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Study of the Effect of *Portunuspelagicus* (Linnaeus 1758) on Fat Discoloration in Male Rabbits Exposed to Oxidative Stress

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Abstract

The present study aimed to investigate the effects of ***Portunuspelagicus*** powder (Linnaeus, 1758) on the lipid profile such as: Total Cholesterol (TC), Triglycerides (TG), and High-Density Lipoprotein (HDL-HD lipoprotein). Low density lipoprotein (LDL-C), very low-density lipoprotein for cholesterol, Very low-density lipoprotein (VLDL-C), the antioxidant enzyme glutathione (GSH), and Malondialdehyde (MDA).In domestic male rabbits exposed to oxidative stress with hydrogen peroxide H2O2 at a concentration of (0.5%) in drinking water throughout the adult experiment period (60) days, the most effective dose of blue crab powder was determined through preliminary experiments, and it was (10 g / kg) of The bush for adult rabbits was divided randomly into (6) groups, since each group included (5) rabbits and as (G1) the control group and (G2) the effective dose group for crab powder alone and (G3) the hydrogen peroxide group H2O2 alone and (G4) the crab powder group (5) g / kg of feed + H2O2 and (G5) the crab powder group (10) g / kg of feed + H2O2 and (G6) group of crab powder (15) g / kg of feed + H2O2.

The results of this study showed: that the treatment of animals with blue crab powder alone led to a significant decrease in MDA, TC, TG, LDL-C, and VLDL-C. While there was a significant increase in GSH, HDL-C compared to control.The treatment of animals with hydrogen peroxide alone led to a significant decrease in the concentrations of GSH, HDL-C, and VLDL-C compared to the control. Whereas, this treatment led to a significant increase in MDA, TC, TG, and LDL-C compared to the control group. The treatment of crab powder (5) g / kg of feed + H2O2 led to a significant decrease in the concentrations of MDA, TC, TG, HDL-C, LDL-C, VLDL-C compared to the control group.While it led to a significant increase in the concentration of GSH, and the treatment of animals with sea crab powder (10) g / kg of feed + H2O2 led to a significant decrease in the concentrations of MDA, TC, TG, LDL-C, VLDL-C compared to the control. While there was a significant increase in GSH, HDL-C. The treatment of marine crab powder (15) g / kg of feed + H2O2 led to a significant decrease in the concentration of MDA, TC, TG, LDL-C, VLDL-C, as compared to the control. While it led to a significant increase in the concentrations of GSH and HDL-C.

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Introduction

Marine crustaceans are made up of avery large range of arthritis, which include such familiar animals as crab crabs, lobsters, crayfish, shrimp shrimp, krill krill and bringles) Barnacles Vazquez et al., 2009), a growing demand in developed country markets for seafood, led to significant interest from both public agenciesand independent investors in marine crustacean breeding in Western countries (1993, Laubier&Laubier).

Blue Swimming Crab (Portunuspelagicus) is one of the world's most important fisheries commodities, and crabs are valuable seafood products both at home and for export, so many countries have exploited marine crabs to support their economies (Nieves et al., 2013; Gadhavi et al., 2013; Suwandi et al.,2019).

Blue crab is also a species (P. Pelagicus (Linnaeus 1758) of the most common marine cancers, in the Indian andPacific Oceans, including Australia and Thailand Tina, 2015). Blue lobster is also found along the coast of the Arabian Gulf (Ibrahim et al., 2020). This animal acts as a linkbetween primary organisms at the base of the food network and consumers at higher dietary levels (Macintosh, 1996).

The chemical structure of blue lobster flesh contains 17.77 protein, 0.29 fat, 77.26% water and 2.17% ash (Wu et al., 2010). Crab meat also contains 16 types of aminoacids, consisting of 8) essential amino acids, 8) non-essential amino acids, the most important isine acids (% 1.29) and the highest glutamic acid (% 2.02 (Abdel-Salam, 2014).

Crustaceans such as crab contain natural components, the main components of which are caetine (20% 30), protein (30% 40), calcium carbonate salts (30% 50) and antioxidant compounds such as selenium and carotenes (astazantine, astatine, and thexanthine) (Cho et al., 1998; Akhuemokhan et al., 2013; Rezakhani et al., 2014).

Crab meat is particularly rich in omega 3 fatty acids, which are essential for reducingtriple fat and blood pressure, thereby reducing the risk of heart disease (Williams et al.,2016). In view of the limited studies on the effect of blue lobster powder on lipids, thisstudy was conducted to show the effect of P-powder. Pelagicus (Linnaeus 1758) is apainted fat and antioxidant in local rabbit males exposed to oxidative jihad with hydrogen peroxide.

Materials Method

In the study (42 of the local rabbit males divided into 12), a rabbit was used for effective dose, and 1,000 grams of cancer powder and (30 rinds of experience, ages 10-7) months, and their weights were between 950-1900 g, divided animals and distributed homogeneous by weight into six aggregates. The animals were subjected to laboratory conditions from a light cycle divided into 12 hours of light and 12 hours of darkness (Balducci-Roslind et al., 2001).

Experiment designs

The experiment used 30 local male rabbits, which were divided into six groups, each containing 5 rabbits, taking into account weight and fed as follows:

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The control group was given only water and food.
The second group (G2) (effective dose group) was given water and a plug was mixed with blue crab powder at a reported rate of 10 g per kilogram of feed.
The third group (G3) (H2O2) was given water containing H2O2 hydrogen peroxide at 0.5% per 1 liter of water and feed.
The fourth group (G4) was given water containing hydrogen peroxide H2O2 (0.5%) per (1 litre water with a lattice) mixed with (5) g of cancer powder per kilogram feed.
Group V (G5) was given water containing H2O2 hydrogen peroxide (0.5%) per (1 litre water with a lattice) mixed with (10) g of cancer powder per kilogram feed.
The sixth group (G6) was given water containing hydrogen peroxide H2O2 (0.5%) per (1 litre water with a lattice) mixed with (15) g of cancer powder per kilogram feed.

After 60 days, the experiment animals were starved for a while. (12) The blood samples were pulled in cardiac stab mode. (8) About ml of blood, put it in test tubes, free ofthrombosis, left for a while. 20 minutes at room temperature, after which the serum was separated by a centrifugal device quickly. (30000) Cycle/minute and 10 minutesand keep the serum under freezing after (-2000 AD) If it is divided into four parts in the Eppendorf tube until chemical tests are carried out.
Glutathione was estimated in blood serum using the modified method used by researchers (Sedlak& Lindsay, 1968; Tietz,1999). The concentration of dialdehyde in blood serum was estimated using the modified method of researchers (Guidet& shah, 1989). An assessment of the concentration of triple clesides in the serum was carried out using the ready-made kit (Kit) of the Spanish company "Spinreact" (Fossà&Prencible, 1982).
The concentration of high-density proteins for cholesterol in the serum was estimatedusing a ready analysis kit from Spanish company Spinreak 1984 (Naito,). Thecalculation of VLDL in the blood serum was done according to the followingrelationship: (Tietz,1999)
VLDL concentration (mg/dL) = (Triglycerides / 5)
LDL-CL concentration in blood serum has also been calculated according to the following relationship (Tietz, 1999):
LDL-C conc. (mg/dl)= Total Cholesterol – (HDL-C + VLDL)

Results and discussion:

1- **GSH chlorathione level in blood serum**:
Figure 1 results showed a moral rise of P (0.05) in group G2 (Effective dose group) Treatment with blue crab powder only compared to control group, and these results also showed a moral rise in totals treated with crab powder in combinations. (15. 10, 5) g/kg of alloy with hydrogen peroxide, and the results showed a moral decrease of G 3 group (H 2 O 2) treatment with only hydrogen peroxide compared to the control group.

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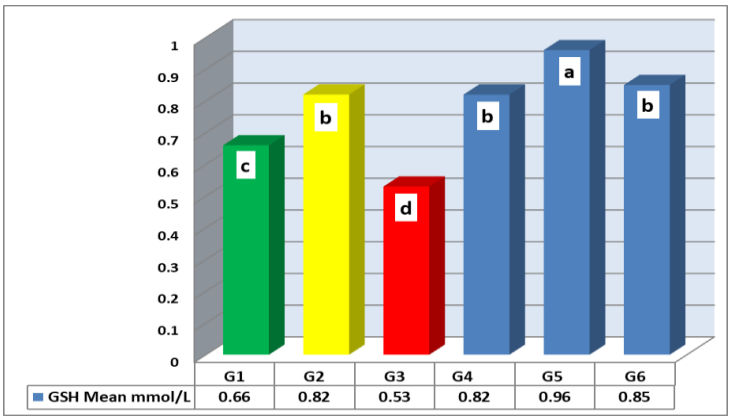
Figure 1. Impact of blue crab powder on chlorathione levels in the blood serums of adult adult male rabbits exposed to oxidative stress. * Values are expressed at the rate. * Different letters mean a moral difference at a moral level (0.05 ≥ P).



The moral reduction of the level of GSH in the third group and the treatment with H2O2hydrogen peroxide compared to the control group, these findings are consistent with the findingsof both (Saleh, et al., 2012; 2011 (Jankeer, when treating both male and female rats and rabbits with H2O2 and for different periods.

The low level of GSH in the cell is indicative of increased oxidative stress (McLennan etal., 1991) (the low level of clutathione is due to its undermining or decreasingcomposition (Loven et al., 1986)), so this decrease is due to the effective participationof clutathione in preventing the updated oxidation of H2O2 through direct removal ofeffects High level of clutathione in crab powder treatment groups, this findingcorresponds to study McCallani et al., 2017 (Yen et al., 2008; Treatment of male rats with crab shell extract has led to a rise in internal antioxidants. Palanisamy&Manian, 2012, attributes the rise in the chlorathione levels of the experimental animals given a container on blue cancer powder until they ate three amino acids.

They are cysteine, clycine, and clomatic acid, which stimulate the body to create theclotathione itself, and low-fat protein foods help the body produce moreclotathione. That is consistent with what we have come up with in this study. The reason for the rise in the level of GSH is the presence of ketosan chitosan, a natural caitin-derived amino polyscaride, known as one of the most abundant organic substances in nature, which is a major component of the crab shell and acts as a free-root antioxidant (hydroxyl roots and deionate).

He found that ketosan from crab crusts raised the GSH level in the blood serum ofwhite rat males. (Yen et al.,2008; El Knidri et al., 2018 (or may be caused by the high level of clutathione due to the high proportion of metals in crab composition. Selenium raises the level of clutathione and produces cysteine molecules during digestion of selenium-rich foods, increasing the production of the chlorathione enzyme (Song et al., 2014; Chun et al.,2010 ; Schrauzer, 2003).

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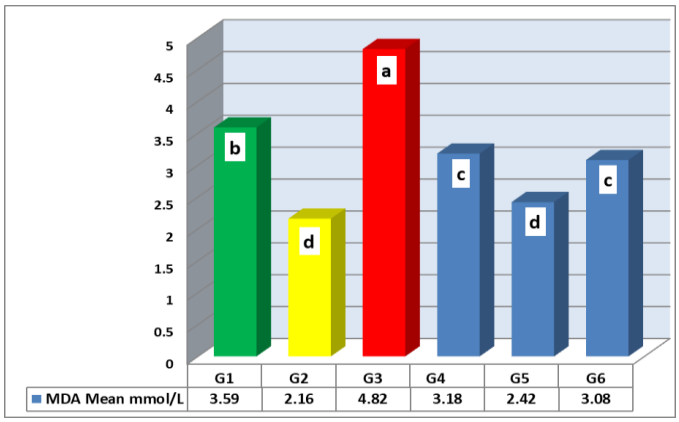
Figure 2. Impact of blue crab powder on levels of dialaldehydemalon in blood serumsof adult male rabbits exposed to oxidative stress. * Values are expressed at therate. * Different letters mean a moral difference at a moral level (0.05 ≥ P).



2- Serum MDA level:

The results of figure (2) showed a reduction of P (0.05) in the level of MDAV group G2(effective dose group) compared to the control group, and a moral decrease in theaggregate treatment of crab powder and hydrogen peroxide compared to the controlgroup, while there was a moral rise in the group G3 (H2O2 group) compared to thecontrol group.

The result of this study is consistent with Ugbaja et al., 2020) finding that ketozan from crab crusts reduced the level of MDAV in the blood serum of white rat males. Razouki et al. 2017 found that treatment of male rabbits exposed to stress with pomegranate juice as an antioxidant led to a higher level of clutathione and a lower level of dialaldehydemalon, and agreed with (Muhammad et al., 2013) that the addition of antioxidants to alloy leads to a moral rise of GSH and a moral decline of MDA.

The rise of MDA in the third group (G3) of experimental animals is a sign of oxidativestress and is the final product of the reaction of the fat oxidation chain to preventoxidative stress (Hardiany et al., 2019). Gorrini et al.,2013). High MDA in serum can also result from leukemia and tumors (Tajika et al., 2012; Jawalekar et al., 2010), or the rise of MDA may be caused by a deficiency in the Catalase enzyme that analyzesH2O2 hydrogen peroxide from cell breathing or from an external source, since the deficiency of this enzyme and the accumulation of H2O2 leads to a rise in dialdehyde(Ighodaro&Akinloye, 2018).

The reason for the low level of MDA in the totals given cancer powder is due. uniqueand antioxidant properties of ketosanchitosan derivatives (Lin & Chou, 2004; Xing et al.,2005), or may be the cause of MDA reduction due to the chemical composition of thechemical-rich crab powder, including selenium, since (spring and cyclic, 2015) theaddition of organic and asymptotic selenium to alloy led to a moral rise in the level ofclutathione and the enzyme of

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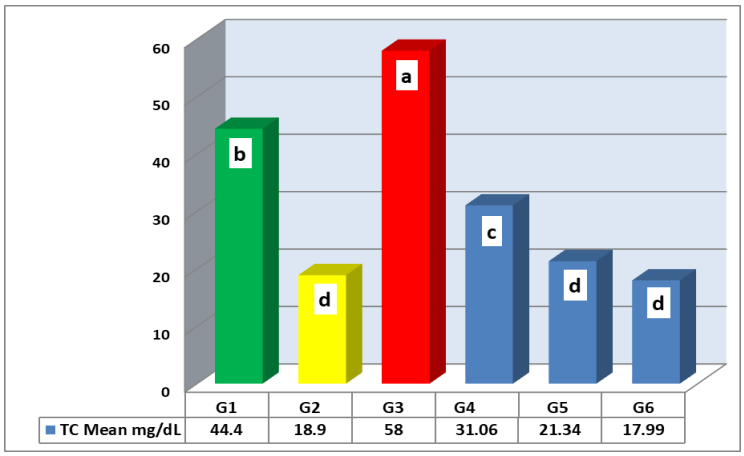
clutathione peroxidase and a typical decrease and amoral decrease in the level of dialaldehyde melon compared to control.

3- Total cholesterol concentration in the blood serum:

The results of figure (3) showed a moral decrease (P 0.05) in total cholesterol concentration (TC in G2 (effective dose group), aggregates treated with crab powderand hydrogen peroxide, showed a moral rise in G3 (H2O2 group), compared to thecontrol group, nor did the totals G5 and G). The results showed a moral decrease incholesterol level in G2 treatment of crab powder compared to control.

Figure (3) Effect of blue crab powder on total cholesterol (TC) total cholestero concentration in domestic male rabbits exposed to oxidative stress. * Values are expressed as averages. * Different letters mean that there is a significant difference at a significant level (0.05≥P).



This is consistent with his statement (Kyung, 2000; * & , 2005) in the low concentration of cholesterol in mice after treatment with crab powder. The reason for the decline is that seafood contains omega-3 acids, which are non-polyunsaturated fatty acids (PUFA, EPA and DHA) that affect the manufacture of cholesterol and fatty proteins and increase VLDL-C and thus cause low levels of LHA.

Crab is the most valuable food source of omega-3-lipid acid in marine crustaceans, containing approximately twice the content of ecosapentaenoic acid (EPA) compared to shrimp and shrimp (et al., Balzano 2017). The reason for the decrease in the TC level in the second group may be ketosan, which is consistent with Hwang, 2006; Kim & Yoon, 2008 Treatment of rats with ketosan from the crab cortex has led to low levels of cholesterol, triple lipids and low-cholesterol lipid proteins LDL-C. Ketosan can also be used as a dietary supplement, effectively reducing the concentration of cholesterol in the blood and controlling obesity (Asaoka, 1996).

The results showed a significant increase in cholesterol in G3 treated with hydrogen peroxide, and the results of this study are in agreement with (Al-Khatib, 2016), as the treatment of male

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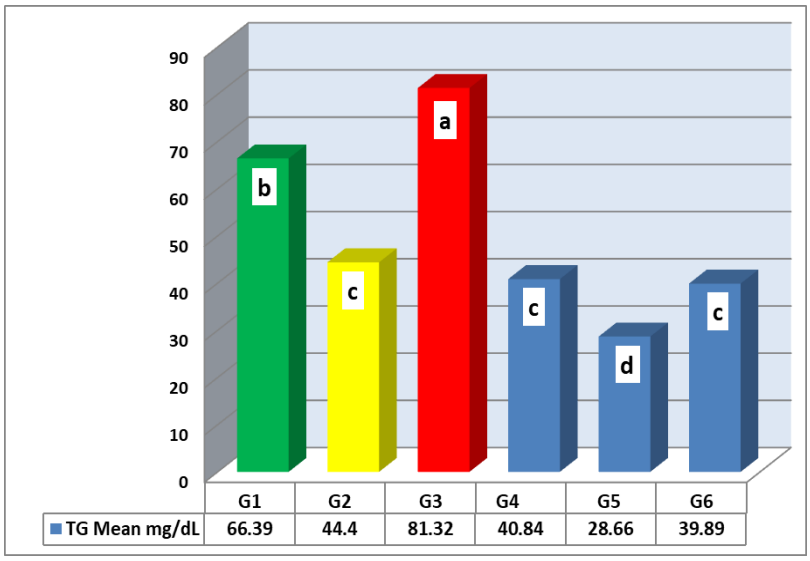
rabbits with hydrogen peroxide led to a significant increase in serum cholesterol compared to control. This increase is attributed to oxidative stress and the process of fat oxidation, as the high cholesterol concentration due to treatment with hydrogen peroxide leads to an increase in cholesterol absorption through the small intestine due to the occurrence of the lipid peroxidation process that affects the structure of the intestinal wall in particular and the digestive system in general Aqil et al. , 2006)).

Or it may be attributed to the increased activity of the enzyme, cholesterol acyl transferase, which is responsible for absorption of cholesterol and which is stimulated by insulin deficiency as a result of oxidative stress that affects pancreatic beta cells by the active oxygen classes, which increases the level of cholesterol absorption by the intestine (Jedlinska-Krakowfka). et al., 2006). As for the groups treated with crab powder with H2O2, the significant decrease in cholesterol was attributed to the element selenium that works to scavenge free radicals, as a study conducted on Wistar rats suffering from selenium deficiency showed that treating them with selenium as a nutritional supplement led to high antioxidants and reduced fat oxidation, It reduces the oxidation of low-density lipoprotein (LDL-C) cholesterol and thus lowers the level of total cholesterol (Huang et al., 2002).

4- Serum TG Triglyceride Concentration:

The results of figure 4 showed a moral decrease (P 0.05) in triple fat concentration (TG) in the second group (effective dose group) compared to the control group, the results showed no moral difference between the two groups (G6 and G4 treatment of cancer powder with H2O2 compared to the effective dose group), and the results showed a moral rise in G3 (H2 group).

Figure (4) Effect of blue crab powder on triglyceride (TG) concentration in domestic male rabbits exposed to oxidative stress. * Values are expressed as averages. * Different letters mean that there is a significant difference at a significant level (0.05≥P).



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The low concentration of triple fats in the second group is consistent with a study (Kyung, 2000) where total cholesterol, triple fat, and low-density cholesterol proteins in mice treated with crab crust powder decreased. This decrease is due, inter alia, to reduced calories in lobster powder,according to David, 2003; Mustafaet al.,2020), the consumption of higher calories produced bythe metabolism of clesrides, fats and proteins results in lower levels. Or this decline in TG may be due to Omega 3 acids - among studies (Ibrahim et al., 2014).

Omega- 3 acids found in seafood reduce blood pressure by affecting the diameter andbreadth of blood vessels, and play a role in reducing TG trifocal lipids initially by curbingthe manufacture of hepatic VLDL. The mechanism of action of omega 3-acid to reduce triple fat concentration (TG) is by determining liver production (Wong & Marsh, 1988).

This is done by inhibiting the activity of the enzyme (Diacyl glycerol acyl transferase) and the enzyme phosphatidic acid phosphorhydrolase (PAP), which are common to the manufacture of triple lipids (TG) (MarSG). The results showed a moral rise of triple fat in G3 (H2O2 group),

The results of this study agree with (Al-Khatib, 2016; Al Douri and others, 2012), as the treatment of male rabbits with hydrogen peroxide led to a significant increase in the level of triglycerides in the serum compared to the control. This increase is attributed to oxidative stress due to the increase in free radicals and fat oxidation, as a study conducted by Aqil et al., 2006 indicated that hydrogen peroxide increased cholesterol absorption from the walls of the small intestine and thus increased triglycerides. Or, this increase in the concentration of triglycerides in the blood may be attributed to the free radicals resulting from the treatment with (H2O2). The decrease in TG in the groups treated with crab powder and H2O2, was attributed to the antioxidants in crab powder such as chitosan and selenium, and this is in agreement with; Huang et al., 2002 (Hwang, 2006), as chitosan and selenium work to scavenge and remove free radicals and reduce the level of free fatty acids in the plasma, thus reducing the level of triglycerides.

5- Serum HDL-C HDL-Cholesterol Concentration:

The results of figure (5) showed a moral increase (P 0.05) in the concentration of high-cutaneous lipid protein in the group G2 treatment of blue crab powder compared to control, the results also showed a moral decline in G3 (group H2O2) compared to control, and the aggregates treated with crab powder and hydrogen peroxide showed a moral increase compared to the control group.

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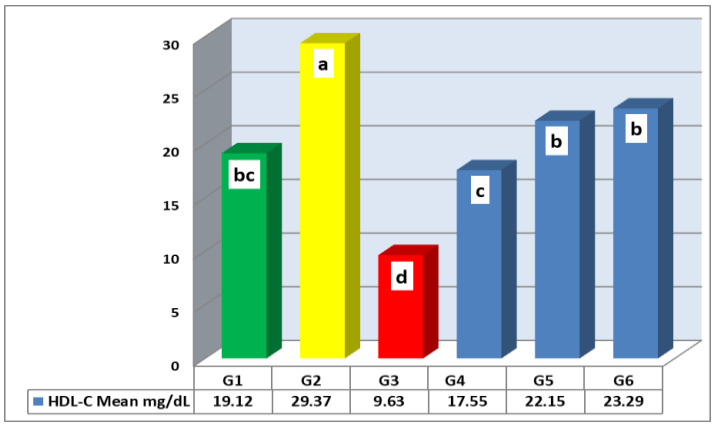
Figure (5) Effect of blue crab powder on HDL cholesterol concentration in domestic male rabbits exposed to oxidative stress. * Values are expressed as averages. * Different letters mean that there is a significant difference at a significant level (0.05≥P).



High HDL-C in G2 treatment with crab powder alone, this result is consistent with(Kyung, 2000) as treatment of rats with crab powder led to a high concentration ofHDL-C in the blood serum. This rise is due to low sugary ketosan polymer, which is consistent with 2006 (Hwang, Kim & Young, 2008; Mustafa& AL-Samarraie.,2020); Treatment of rats with ketosan from the crab cortex has led to a low level of cholesterol, triple lipids and low-cholesterol lipid proteins LDL-C and has led to a moral rise in the concentration of high-cholesterol fat proteins HDL-C.

The concentration of HDL increases when cholesterol balance is achieved, as the body balances creation, dietary intake and subtraction rates. Excess cholesterol is released from cells and transported into the blood as HDL, where it is removed by the liver. High cholesterol in HDL is useful compared to LDL, because it is useful.

The results showed a moral decrease (P 0.05) in G3 (H2O2 group) compared to control,consistent with (Fiancé, 2016; Periodic et al., 2012), when the treatment of rabbit males with hydrogen peroxide led to a moral decline in the concentration of HDL-C. The increase in the generation of efficient oxygen varieties leads to a higher concentration of total cholesterol (TCCs) at the HDL-C level (Guyton & Hall, 2006).

This increase is due to the low effectiveness of the lipoprotein enzyme: (et al., 2008 Bouhdid)Reduction of LeipoproteinLeipase enzyme due to damage caused by hydrogen peroxide as wellas LDL oxidation and destruction of internal cholesterol in the body due to the free roots ofeffective oxygen reduces the level of HDL, which is the basis for the transfer of cholesterol from body cells to the liver.

The low level of HDL-C is also due to the high oxidation level et al. The activity of the cholesterol enzyme is cholesterol transferase ester as it transfers the cholesterol ester from HDL-C to VLDL-Apo, leaving a richly pure HDL-C form. al., 2011) Cartea). While the results showed that the concentration of HDL-C was significantly higher when male rabbits were treated with blue crab powder with H2O2 compared to the control group. During its antioxidant activities and increased activity of enzymes catalase and supraoxidedesmutase (Hwang, 2006); Huang et al.,

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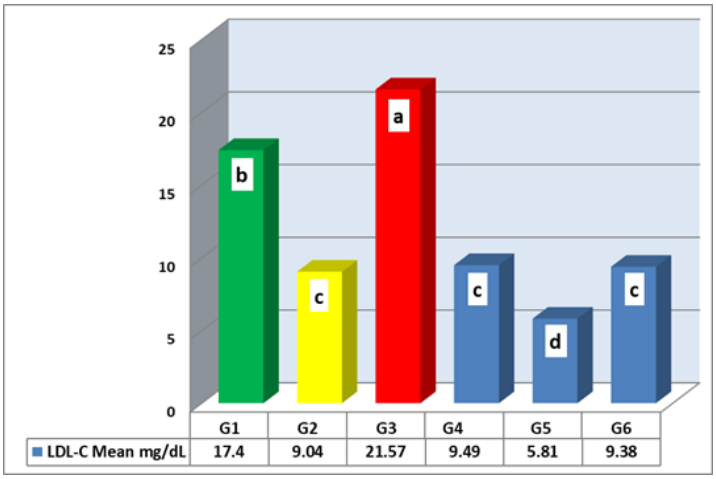
2002). This could explain the mechanism of HDL-C elevation, to the ability of substances in crab powder to increase the activity of the enzyme Licithin cholesterol acyltransferase (LCAT) and stimulate liver and intestinal cells to increase the production of Apo-A-1, which is essential in the formation of HDL-C (et al.). Cipollone, 2003).

6- The concentration of low-density lipoproteins of LDL-C cholesterol in blood serum:

The results of Figure (6) showed a significant decrease (P≤0.05) in the low-density lipoprotein concentration of cholesterol in G2 treated with the effective dose of blue crab powder compared to the control group, and a significant decrease in the groups treated with the powder and hydrogen peroxide compared to the control group, and the results showed an increase The LDL-C concentration was significant for the hydrogen peroxide group alone compared with the control group.

Figure (6) Effect of blue crab powder on low density lipoprotein cholesterol concentration in domestic male rabbits exposed to oxidative stress. * Values are expressed as averages. * Different letters mean that there is a significant difference at a significant level (0.05≥P).



Blue crab powder has shown effectiveness in reducing LDL-C, and this is consistent with a study (Kyung, 2000) indicating that treatment of rats with crab powder has led to a reduced concentration of LDL-C in serum blood. It may be due to omega-3 acids - found in seafood and blue crab in particular.

A study (Tangka et al., 2016) indicated that multiple unsaturated fatty acids increasethe speed of destruction of LDL-C molecules by increasing the number of receptors. The cause of low LDL-C may be ketosan, the primary component of the crab shell, which is consistent with 2006; Kim & Yoon, 2008) (Hwang,He noted that the treatment of rats with ketosan from the crab shell had led to a moral decline in the level of cholesterol, triple fat and low-cholesterol lipid proteins LDL-C. The results also showed a moral decrease at the LDL-C level in the total treatment of crab powder with H2O2 compared to the control group.

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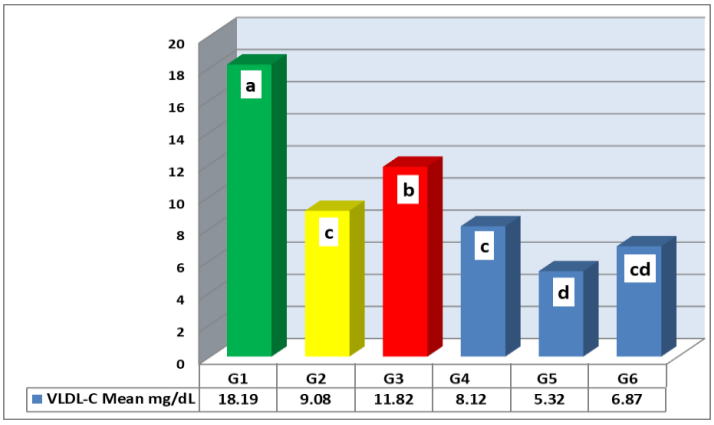
He noted that the treatment of rats with ketosan from the crab shell had led to a moral decline in the level of cholesterol, triple fat and low-cholesterol lipid proteins LDL-C. The results also showed a moral decrease at the LDL-C level in the total treatment of crab powder with H2O2 compared to the control group.

This decrease can be attributed to the presence of high concentrations of vitamin B12, carotenoids, selenium and chitosan, which scavenge free radicals and reduce oxidation processes and lipid perturbations and thus reduce the concentration of LDL-C, as well as the effect on the liver cells that are important to LDL-C receptors. For these substances is to reduce the damage resulting from these free radicals due to hydrogen peroxide and to increase some enzymes that work against free radicals inside the body, such as Kris-Etherton et al., 2002 (Glutathione-S-transferase). The results of this study also showed a significant increase in the G3 group treated with hydrogen peroxide compared to the control group. This significant increase in the LDL-C concentration is consistent with the study (Al-Khatib, 2016) as it was shown that the treatment of male rabbits with hydrogen peroxide led to a significant increase in the concentration of LDL-C in Serum. The reason for this increase in the level of LDL-C is due to the increase in the MDA level in this group, in addition to the contribution of cholesterol to the synthesis of protein substances in the liver, which in turn increases the level of low-density lipoproteins of cholesterol.

7. Concentration of very low-density lipoprotein VLDL-C cholesterol in serum:

The results of figure (7) showed a moral decrease (P 0.05) in the concentration of very low-density cholesterol protein in all aggregates treated with crab powder compared to the control group, and a moral rise in the hydrogen peroxide group compared to the blue crab powder treatment group.

Figure (7) Effect of blue crab powder on very low density lipoprotein cholesterol concentration in domestic male rabbits exposed to oxidative stress. * Values are expressed as averages. * Different letters mean that there is a significant difference at a significant level (0.05≥P).



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Significant decrease in VLDL-C concentration in the placebo group treated with crab powder alone. In agreement with (Kyung, 2000), he indicated that the treatment of mice with crab powder led to a significant decrease in the concentration of TC, TG, LDL-C, and VLDL-C, and a significant increase in the concentration of HDL-C in blood serum. The reason for this decrease is due to the containment of chitosan in blue crab powder, and this result is consistent with 2006; Kim & Yoon, 2008) (Hwang), as the treatment of rats with chitosan extracted from the shell of crabs, led to a decrease in the concentration of total cholesterol, triglycerides TG, low-cholesterol lipoproteins (LDL-C) and very low-density lipoproteins (VLDL-C) in the blood serum. The groups treated with crab powder and exposed to oxidative stress with hydrogen peroxide may be due to many compounds that act as antioxidants, including chitosan, selenium, folic acid, carotenoids, and omega-3 acids - vitamins B12 and B9, in addition to the role of these compounds in reducing the lipid level by reducing the production of Total cholesterol (TC) et al., 2017; Ugbaja et al., 2020; Linder, 1992) (Elhabiby. It may also be attributed to glutathione peroxidase (Gpx) and superoxide dismutase (SOD) hepatic antioxidants that work on Reducing the oxidative stress resulting from hydrogen peroxide treatment or diabetes, and prevents the process of lipid oxidation and thus reduces the level of VLDL-C serum concentration (Capasso et al., 2006). ; Collective et al., 2008). The results of treatment with hydrogen peroxide showed a significant increase compared to the effective dose group, and this result is consistent with a study (Al-Khatib, 2016), which showed that there was a significant increase in VLDL-C cholesterol for male rabbits when treated with hydrogen peroxide. The reason for the increase is due to the increase in the level of maloneDaldehyde as well as the contribution of (TC) to the synthesis of protein substances in the liver, which in turn increases the level of LDL-C and VLDL-C. The reason for their high concentrations may be attributed to an increase in the concentration of free radicals in the body as a result of treatment with (H2O2), as these radicals destroy fat tissue cells, which increases the liberation of free fatty acids FFA, which the liver uses in large quantities to produce VLDL-C (Sithisarn&Jarikasem, 2010; Zhang, 2010).

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