaster situations, the disabled are at risk of long-term displacement because they may be left behind or have no access at all, because their housing needs are not met, or because they do not receive adequate financial assistance (Ito, 2014).

Problems also arise during disasters, such as lack of access to medications for the disabled, disruptions in the caregiver network, and transportation difficulties during evacuation (Malmin & Eisenman, 2023). Therefore, disaster management

for vulnerable disabled people is needed to ensure that they receive more attention after a disaster (Eisenman et al., 2009; Phibbs, Good, Severinsen, Woodbury, & Williamson, 2015). People who have disabilities that are easily identifiable such as orthopaedic problems, blindness, deafness, etc. are more likely to get assistance from others, whereas those who experience a disability that impairs their cognitive function after a disaster might not get assistance until their needs become obvious to others (Greenspan, Switzky, & Woods, 2011).

If their needs cannot be identified by disaster authorities, people with cognitive disabilities are more likely to experience delays in getting the help they need (Türk, 2022). On the other hand, respondents might give an incorrect description of the nature of a person's disability, which could result in incorrect and incomplete claims being filed in emergency situations. This is because the identity, diagnosis, and degree of disability of the disabled person may not be established, and important information such as the medications used for treatment may not be readily available (Tonak & Kitiş, 2020).

The elderly and natural disasters

Unfortunately, two-thirds of the world's older people live in developing countries, which are particularly vulnerable to disasters, and this proportion is expected to rise to 80 per cent by 2050 (Joseph & Jaswal, 2021). In situations like disasters, older adults are among the most vulnerable groups (Oostlander, Champagne-Poirier, & O'Sullivan, 2022). They are one of the most neglected populations in society during and after disaster events (Timalsina & Songwathana, 2020). They are an age group that is particularly vulnerable to environmental changes that affect the standard of living and health of older people (Fauzan et al., 2020). Disasters can, directly and indirectly, affect the physical and mental health of the elderly (World Health Organization, 2009). It has been argued that the elderly are not well prepared for emergencies, despite the fact that they belong to a demographic that is more susceptible to the effects of natural catastrophes. (Adepoju, Herrera, Chae, & Han, 2023).

When it comes to evacuating potentially dangerous areas in a crisis, older people have some challenges that younger people do not. These deficiencies are due in part to a variety of factors, including

age-related physical limitations, lack of communication, limited transportation options, and few economic opportunities for the aging population (Adepoju et al., 2023). As older people age, they may experience physical regression, inability to receive adequate services, age discrimination, disability, changing dynamics and family systems in the home where they live, increased poverty, low physical strength, and weak immune systems. Even situations such as dependence on others, living alone, and limited access to transportation can be observed. For these reasons, the negative impact of disaster situations on the physical, mental, and social well-being of older people increases (Timalsina & Songwathana, 2020).

Compared to the general population, older adults are reportedly more vulnerable to disasters. Factors that exacerbate this include age-related physical, cognitive, economic, and psychosocial problems, as well as decreased sensory awareness and chronic health conditions. These factors reduce both the likelihood of disaster preparedness and the ability of older adults to adapt during a disaster (Baker, Cormier, & Baker, 2014). For these reasons, older adults may be considered a high-risk group in disaster situations.

People with non-communicable diseases and disasters

Noncommunicable diseases (NCDs) are among the leading causes of death worldwide, accounting for about 70% of deaths (UNISDR, 2009). Unexpected events, such as natural disasters, are associated with an increase in the prevalence of noncommunicable diseases (Nishizawa, Hoshide, Shimpo, & Kario, 2012). According to published research, there is a link between the stress caused by natural disasters and wars and the subsequent increase in cases of impaired fasting blood glucose (IFG) and diabetes mellitus (DM) among survivors (An et al., 2014; Ebling, Majnarić-Trtica, Gmajnić, Ebling, & Vranjes, 2007; Karrouri, 2014).Just as natural disasters can lead to an increase in the prevalence of non-communicable diseases, so too can the treatment of such diseases become more difficult in the aftermath of a disaster (Crook, Arrieta, & Foreman, 2010). Strengthening and expanding the range of NCD diagnoses included in disaster management planning is critical. It is also important to focus specifically on children and adolescents, as these age groups present

significant opportunities for interventions to reduce future NCD morbidity (Ngaruiya et al., 2022). Disasters can lead to severe exacerbations of bronchospasm as patients with COPD require supplemental oxygen or patients with asthma are exposed to increased allergen exposure and humidity. For patients with such respiratory conditions, this can often lead to emergencies. Furthermore, patients with conditions such as diabetes need to keep their insulin cool and have certain dietary requirements. As a result, meeting all of these needs can be challenging during times of natural disaster (Crook et al., 2010).

Conclusion

In developing plans for disaster preparedness and response to extraordinary natural events such as disasters, the needs of the most vulnerable should be considered. To prevent secondary health problems that may occur later as a result of disasters, the needs of these vulnerable people should be given special consideration in disaster management.

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